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2018

IN BRIEF

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

BUILDING CLIMATE RESILIENCE FOR FOOD SECURITY AND NUTRITION

CONTENTS

This booklet contains the key messages and content from the publication ***The State of Food Security and Nutrition in the World 2018***. The numbering of the tables and figures corresponds to that publication.

KEY MESSAGES

➔ New evidence continues to signal a rise in world hunger and a reversal of trends after a prolonged decline. In 2017 the number of undernourished people is estimated to have increased to 821 million – around one out of every nine people in the world.

➔ While some progress continues to be made in reducing child stunting, levels still remain unacceptably high. Nearly 151 million children under five – or over 22 percent – are affected by stunting in 2017.

➔ Wasting continues to affect over 50 million children under five in the world and these children are at increased risk of morbidity and mortality. Furthermore, over 38 million children under five are overweight.

➔ Adult obesity is worsening and more than one in eight adults in the world is obese, or more than 672 million. Undernutrition and overweight and obesity coexist in many countries.

➔ Food insecurity contributes to undernutrition, as well as overweight and obesity, and high rates of these forms of malnutrition coexist in many countries. The higher cost of nutritious foods, the stress of living with food insecurity and physiological adaptations to food restriction help explain why food insecure families may have a higher risk of overweight and obesity.

➔ Poor access to food increases the risk of low birthweight and stunting in children, which are associated with higher risk of overweight and obesity later in life.

➔ Exposure to more complex, frequent and intense climate extremes is threatening to erode and reverse gains made in ending hunger and malnutrition.

➔ In addition to conflict, climate variability and extremes are among the key drivers behind the recent uptick in global hunger and one of the leading causes of severe food crises. The cumulative effect of changes in climate is undermining all dimensions of food security – food availability, access, utilization and stability.

➔ 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.

➔ Actions need to be accelerated and scaled up to strengthen resilience and adaptive capacity of food systems, people's livelihoods, and nutrition in response to climate variability and extremes.

➔ Solutions require increased partnerships and multi-year, large-scale funding of integrated disaster risk reduction and management and climate change adaptation programmes that are short-, medium- and long-term in scope.

➔ The signs of increasing food insecurity and high levels of different forms of malnutrition are a clear warning that there is an urgent need for considerable additional work to ensure we "leave no one behind" on the road towards achieving the SDG goals on food security and nutrition.

FOREWORD

In September 2017, we jointly launched *The State of Food Security and Nutrition in the World*, marking the beginning of a new era in monitoring progress towards achieving a world without hunger and malnutrition, within the framework of the Sustainable Development Goals (SDGs).

This report monitors progress towards the targets of ending both hunger (SDG Target 2.1) and all forms of malnutrition (SDG Target 2.2), and provides an analysis of the underlying causes and drivers of observed trends. While the prevalence of undernourishment is at the forefront of monitoring hunger, the prevalence of severe food insecurity – based on the Food Insecurity Experience Scale (FIES) – was introduced last year to provide an estimate of the proportion of the population facing serious constraints on their ability to obtain safe, nutritious and sufficient food.

The report also tracks progress on a set of indicators used to monitor World Health Assembly global targets for nutrition and diet-related non-communicable diseases, three of which are also indicators of SDG2 targets.

The challenges we face are indeed significant. Of great concern is the finding last year that, after a prolonged decline, the most recent estimates showed global hunger had increased in 2016. Last year we observed that the failure to reduce world hunger is closely associated with the increase in conflict and violence in several parts of the world, and that efforts to fight hunger must go hand in hand with those to sustain peace. New evidence in this year's report corroborates the rise in world hunger, thus demanding an even greater call to action. Furthermore, while we must sow the seeds of peace in order to achieve food security, improve nutrition and "leave no one behind", we also need to redouble efforts to build climate resilience for food security and nutrition.

In 2017, the number of undernourished people is estimated to have reached 821 million – around one person out of every nine in the world. Undernourishment and severe food insecurity appear to be increasing in almost all subregions of Africa, as well as in South America, whereas the undernourishment situation is stable in most regions of Asia.

A more encouraging finding last year was that the rising trend in undernourishment had not yet been reflected in rates of child stunting; this continues to be the case this year as well. Nonetheless, we are concerned that in 2017, nearly 151 million children under five have stunted growth, while the lives of over 50 million children in the world continue to be threatened by wasting. Such children are at a higher risk of mortality and poor health, growth and development. A multisectoral approach is needed to reduce the burden of stunting and wasting, and to appropriately treat wasting to reduce childhood morbidity and mortality.

In addition to contributing to undernutrition, the food insecurity we are witnessing today also contributes to overweight and obesity, which partly explains the coexistence of these forms of malnutrition in many countries. In 2017, childhood overweight affected over 38 million children under five years of age, with Africa and Asia representing 25 percent and 46 percent of the global total, respectively. Anaemia in women and obesity in adults are also on the increase at the global level – one in three women of reproductive age is anaemic and more than one in eight adults is obese, or more than 672 million. The problem of obesity is most significant in North America, but it is worrying that even Africa and Asia, which still show the lowest rates of obesity, are also experiencing an upward trend. Furthermore, overweight and obesity are increasing the risk of non-communicable diseases such as type 2 diabetes, high blood pressure, heart attacks and some forms of cancer.

In addition to conflict and violence in many parts of the world, the gains made in ending hunger and malnutrition are being eroded by climate variability and exposure to more complex, frequent and intense climate extremes, as shown in Part 2 of this report. Hunger is significantly worse in countries with agricultural systems that are highly sensitive to rainfall and temperature variability and severe drought, and where the livelihood of a high proportion of the population depends on agriculture. If we are to achieve a world without hunger and malnutrition in all its forms by 2030, it is imperative that we accelerate and scale up actions to strengthen the resilience and adaptive capacity of food systems and people's livelihoods in response to climate variability and extremes.

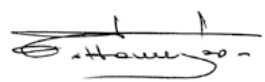
Building climate resilience will require climate change adaptation and disaster risk reduction and management to be integrated into short-, medium- and long-term policies, programmes and practices. National and local governments can find guidance in the outcomes and recommendations of existing global policy platforms: climate change (governed by the UNFCCC and the 2015 Paris Agreement); disaster risk reduction (the Sendai Framework on Disaster Risk Reduction); humanitarian emergency response (the 2016 World Humanitarian Summit and the Grand Bargain); improved nutrition and healthy diets (the Second International Conference on Nutrition [ICN2] and the UN Decade of Action on Nutrition 2016–2025); and development as part of the overarching 2030 Agenda for Sustainable Development. Currently many of these global policy platforms are still too compartmentalized and not well aligned. Therefore, we must do more to work towards a better integration of these platforms to ensure that actions across and within sectors such as environment, food, agriculture and health, pursue coherent objectives to address the negative impacts and threats that changing climate variability and increased climate extremes pose to people's food security, access to healthy diets, safe nutrition and health.

The transformative vision of the 2030 Agenda for Sustainable Development and the new challenges we face in ending hunger and malnutrition call on us to renew and strengthen our five organizations' strategic partnerships.

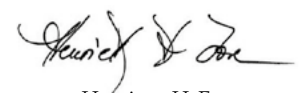
We reiterate our determination and commitment to step up concerted action to fulfil the ambitions of the 2030 Agenda and achieve a world free from hunger and all forms of malnutrition.

The alarming signs of increasing food insecurity and high levels of different forms of malnutrition are a clear warning that there is considerable work to be done to make sure we "leave no one behind" on the road towards achieving the SDG goals on food security and improved nutrition.

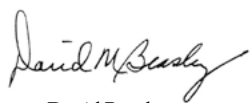
José Graziano da Silva
FAO Director-General



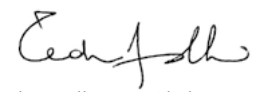
Gilbert F. Houngbo
IFAD President



Henrietta H. Fore
UNICEF Executive Director



David Beasley
WFP Executive Director



Tedros Adhanom Ghebreyesus
WHO Director-General

PART 1
FOOD SECURITY AND NUTRITION AROUND THE WORLD IN 2018

Last year, *The State of Food Security and Nutrition in the World* marked the start of a new era in monitoring progress towards achieving a world without hunger and malnutrition in all its forms – an aim set out in the 2030 Agenda for Sustainable Development (2030 Agenda).

Part 1 of this year's report presents the most recent trends in hunger, food insecurity and malnutrition in all its forms with a focus on monitoring progress on SDG Targets 2.1 and 2.2.

1.1 RECENT TRENDS IN HUNGER AND FOOD INSECURITY

KEY MESSAGES

➔ New evidence continues to point to a rise in world hunger in recent years after a prolonged decline. An estimated 821 million people – approximately one out of every nine people in the world – are undernourished.

➔ Undernourishment and severe food insecurity appear to be increasing in almost all regions of Africa, as well as in South America, whereas the undernourishment situation is stable in most regions of Asia.

➔ The signs of increasing hunger and food insecurity are a warning that there is considerable work to be done to make sure we "leave no one behind" on the road towards a world with zero hunger.

Evidence continues to point to a rise in world hunger in recent years, an important warning that we are not on track to eradicate hunger by 2030

New data suggest the number of people who suffer from hunger has been growing over the past three years, returning to levels from almost a decade ago. The absolute number of people in the world

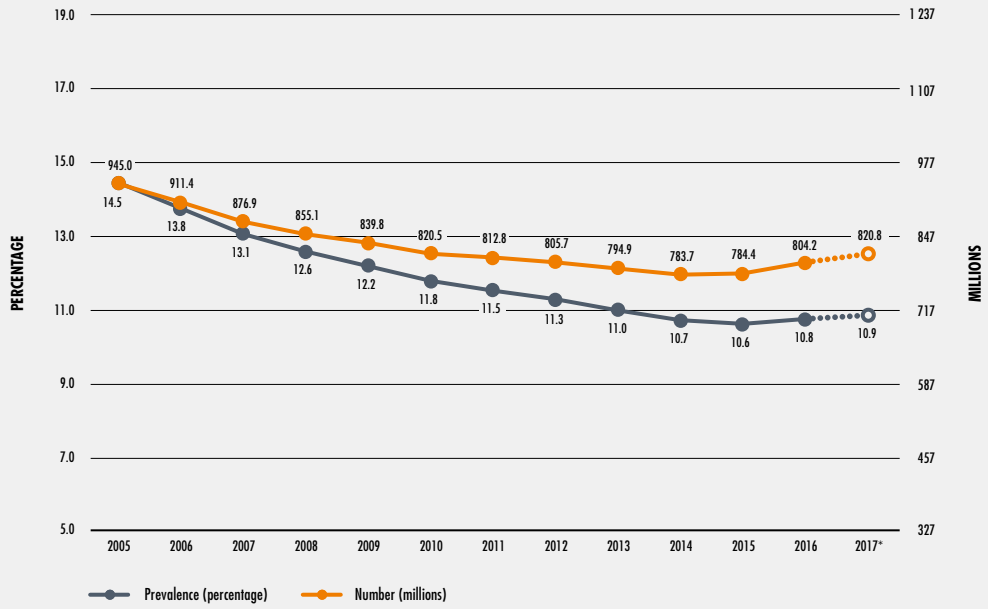
affected by undernourishment, or chronic food deprivation, is now estimated to have increased from around 804 million in 2016 to nearly 821 million in 2017. The situation is worsening in South America and most regions of Africa; likewise, the decreasing trend in undernourishment that characterized Asia until recently seems to be slowing down significantly.

Without increased efforts, there is a risk of falling far short of achieving the SDG target of hunger eradication by 2030.

Prevalence of undernourishment (PoU)

New evidence confirms that lower levels of per capita food consumption in some countries, and increased inequality in the ability to access food in the populations of other countries, have contributed to what is projected to be **a further increase in the percentage of people in the world having insufficient dietary energy consumption in 2017**. The latest FAO estimates show that the share of undernourished people in the world

FIGURE 1
THE NUMBER OF UNDERNOURISHED PEOPLE IN THE WORLD HAS BEEN ON THE RISE SINCE 2014, REACHING AN ESTIMATED 821 MILLION IN 2017



NOTE: *Projected values, illustrated by dotted lines and empty circles.
SOURCE: FAO.

population – the prevalence of undernourishment, or PoU – may have reached 10.9 percent in 2017 (Figure 1 and Table 1).

These new estimates (Box 1) confirm that the prevalence of undernourishment in Africa and Oceania has been increasing for a number of years. Africa remains the continent with the highest PoU,

TABLE 1
PREVALENCE OF UNDERNOURISHMENT IN THE WORLD, 2005–2017

	Prevalence of undernourishment (%)					
	2005	2010	2012	2014	2016	2017[1]
WORLD	**14.5**	**11.8**	**11.3**	**10.7**	**10.8**	**10.9**
AFRICA	**21.2**	**19.1**	**18.6**	**18.3**	**19.7**	**20.4**
Northern Africa	6.2	5.0	8.3	8.1	8.5	8.5
Northern Africa (excluding Sudan)	*6.2*	*5.0*	*4.8*	*4.6*	*5.0*	*5.0*
Sub-Saharan Africa	24.3	21.7	21.0	20.7	22.3	23.2
Eastern Africa	34.3	31.3	30.9	30.2	31.6	31.4
Middle Africa	32.4	27.8	26.0	24.2	25.7	26.1
Southern Africa	6.5	7.1	6.9	7.4	8.2	8.4
Western Africa	12.3	10.4	10.4	10.7	12.8	15.1
ASIA	**17.3**	**13.6**	**12.9**	**12.0**	**11.5**	**11.4**
Central Asia	11.1	7.3	6.2	5.9	6.0	6.2
South-eastern Asia	18.1	12.3	10.6	9.7	9.9	9.8
Southern Asia	21.5	17.2	17.1	16.1	15.1	14.8
Western Asia	9.4	8.6	9.5	10.4	11.1	11.3
Central Asia and Southern Asia	*21.1*	*16.8*	*16.7*	*15.7*	*14.7*	*14.5*
Eastern Asia and South-eastern Asia	*15.2*	*11.5*	*10.1*	*9.0*	*8.9*	*8.9*
Western Asia and Northern Africa	*8.0*	*7.1*	*8.9*	*9.3*	*9.9*	*10.0*
LATIN AMERICA AND THE CARIBBEAN	**9.1**	**6.8**	**6.4**	**6.2**	**6.1**	**6.1**
Caribbean	23.3	19.8	19.3	18.5	17.1	16.5
Latin America	8.1	5.9	5.4	5.3	5.3	5.4
Central America	8.4	7.2	7.2	6.8	6.3	6.2
South America	7.9	5.3	4.7	4.7	4.9	5.0
OCEANIA	**5.5**	**5.2**	**5.4**	**5.9**	**6.6**	**7.0**
NORTHERN AMERICA AND EUROPE	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**	**< 2.5**

[1] Projected values.

SOURCE: FAO.

affecting almost 21 percent of the population (more than 256 million people). The projected PoU for Asia in 2017 points to a situation in which 11.4 percent of the population is estimated to be undernourished, which represents more than 515 million people. The situation is also deteriorating in South America, where the PoU has increased from 4.7 percent in 2014 to a projected 5.0 percent in 2017.

Prevalence of severe food insecurity in the population, based on the FIES

Last year, *The State of Food Security and Nutrition in the World* presented, for the first time, estimates of the prevalence of severe food insecurity based on the **Food Insecurity Experience Scale (FIES)** (Box 3).

The estimates are based on data collected by FAO using the FIES in more than 140 countries worldwide and on data collected by national institutions using the FIES or other similar experience-based food security scales in a number of countries in the Americas, Africa and Asia.

According to latest FAO estimates, in 2017, **around 10 percent of the world population was exposed to severe food insecurity, corresponding to about 770 million people**. At the regional level, values range from 1.4 percent in Northern America and Europe to almost 30 percent in Africa. As in the case of the PoU, severe food insecurity has been on the rise at the global level, driven by trends observed in Africa and Latin America. Analysis of

BOX 1

REVISED SERIES OF ESTIMATES OF THE PREVALENCE OF UNDERNOURISHMENT AND PROJECTIONS FOR 2017

In preparation for each edition of *The State of Food Security and Nutrition in the World*, the Statistics Division of FAO conducts a thorough revision of the entire series of PoU estimates, to reflect all updated or additional evidence gathered since the publication of the previous edition. As a result, the PoU series from different issues of the report cannot be directly compared; the reader is advised to refer to figures presented in the same issue to evaluate the evolution of undernourishment over time.

- In this edition, one major revision involves the series of population data used for all countries. National population figures are now obtained from the 2017 revision of the *World Population Prospects* released by the United Nations Department of Economic and Social Affairs (DESA) Population Division in May 2017.
- This edition also includes updated dietary energy supply (DES) estimates for a number of the countries with the largest undernourished populations in the world, resulting from a revision of the methodology used to compile the Food Balance Sheets.

PoU estimates are presented as three-year averages at the country level and as annual values at the regional and global level. Projections are needed in order to generate figures for the most recent time period (see the methodological note in Annex 1 of the full report).

FIES data reveals that, in Africa, Asia and Latin America, the prevalence of severe food insecurity is slightly higher among women, with the largest differences found in Latin America.

1.2 PROGRESS TOWARDS IMPROVING NUTRITION

KEY MESSAGES

➔ **Over 50 million children under five in the world are affected by wasting. Roughly half live in Southern Asia and one-quarter in sub-Saharan Africa. Addressing the burden of wasting will require a multipronged approach, including prevention, early identification, and treatment.**

➔ **Progress has been made on reducing child stunting. However, nearly 151 million children under five in the world – or 22 percent – were still stunted in 2017, down from 25 percent in 2012, due mainly to progress in Asia. Over 38 million children under five are overweight.**

➔ **Prevalences of anaemia in women and obesity in adults are increasing. More than one in eight adults in the world is obese and one in three women of reproductive age is anaemic.**

In the 2012 World Health Assembly (WHA), Member States approved six global targets for improving maternal, infant and young child nutrition to be met by 2025. These WHA targets call for measures to: i) reduce anaemia in women of reproductive age; ii) reduce low birthweight in newborns; iii) increase rates of exclusive breastfeeding in infants; iv) reduce stunting; v) reduce wasting; and vi) halt the rise of overweight among children under five years of age. To align with the 2030 deadline of the SDGs, this set of 2025 targets has been extended to 2030 to establish global targets for nutrition. In addition, the WHA plan of action for the prevention and control of non-communicable diseases also called for a reduction in adult obesity by 2025.

BOX 3

A COMBINED LOOK AT THE PREVALENCE OF UNDERNOURISHMENT AND OF SEVERE FOOD INSECURITY

Even though these two measures are based on different data and a different approach, the evidence provided by figures and trends in severe food insecurity, based on the FIES, is consistent with that provided by the series of figures on the PoU.

Having two alternative views of the hunger problem provides an important opportunity to cross-check the values of the two indicators for given countries. The two indicators provide a consistent picture for most countries, but still with some differences. Where the difference between the two indicators is very large there is a need for further investigation in order to detect potential data issues.

The State of Food Security and Nutrition in the World 2018 tracks progress on six of the seven aforementioned indicators (Figure 6). Low birthweight estimates will be released after the publication of this report.

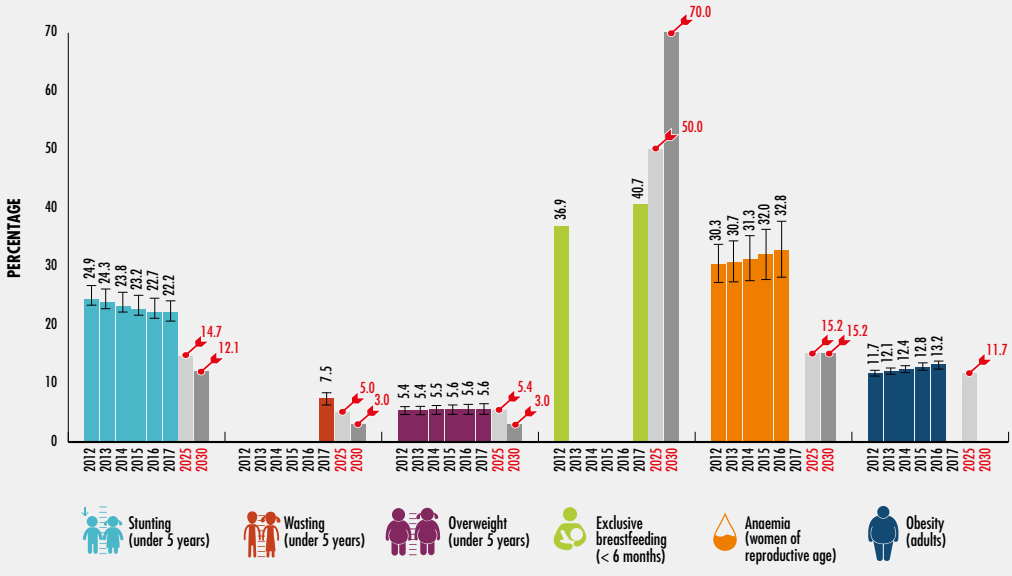
Child undernutrition continues to decline, but levels of adult obesity and anaemia in women of reproductive age are increasing

Global trends

Globally, the proportion of children below the age of five who are stunted continues to decline, with 22.2 percent affected in

FIGURE 6

THERE IS STILL A LONG ROAD AHEAD TO ACHIEVE THE 2025 AND 2030 TARGETS FOR STUNTING, WASTING, OVERWEIGHT, EXCLUSIVE BREASTFEEDING, ANAEMIA IN WOMEN OF REPRODUCTIVE AGE AND ADULT OBESITY



SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO and International Bank for Reconstruction and Development/World Bank. 2018. *UNICEF, WHO, World Bank Group Regional and Global Joint Malnutrition Estimates, May 2018 Edition* [online]. https://data.unicef.org/topic/nutrition, www.who.int/nutgrowthdb/estimates, https://data.worldbank.org; data for exclusive breastfeeding are based on UNICEF. 2018. Infant and Young Child Feeding: Exclusive breastfeeding, Predominant breastfeeding. In: *UNICEF Data: Monitoring the Situation of Children and Women* [online]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for anaemia are based on WHO. 2017. *Global Health Observatory (GHO)* [online]. http://apps.who.int/gho/data/node.imr.PREVANEMIA?lang=en; data for adult obesity are based on WHO. 2017. Global Health Observatory (GHO) [online]. http://apps.who.int/gho/data/node.main.A900A?lang=en

2017. The number of stunted children has also decreased from 165.2 million in 2012 to 150.8 million in 2017, representing a 9 percent decline. In 2017, Africa and Asia accounted for more than nine out of ten of all stunted children globally.

In 2017, 7.5 percent of children under five years of age – 50.5 million – suffered from wasting. Two regions – Asia and Oceania – saw almost one in ten affected, compared to just one in one hundred in Latin America and the Caribbean.

Since 2012, the global proportion of overweight children seems stagnant, with 5.4 percent in 2012 (baseline year of WHA targets) and 5.6 percent in 2017. In 2017, childhood overweight affected 38.3 million children, with Africa and Asia representing 25 percent and 46 percent of the global total respectively, despite being the regions with the lowest percentage of children who are overweight.

Globally, 36.9 percent of infants below six months of age were exclusively breastfed in 2012, while 40.7 percent were exclusively breastfed in 2017.

The prevalence of anaemia among women of reproductive age has risen incrementally from 30.3 percent in 2012 to 32.8 percent in 2016. At the same time, adult obesity continues to rise each year, from 11.7 percent in 2012 to 13.2 percent in 2016, or 672.3 million people.

1.3 LINKS BETWEEN FOOD INSECURITY AND MALNUTRITION

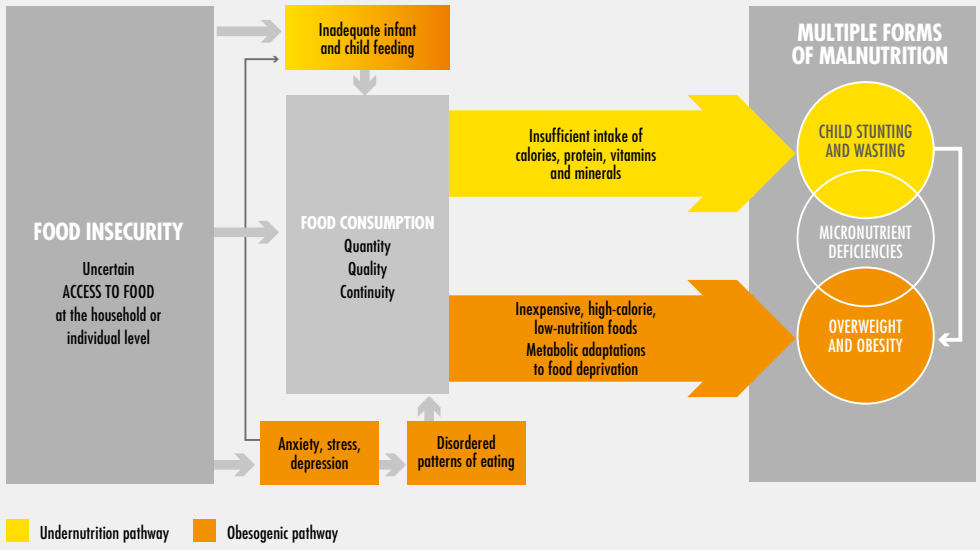
Multiple forms of malnutrition are evident in many countries. Poor access to food and particularly healthy food contributes to undernutrition as well as overweight and obesity. It increases the risk of low birthweight, childhood stunting and anaemia in women of reproductive age, and it is linked to overweight in school-age girls and obesity among women, particularly in upper-middle- and high-income countries. There are several pathways from inadequate food access to multiple forms of malnutrition (Figure 14).

Food insecurity can both directly (through compromised diets) and indirectly (through the impact of stress on infant feeding) cause child wasting, stunting and micronutrient deficiencies.

Although it may appear to be a paradox, food insecurity is often associated with overweight and obesity as well. The higher cost of nutritious foods, the stress of living with food insecurity, and physiological adaptations to food restriction help explain why food insecure families may have a higher risk of overweight and obesity.

Poor food access increases the risk of low birthweight and stunting in children, which are associated with higher risk of overweight and obesity later in life.

FIGURE 14
PATHWAYS FROM INADEQUATE FOOD ACCESS TO MULTIPLE FORMS OF MALNUTRITION



SOURCE: Created by FAO Statistics Division for this report.

Many countries have a high prevalence of more than one form of malnutrition. The multiple burden of malnutrition is more prevalent in low-, lower-middle- and middle-income countries and concentrated among the poor. Obesity in high-income countries is similarly concentrated among the poor. Access to safe, nutritious and sufficient food must be framed as a human right, with priority given to the most vulnerable. Policies must pay special attention to the food security and nutrition of children under five, school-age children, adolescent girls and women to halt the intergenerational cycle of malnutrition.

The 1 000 days between conception and a child's second birthday is a window of unsurpassed opportunity to both prevent child stunting and overweight and promote child nutrition, growth and development with lasting effects over the child's life.

PART 2
THE IMPACT OF CLIMATE ON FOOD SECURITY AND NUTRITION

Part 2 of this year's *The State of Food Security and Nutrition in the World* report closely scrutinizes the extent to which climate variability and extremes are undermining progress in the areas of food security and nutrition through different channels. The analysis ultimately points to guidance on how the key challenges brought about by climate variability and extremes can be overcome, if we are to achieve the goals of ending hunger and malnutrition in all forms by 2030 (SDG Targets 2.1 and 2.2) as well as other related SDGs, including taking action to combat climate change and its impacts (SDG13).

2.1 WHY FOCUS ON THE IMPACT OF CLIMATE VARIABILITY AND EXTREMES ON FOOD SECURITY AND NUTRITION?

KEY MESSAGES

➔ Climate variability and exposure to more complex, frequent and intense climate extremes are threatening to erode and even reverse the gains made in ending hunger and malnutrition.

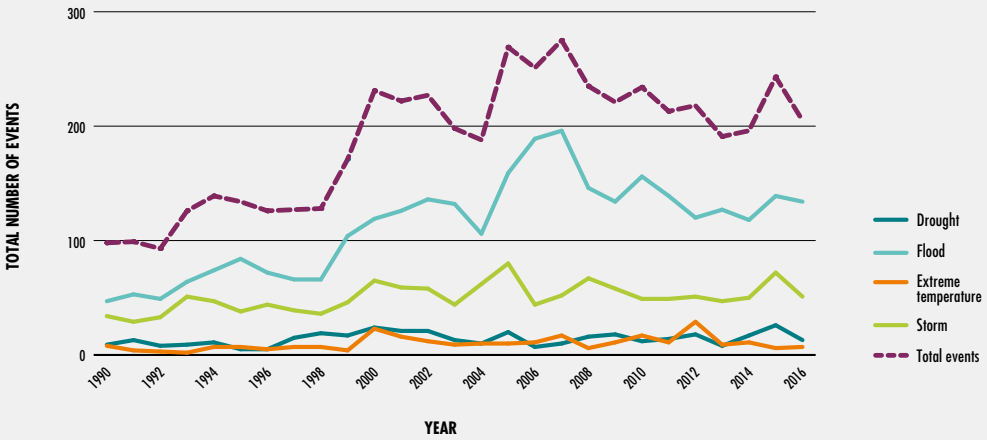
➔ Climate variability and extremes are a key driver behind the recent rise in global hunger and one of the leading causes of severe food crises.

➔ Severe droughts linked to the strong El Niño of 2015–2016 affected many countries, contributing to the recent uptick in undernourishment at the global level.

➔ Hunger is significantly worse in countries with agricultural systems that are highly sensitive to rainfall and temperature variability and severe drought, and where the livelihood of a high proportion of the population depends on agriculture.

Mounting evidence points to the fact that climate change is already affecting agriculture and food security, which will

FIGURE 15
INCREASING NUMBER OF EXTREME CLIMATE-RELATED DISASTERS, 1990–2016



NOTE: Total number of natural disasters that occurred in low- and middle-income countries by region and during the period 1990–2016. Disasters are defined as medium- and large-scale disasters that exceed the thresholds set for registration on the EM-DAT international disaster database. See Annex 2 for the full definition of EM-DAT disasters.
SOURCE: FAO elaboration based on data from Emergency Events Database (*EM-DAT*). 2009. *EM-DAT* [online] Brussels. www.emdat.be

make the challenge of ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture more difficult.

Changes in climate are already undermining production of major crops (wheat, rice and maize) in tropical and temperate regions and, without adaptation, this is expected to worsen as temperatures increase and become more extreme. The number of extreme climate-related disasters, including extreme heat, droughts, floods and storms, has doubled since the early 1990s, with an average of 213 of these events occurring every year during the period of 1990–2016 (Figure 15).

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. Of all natural hazards, floods, droughts and tropical storms affect food production the most. Drought in particular causes more than 80 percent of the total damage and losses in agriculture, especially for the livestock and crop production subsectors.

The importance of changing climate variability and extremes to agriculture, food security and nutrition

Increasing and more variable temperatures

In many areas, temperature extremes have increased in number and intensity, particularly where average temperatures are shifting upwards: very hot days are becoming more frequent and the hottest days are becoming hotter. Temperature anomalies over agriculture cropping areas continued to be higher than the long-term mean throughout 2011–2016, leading to more frequent extremely hot conditions in the last five years.

Large spatial variability in rainfall

Recent years show large spatial variability in rainfall, both strong positive and negative anomalies when compared with the historic average. Most notable are the below-normal rainfall levels over a large area of the globe in 2015–2016, some of which are also evident during the 2011–2016 period. This is particularly the case in Africa, Central and South America and South-eastern Asia. The livelihoods of millions of small-scale family farmers, pastoralists and agropastoralists depend on rainfall – but above-normal rainfall is often hazardous and leads to crop damage, soil erosion and flooding. During the 2015–2016 El-Niño, large parts of Asia experienced higher than normal rainfall.

Severe droughts and increasing flood-related disasters

Evidence shows that recent years (2011–2016) have been characterized by a number of severe droughts in many regions, notably in Africa, Central America and South-eastern Asia.

Floods cause more climate-related disasters globally than any other extreme climate event, with flood-related disasters seeing the highest increase – 65 percent – in occurrence over the last 25 years.

Changes in seasonality

The nature of rainfall seasons is also changing, specifically the timing of seasonal climate events and many countries – especially in Africa and Asia – are now more exposed to changes in seasonality. Fifty-one low- and middle-income countries experienced early or delayed onset of seasons, 29 experienced seasons of shorter length, and 28 experienced both.

Climate impacts on food security and nutrition

Increases in undernourishment associated with severe drought

New information from country food balance sheets points to reductions in food availability and price increases in regions affected by the El Niño phenomenon in 2015–16. This event resulted in large climatic deviations and anomalies compared to historical norms, which were experienced in different ways and to varying degrees of intensity in various parts of the world.

Food security and nutrition indicators can be shown to be associated particularly with an extreme climate event, such as a severe drought, that critically challenges agriculture and food

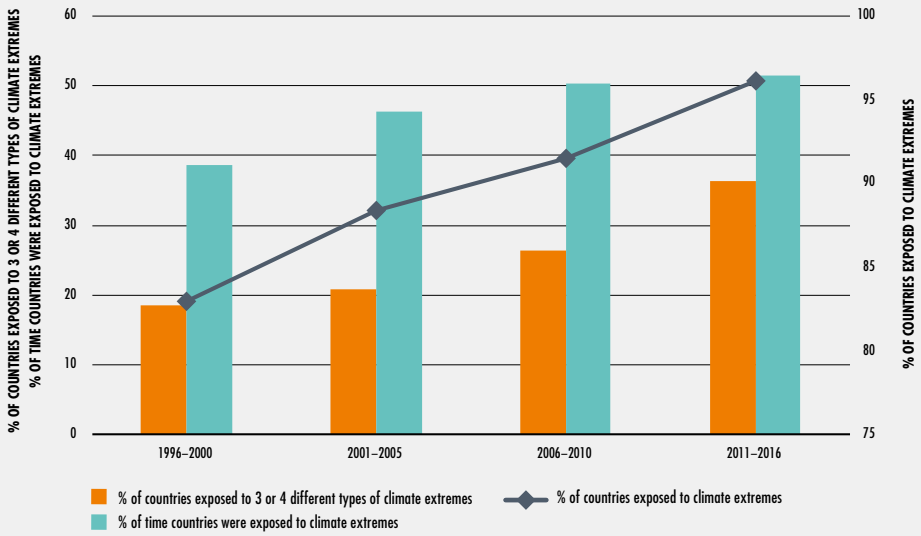
production. Although it is difficult to establish a direct causal relationship considering the way the PoU is computed and smoothed over time, it is possible to examine whether an increase (change point) in the PoU time series corresponds to occurrences of severe drought.

For almost 36 percent of the countries that experienced a rise in undernourishment since 2005, this coincided with the occurrence of severe drought. Out of 27 countries with change points occurring under severe drought stress conditions, most (19 countries) are in Africa, with the remaining 4 in Asia, 3 in Latin America and the Caribbean, and 1 in Eastern Europe.

Increased exposure and vulnerability to climate extremes

The number of low- and middle-income countries exposed to climate extremes has increased, from 83 percent of

FIGURE 24
INCREASED EXPOSURE TO MORE FREQUENT AND MULTIPLE TYPES OF CLIMATE EXTREMES IN LOW- AND MIDDLE-INCOME COUNTRIES

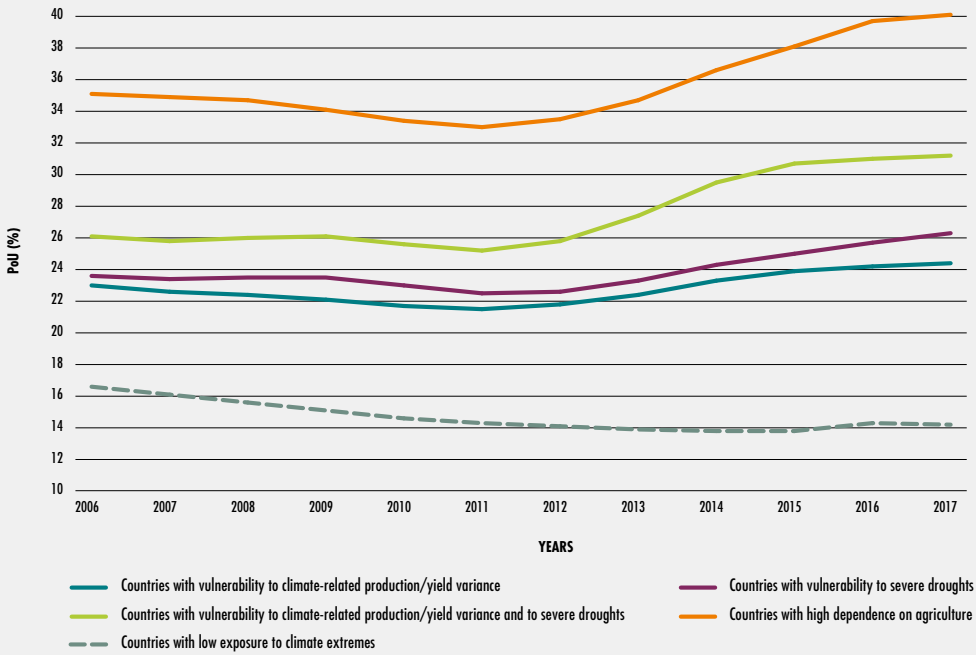


NOTES: Percentage of low- and middle-income countries exposed to three or four types of climate extremes (extreme heat, drought, floods and storms) during any of the periods shown; percentage of time (based on the average number of years within a period) that a country was exposed to climate extremes; and percentage of countries exposed to at least one climate extreme in each period. Results are presented using five-year periods, except for 2011–2016 which is a six-year period. See Annex 2 for definition and methodology. Analysis is only for low- and middle-income countries.
SOURCE: C. Holleman, F. Rembold and O. Crespo (forthcoming). *The impact of climate variability and extremes on agriculture and food security: an analysis of the evidence and case studies.* FAO Agricultural Development Economics Technical Study 4. Rome, FAO.

countries in 1996–2000 to 96 percent in 2011–2016. Most striking is that the frequency (number of years exposed in a five year period) and intensity (multiple types of climate extremes in a five-year period) of exposure to climate extremes have both increased too (Figure 24).

Simple correlations show higher levels of food insecurity in countries with high levels of exposure to climate shocks. In 2017, the average of the PoU in countries with high exposure to climate shocks was 3.2 percentage points above that of countries with low or no exposure. Even more striking is that countries with high

FIGURE 27
UNDERNOURISHMENT IS HIGHER FOR COUNTRIES WITH BOTH HIGH EXPOSURE TO CLIMATE EXTREMES AND HIGH VULNERABILITY



NOTES: Low- and middle-income countries with high exposure are defined as exposed to climate extremes (heat, drought, floods and storms) for more than 66 percent of the time, i.e. more than three years in the period 2011–2016. The estimates in the figure refer to unweighted population average of the prevalence of undernourishment in a sample of 51 low- and middle-income countries with high exposure to climate extremes in 2011–2016, for countries showing different combinations of vulnerabilities identified in Box 9 and for 77 low- and middle-income countries with low exposure to climate extremes. See Annex 2 for more detailed definitions and methodology of the different types of vulnerability to climate variability and extremes.
SOURCE: C. Holleman, F. Rembold and O. Crespo (forthcoming). *The impact of climate variability and extremes on agriculture and food security: an analysis of the evidence and case studies.* FAO Agricultural Development Economics Technical Study 4. Rome, FAO, for exposure (both low and high) to climate extremes; FAO for data on prevalence of undernourishment.

TABLE 7

CLIMATE SHOCKS WERE ONE OF THE LEADING CAUSES OF FOOD CRISIS SITUATIONS IN 2017

Regions	Climate shocks	Countries affected by climate shocks (also affected by conflict)	Number of people (millions)	
			IPC/CH Phase 3 (Crisis)	IPC/CH Phase 4 (Emergency)
Africa	Droughts	Burundi, Djibouti, Eswatini, Kenya, Lesotho, Namibia, Somalia	8.4	2.3
	Dry spells/low rainfall	Angola, Chad, South Sudan, Uganda	6.9	1.7
	Seasonal variability (late onset of the rainy season)	Sudan, Zambia	3.7	0.1
	Late onset and dry spells/erratic rainfalls	Cameroon, Gambia, Mauritania (early cessation rainy season), Niger, United Republic of Tanzania	5.7	0.1
	Late onset and floods	Guinea-Bissau	0.3	0
	Droughts and other climate shocks	Malawi	5.1	N/A
		Ethiopia	8.5	N/A
		Zimbabwe	3.5	0.6
		Democratic Republic of the Congo	6.2	1.5
		Madagascar, Mozambique	3.4	1.3
Asia	Floods and other climate shocks	Afghanistan, Nepal, Pakistan	7.8	3.3
		Bangladesh	2.9	0.5
		Sri Lanka, Yemen	11.1	6.8
Latin America and the Caribbean	Drought and other climate shocks	Guatemala, Haiti	2.1	0.7
		Honduras	0.4	0
			76.0	**18.9**
				94.9

Countries affected by conflicts · Countries affected by dry spells · Countries affected by seasonal variability · Countries affected by floods
Countries affected by droughts · Countries affected by flash flood · Countries affected by storms

NOTES: This table is elaborated on the basis of the Global Food Crisis Report (GFCR 2018). The table reports the number of people who are food insecure classified according to the Integrated Food Security Phase Classification (IPC) or the *Cadre Harmonisé* (CH) and reports on the occurrence of specific climate shocks (droughts, floods and cyclones) which are drivers contributing to food insecurity. This information is complemented with information on other types of climate shocks linked with food insecurity (dry spells, flash floods and seasonal variability). Information for these were identified from the GFCR 2018 and the FAO Global Information and Early Warning System for Food Security and Agriculture (GIEWS) Country briefs. Population in IPC Phase 4 for South Sudan also includes population in IPC Phase 5. Some countries are not included in the report due to lack of recently validated data or because variations in the geographical coverage of IPC or CH analysis represent a technical limitation in showing trends for certain countries.
SOURCE: FAO elaboration based on FSIN. 2018. *Global Report on Food Crisis 2017.*

exposure have more than double the number of undernourished people (351 million more) as those without high exposure.

The increase in PoU begins in 2011 for those countries with both high exposure to climate extremes (more than 66 percent of the time) and high levels of vulnerability (Figure 27).

Where agriculture production, food systems and livelihoods are vulnerable to climate variability and extremes, countries face the greatest risk of food insecurity and malnutrition.

Climate extremes as a major driver of global food crises

In 2017, almost 124 million people across 51 countries and territories faced "crisis" levels of acute food insecurity or worse, requiring immediate emergency action to safeguard their lives and preserve their livelihoods, an increase compared to 2015 and 2016 (80 and 108 million people, respectively).

Climate variability and extremes are one of the leading causes of food crisis situations. In 2017, for example, climate shocks were a key driver of the food crises in 34 out of the 51 countries facing such crises (Table 7).

Where conflict and climate shocks occur together, the impact on acute food insecurity is more severe. In 2017, 14 out of the 34 food-crisis countries experienced the double impact of both conflict and climate shocks, which led to significant increases in the severity of acute food insecurity.

2.2 HOW DO CHANGING CLIMATE VARIABILITY AND EXTREMES AFFECT THE IMMEDIATE AND UNDERLYING CAUSES OF FOOD INSECURITY AND MALNUTRITION?

KEY MESSAGES

➔ Climate variability and extremes are undermining in multiple ways food availability, access, utilization and stability, as well as feeding, caregiving and health practices.

➔ Direct and indirect climate-driven impacts have a cumulative effect, leading to a downward spiral of increased food insecurity and malnutrition.

➔ Climate variability and extremes are harming agricultural productivity, food production and cropping patterns, thus contributing to food availability shortfalls.

➔ Food price spikes and volatility, often combined with losses in agricultural income, follow climate extremes, reducing food access and negatively affecting the quantity, quality and dietary diversity of food consumed.

➔ Changes in climate impact heavily on nutrition through: impaired nutrient quality and dietary diversity of foods produced and consumed; effects on water and sanitation, with their implications for patterns of health risks and disease; and changes in maternal and child care and breastfeeding.

The changing nature of climate variability and extremes is negatively affecting all dimensions of food security (food availability, access, utilization and stability), as well as reinforcing other underlying causes of malnutrition related to child care and feeding, health services and environmental health.

Climate variability and extremes have the strongest direct impact on food availability, given the sensitivity of agriculture to climate and the primary role of the sector as a source of food and livelihoods for the rural poor. However, food security and nutrition are also dependent on food access, utilization, consumption patterns and the overall stability of the system.

Impacts on food availability

Most regions, particularly those with large numbers of undernourished people, are experiencing reduced yields largely due to increased climate variability and extremes. In sub-Saharan Africa, a region that already has the lowest crop yields globally, increasing temperatures reduced yields for maize, sorghum and groundnuts.

In semi-arid climate regions such as Central Asia, the Near East, and Northern Africa, cereal production is highly dependent on climate variability and it is not unusual to have 80 percent or more of inter-annual production variability explained by climate.

Climate variability and extremes also affect food imports as countries try to compensate for domestic production losses. Agricultural commodity decreases in exports and increases in imports owing to the harmful effects of climate-related shocks on domestic production tend to be, on aggregate, largest for Asia and Latin America and the Caribbean.

Impacts on food access

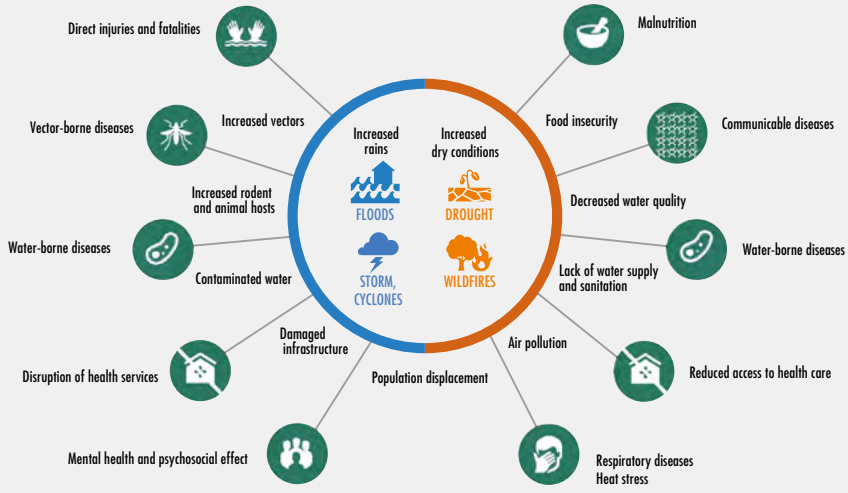
Spikes in food prices and volatility follow climate extremes, which in turn negatively impact food access. There is strong statistical evidence that the price of a food basket in communities affected by floods, droughts or cyclones is higher than in control communities – and, importantly, the effect can last for up to nine months. The impact of price spikes and volatility not only falls heaviest on the urban poor, but can also significantly undermine the livelihoods and income of small-scale food producers, agriculture labourers and the rural poor who are net food buyers.

Climate variability and extremes also lead to income loss for those whose livelihoods depend on agriculture and natural resources, which then constrain food access as households have less resources to purchase food. Food and income of small family agriculture households are negatively impacted by climate variability and extremes – according to different household studies. There is also evidence that climate shocks not only affect the level of income, but affect also the variability of incomes.

Impacts on food utilization and food safety

Climate variability and extremes have repercussions for food utilization as they can jeopardize the nutritional quality of

FIGURE 35
HEALTH CONSEQUENCES OF EXTREME CLIMATE-RELATED EVENTS



SOURCE: WHO. 2016. El Niño threatens at least 60 million people in high-risk developing countries. In: *WHO* [online]. Geneva, Switzerland. www.who.int/hac/crises/el-nino/22january2016/en

food produced and consumed, as well as food safety. The link between climate shocks, the adoption of coping strategies and the resulting negative impacts on dietary diversity and quality of food are well documented. For example, in Bangladesh climate shocks that affect rice production often lead to higher rice prices, which are strongly associated with greater prevalence of child underweight and poorer dietary diversity.

Impacts on health and nutrition

Climate-driven human health impacts are critical to food security and nutrition. Climate variability and extremes can affect human health directly, through changes in temperature and precipitation and natural hazards such as heatwaves, floods, cyclones, droughts; as well as indirectly, through the effect of climate on ecological-mediated risks (e.g. vector-borne and other infectious diseases, crop failures), food safety risks (mycotoxins, heavy metals, harmful algal blooms, etc.) and social responses to climate shocks (e.g. displacement of populations following prolonged drought) (see Figure 35).

2.3 WHAT ARE THE IMPACTS OF CLIMATE ON THE VULNERABILITY, RESOURCE AND CONTROL FACTORS THAT SHAPE FOOD SECURITY AND NUTRITION?

Climate variability and climate extremes can undermine households' ability to maintain their livelihood asset base or to reinvest in agriculture, leading some to chronic food insecurity, malnutrition, poor health, and lack of economic productivity. There is evidence that the livelihoods of the poor are particularly affected.

Climate-related disasters are a significant factor in ecosystem degradation and loss, including increased soil erosion, declining rangeland quality, salinization of soils, deforestation, reduction of quantity and quality of ecosystem services, and biodiversity loss. Consequently, economic opportunities and livelihood options of households who are heavily dependent on natural resources to meet their food security and nutrition needs are also affected.

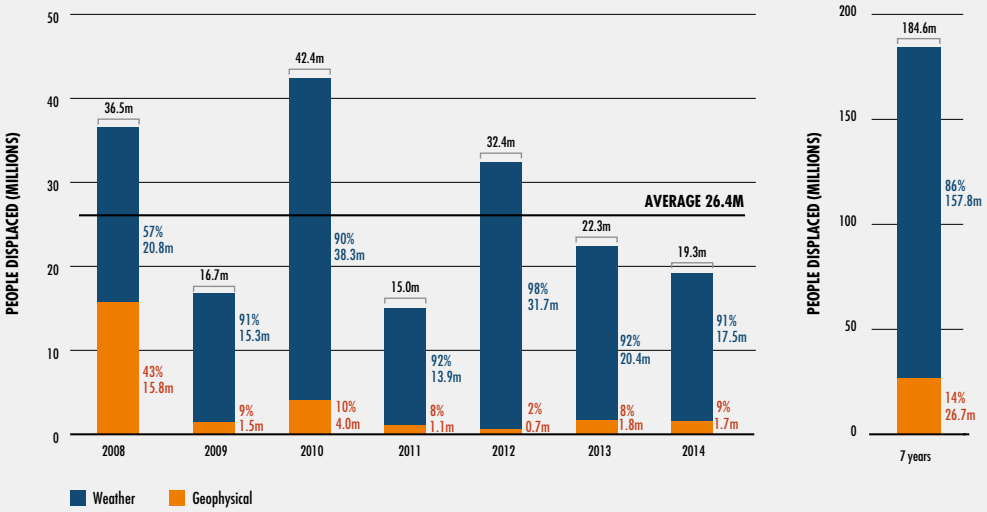
Resilience is an important factor in coping with the impacts of climate variability and extremes and there are three capacity types that determine the ways and extent to which individuals, households and communities are able to cope with and adapt to climate shocks and their impact:

- adaptive capacity (coping strategies, risk management, and savings);
- absorptive capacity (use of assets, attitudes/motivation, livelihood diversification and human capital); and
- transformative capacity (governance mechanisms, policies/regulations, infrastructure, community networks and formal safety nets).

The adoption of *ex post* adjustments following climate extreme episodes depends on the nature of the event and the degree of impact on the household's access to food and income. In the most severe form, extreme climate events or prolonged/recurrent climate variability can lead to the collapse of coping mechanisms and the loss of livelihoods and be a significant driver of migration and forced displacement (Figure 39). Disasters brought on by climate-related hazards forced more than 17.5 million people to leave their homes in 2014.

Moreover, the 2011 East Africa Drought and the Somalia Famine 2011–2012 are examples of extreme climate events that, combined with other vulnerability factors, resulted in a severe food crisis across Djibouti, Ethiopia, Kenya and Somalia, threatening the livelihoods of 9.5 million people.

FIGURE 39
THE GLOBAL SCALE OF DISPLACEMENT CAUSED BY DISASTERS, 2008–2014



NOTES: Total number and percentage of people displaced between 2008 and 2014 by two broad category types of disaster: weather and geophysical. Following the classification system adopted by the international disaster database (EM-DAT), geophysical events include earthquakes, mass movements and volcanic activity; weather includes meteorological (storms, extreme temperatures), hydrological (floods, landslides, wave action) and climatological events (droughts, wildfires). Differences in total are due to rounding of figures to the nearest decimal point.
SOURCE: Global Estimates (2015), data as of June 2015 from Internal Displacement Monitoring Centre (IDMC).

2.4 WORKING TOWARDS COHERENCE OF POLICIES, PROGRAMMES AND PRACTICES TO ADDRESS CLIMATE VARIABILITY AND EXTREMES

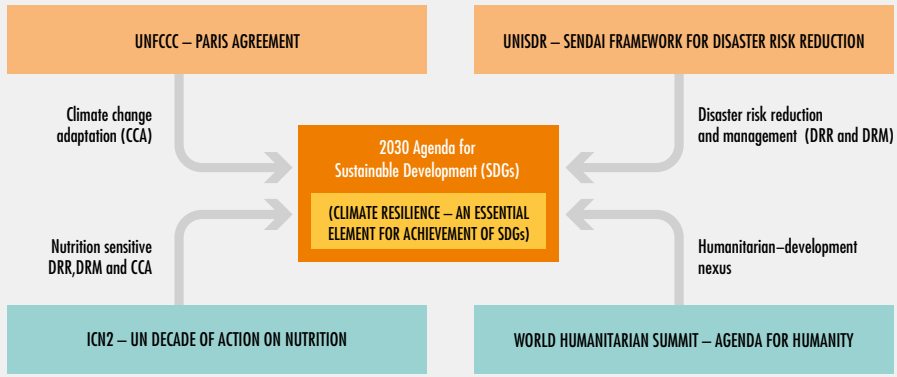
The concept of resilience, and more specifically climate resilience, plays an important role in global policy processes. Four United Nations frameworks and a multi-stakeholder global process are particularly important (Figure 40) when examining the possible solutions for addressing the threats and impact of climate variability and extremes on food security and nutrition:

- **The United Nations Framework Convention on Climate Change (UNFCCC)** – through which **the 2015 Paris Agreement** was negotiated – offers the policy architecture to support climate change adaptation and mitigation goals.

- **The Sendai Framework for Disaster Risk Reduction (SFDRR)** (2015–2030), adopted in 2015, provides a worldwide framing for disaster risk reduction (DRR) and disaster risk management (DRM) work.
- **The 2030 Agenda for Sustainable Development** commits the international community to ending poverty, hunger and malnutrition, tackling climate change and achieving equitable and sustainable development by 2030.
- **The Rome Declaration on Nutrition and the Framework for Action**, adopted at **the Second International Conference on Nutrition (ICN2) in 2014**, recognizes the need to address the impacts of climate change and to enhance the resilience of the food supply in crisis prone areas.
- **The World Humanitarian Summit and the Grand Bargain** is a multi-stakeholder global policy process that seeks to reinspire and reinvigorate humanitarian principles; enable countries and communities to better prepare for and respond to crises, and be resilient to shocks; and share best practices that can help save lives around the world.

These global policy frameworks and processes, however, lack alignment on building resilience against risks, including those associated with changing climate. It is important to integrate better these global policy platforms and

FIGURE 40
GLOBAL POLICY PLATFORMS AND PROCESSES WHERE CLIMATE RESILIENCE IS A KEY ELEMENT FOR THE ACHIEVEMENT OF SUSTAINABLE DEVELOPMENT



SOURCE: FAO.

BOX 15

CLIMATE-SMART AGRICULTURAL PRACTICES AND FOOD SYSTEMS: THE CASE OF SMALL FAMILY FARM CROP DIVERSIFICATION IN MALAWI

In sub-Saharan Africa, many countries' national food security relies on a few staple crops, particularly maize. This crop is produced mostly by small-scale family farmers under rainfed conditions, which makes households and national food security vulnerable to climate variability and extremes.

As seen in this report, climate variability and extremes can negatively impact on small family farm incomes as agricultural production falls. For some Malawian households food consumption declines not only because of decreases in income but also because households have less of their own food production to consume.

Crop diversification is an important adaptation and vulnerability reduction strategy that can, in the context of increased climate variability and extremes, help distribute risk, increase productivity and stabilize incomes of small-scale family farmers, thus improving food access. In Malawi, more diversified cropping systems – particularly those that incorporate legumes – have been shown to significantly reduce crop income variability compared with maize monocropping (see figure below).

Through crop diversification, farming households can spread production and income risk over a wider range of crops. Moreover, diversification can produce agronomic benefits in terms of pest management and soil quality and nutritional benefits by promoting dietary diversity depending on the crop combination.

Though crop diversification can be an important adaptation and risk reduction strategy, to achieve climate resilience it needs to be implemented with a food systems approach that ensures functional and competitive private input and output markets, and addresses other key interlinked factors in the food systems.

SOURCE: FAO, Economic and Policy Analysis of Climate Change (EPIC) Team of the Agriculture Development Economics Division (ESA).

SOURCES: FAO. 2018. *Crop diversification increases productivity and stabilizes income of smallholders.* Rome; FAO. 2016. *Managing climate risk using climate-smart agriculture.* Rome.

processes to ensure actions across and within sectors such as environment, food, agriculture and health, and to pursue coherent objectives and actions for building climate resilience.

To meet the needs of the most vulnerable groups, cross-institutional partnerships, responsibility sharing and information flow need to be at the centre of an inclusive climate resilience strategy within and across sectors. While the 2030 Agenda recognizes this need, more efforts are required at national and local level.

Resilience building must be realized through food security- and nutrition-sensitive measures blending short-, medium- and long-term interventions that link humanitarian disaster response and risk-informed development actions addressing root causes of climate vulnerabilities and climate change adaptation.

Supporting climate resilience-building efforts requires site-specific solutions that take advantage of autonomous (i.e. local) knowledge and practices when addressing climate variability and extremes.

2.5 OVERALL CONCLUSION

This report sends a clear message that climate variability and extremes — in addition to conflict and violence in some parts of the world — are a key driver behind the recent rises in global hunger and one of the leading causes of severe food crises.

Scaled-up actions across sectors are needed to strengthen the resilience of livelihoods and food systems to climate variability and extremes. Such actions should take place through integrated disaster risk reduction and management and climate change adaptation policies, programmes and practices with short-, medium- and long-term vision.

It is imperative to build climate resilience for food security and nutrition. The success of climate resilience policies, programmes and practices requires renewed efforts and new approaches that help people anticipate, absorb and adapt to climate variability and extremes. Otherwise the goals of ending hunger and malnutrition in all forms by 2030 (SDG Targets 2.1 and 2.2) as well as with other goals – such as taking action to combat climate change and its impacts (SDG13) – will remain elusive.

Working for #ZeroHunger

THE STATE OF THE WORLD

2018

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

BUILDING CLIMATE RESILIENCE FOR FOOD SECURITY AND NUTRITION

New evidence this year corroborates the rise in world hunger observed in this report last year, sending a warning that more action is needed if we aspire to end world hunger and malnutrition in all its forms by 2030. Updated estimates show the number of people who suffer from hunger has been growing over the past three years, returning to prevailing levels from almost a decade ago. Although progress continues to be made in reducing child stunting, over 22 percent of children under five years of age are still affected. Other forms of malnutrition are also growing: adult obesity continues to increase in countries irrespective of their income levels, and many countries are coping with multiple forms of malnutrition at the same time – overweight and obesity, as well as anaemia in women, and child stunting and wasting.

Last year's report showed that the failure to reduce world hunger is closely associated with the increase in conflict and violence in several parts of the world. In some countries, initial evidence showed climate-related events were also undermining food security and nutrition. This year's report goes further to show that climate variability and extremes – even without conflict – are key drivers behind the recent rise in global hunger and one of the leading causes of severe food crises and their impact on people's nutrition and health. Climate variability and exposure to more complex, frequent and intense climate extremes are threatening to erode and reverse gains in ending hunger and malnutrition. Furthermore, hunger is significantly worse in countries where agriculture systems are highly sensitive to rainfall, temperature and severe drought, and where the livelihood of a high proportion of the population depends on agriculture.

The findings of this report reveal new challenges to ending hunger, food insecurity and all forms of malnutrition. There is an urgent need to accelerate and scale up actions that strengthen resilience and adaptive capacity of people and their livelihoods to climate variability and extremes. These and other findings are detailed in the 2018 edition of *The State of Food Security and Nutrition in the World.*

2018 The State of Food Security and Nutrition in the World (full text)