



Food (in)security and (un)healthy diet on the (difficult) road to zero hunger: *Celebrating the World Food Day*

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ABSTRACT

The worldwide prevalence of undernourishment and food insecurity has been steadily increasing in recent years, despite the United Nations' Zero Hunger target by 2030. At the same time, unhealthy diets represent a major cause of diet-related non-communicable diseases. This contributes to the global increase in overweight and obesity, the Janus of malnutrition. Major drivers of food insecurity are economic slowdowns and downturns (further exacerbated by the COVID-19 pandemic), conflict and food crisis, poverty and inequality, and climate-related natural disasters. In this scenario, transformation of food systems will be pivotal to address these drivers of food insecurity, malnutrition, and unaffordability of healthy diets.

Keywords: prevalence of undernourishment, malnutrition, Sustainable Development Goals, food systems, overweight, obesity, non-communicable diseases

Ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture all represent the Zero Hunger target, one of the 17 Sustainable Development Goals (SDG) set by the United Nations (UN) to guide the actions of the international community over the next 15 years (2016-2030). However, after having remained unchanged from 2014 to 2019, the prevalence of undernourishment (PoU,) rose to

about 9.9% in 2020, from 8.4% the year before, with the number of undernourished people in the world gradually increasing (Figure 2) [1]. PoU is the SDG Indicator 2.1.1, the main indicator for monitoring progress on the eradication of hunger in the world. In Africa, the PoU is higher than in Asia and other continents, probably due to the large number of developing countries.

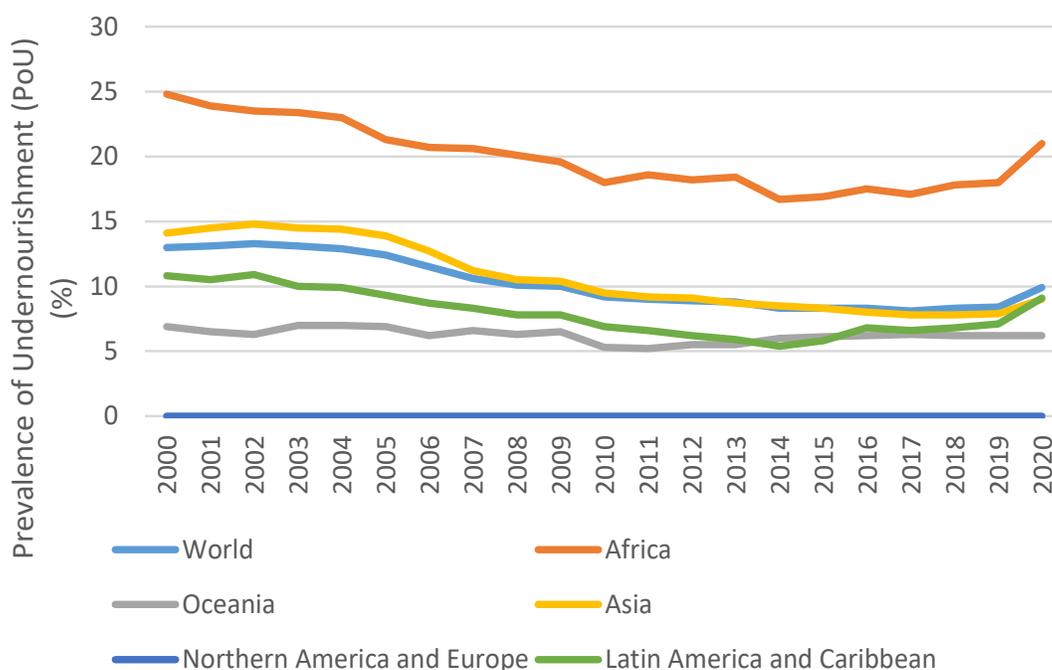
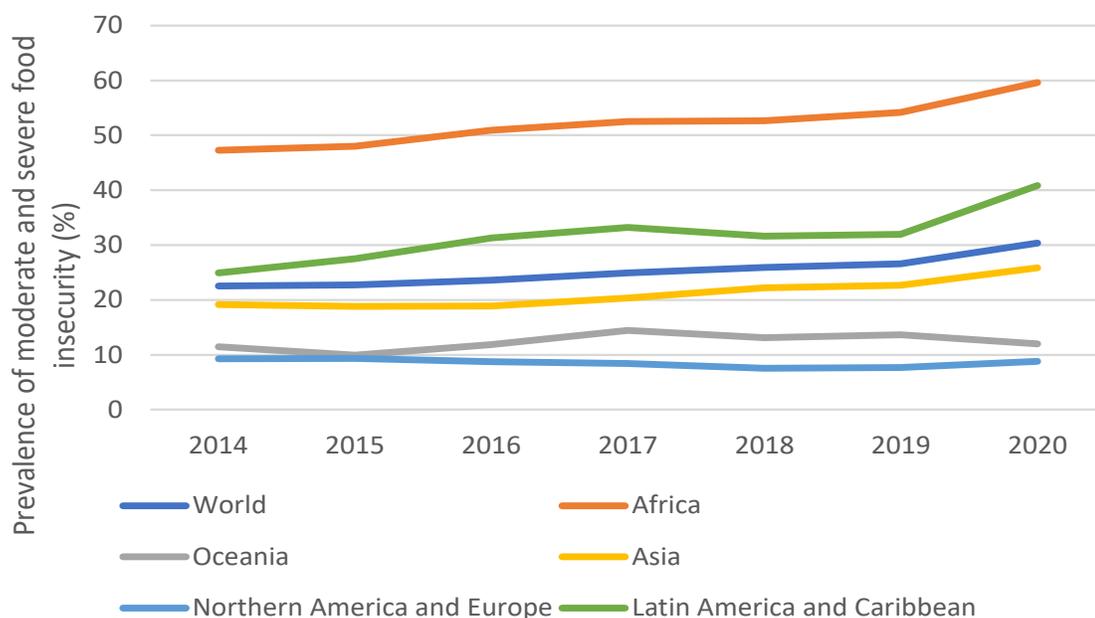


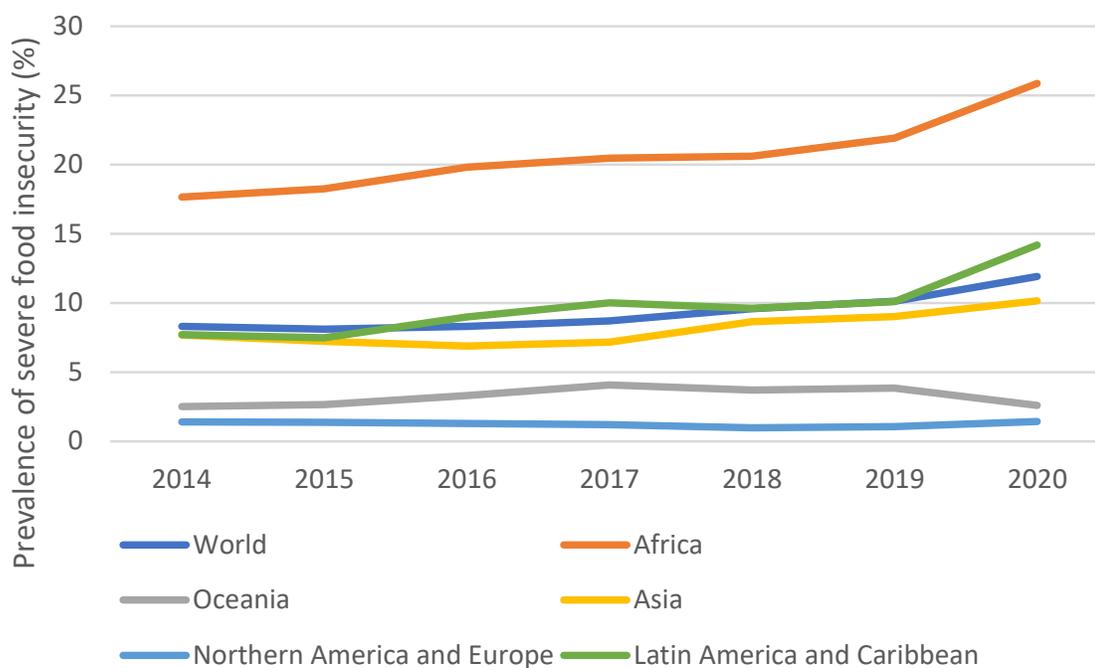
Figure 2. Prevalence of Undernourishment (PoU) in the world population, 2000-2020 [2].

The number of people affected by moderate or severe food insecurity shows a similar upward trend. Food insecurity is a condition that exists when people do not have adequate physical, social, or economic access to food. Moderate food insecurity refers to a lack of consistent access to food due to lack of money or other resources, which reduces dietary quality, changes common eating patterns, and potentially has detrimental consequences for health. Therefore, people experiencing moderate food insecurity face uncertainties about their

ability to obtain food and are, at times, forced to reduce the quality and/or quantity of food they consume. People facing severe food insecurity are short of food, experience hunger and spend days without eating, and put their health at high risk. The prevalence of moderate or severe food insecurity (SDG Indicator 2.1.2) is based on the Food Insecurity Experience Scale (FIES) that produces a measure of the severity of food insecurity experienced by individuals based on direct interviews (Figure 3A, B) [1].



(A)



(B)

Figure 3. Prevalence of moderate and severe (A) and severe (B) food insecurity in the world population, 2014-2020 [3].

Both indicators also show enduring and troubling regional inequalities and gender gaps. For instance, 1 in 5 people (PoU of 21%) faced hunger in Africa in 2020, more than double of any other region (PoU of 9.9%). The

prevalence of moderate or severe food insecurity was also 10% higher among women than men in 2020, compared with 6% in 2019 (Figure 4A,B) [1].

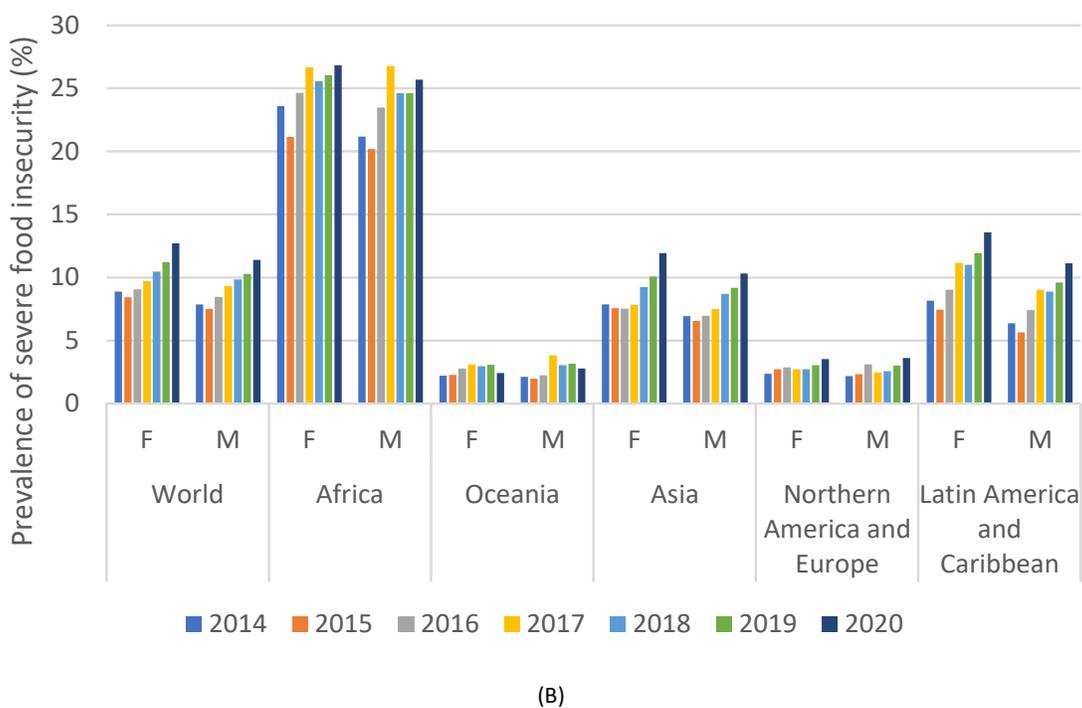
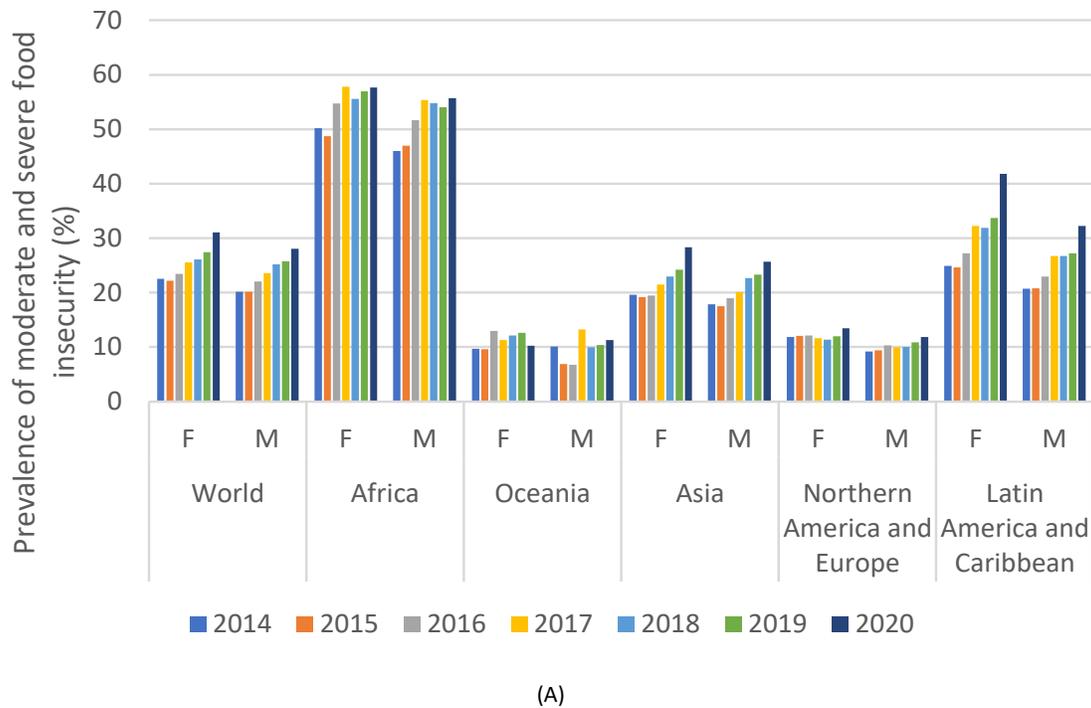


Figure 4. Prevalence of moderate and severe (A) and severe (B) food insecurity in the world population by gender (F, females; M, males), 2014-2020 [3].

Major drivers of food insecurity include climate variability, extremes, and climate-related natural disasters (bio-physical and environmental drivers); economic slowdowns and downturns (economic and

market drivers); conflict and food crisis (political and institutional drivers); and poverty and inequality (economic and sociocultural drivers). As expected, the highest levels of food insecurity and malnutrition have

been reported in countries affected by multiple drivers generating multiple, compounding impacts on food systems responsible for severe short-term and persisting long-term negative effects [1].

Food insecurity is more than just hunger, with nutritious food (not just safe and sufficient) that should be accessible to all people. This is especially important for the poor and people in vulnerable situations, including infants, all year around. However, healthy diets were still unaffordable for around 3 billion people worldwide in 2019, particularly in Asia (1.85 billion) and Africa (1.0 billion) where high levels of income inequality persist. The cost of a healthy diet was 4.04 USD per person per

day [1]. At the same time, overweight and obesity (important diet-related risk factors for many non-communicable diseases) are on the rise all over the world, boosted by industry-led marketing and increased access to highly processed foods that are often high in energy, fats (particularly saturated and trans fats), free sugars, and salt, along with inadequate levels of physical activity. The global prevalence of adult obesity increased from 11.7% in 2012 to 13.1% in 2016; whereas, in 2020, 5.7% (38.9 million) of children under 5 years old were affected by overweight. SDG Indicator 2.2.2 is the prevalence of malnutrition among children under 5 years of age, by type-wasting and overweight (Figure 5) [1].

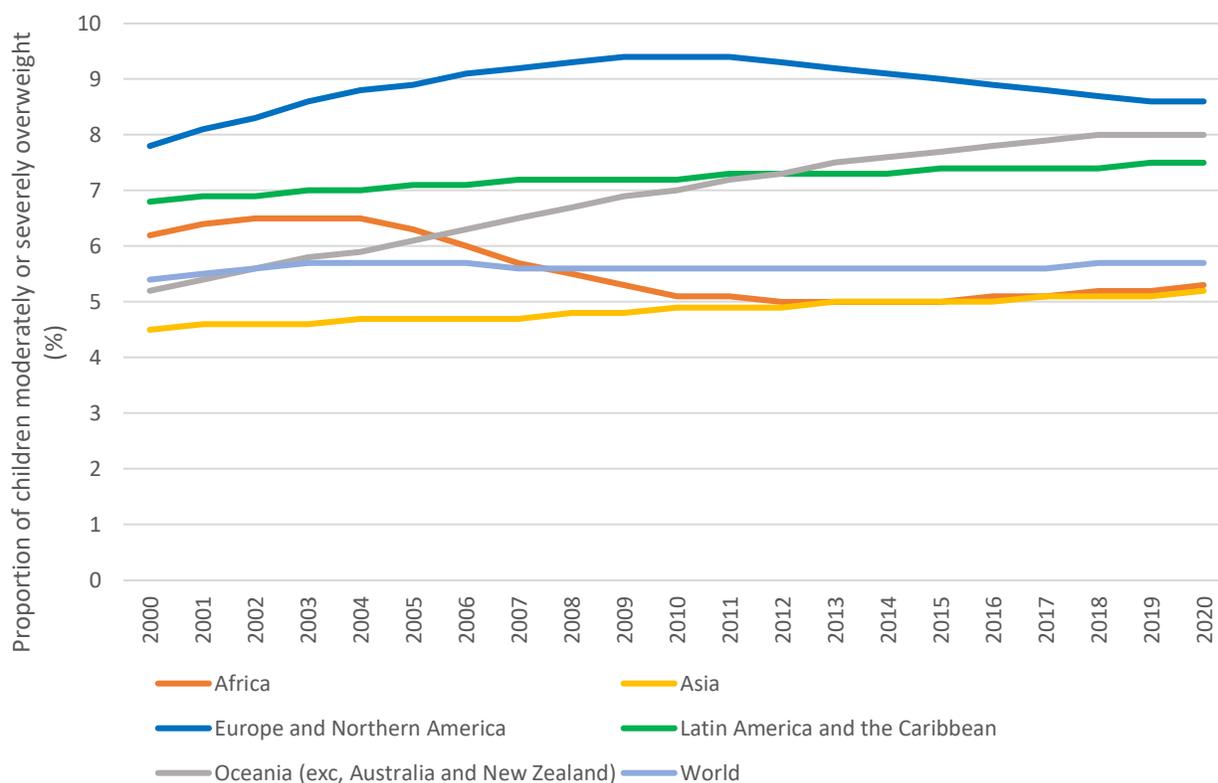


Figure 5. Proportion of children under 5 years old moderately or severely overweight in the world population, 2000-2020 [4].

Noteworthy, the Global Burden of Disease Study has estimated that 11 million deaths and 255 million

DALYs (disability-adjusted life years) were attributable to dietary risk factors in 2017. These included a particularly

high intake of sodium and low intake of whole grain cereals, fruits, nuts and seeds, vegetables, and omega-3 fatty acids [5].

TRADITIONAL FOODS

In this context, the exploitation of traditional local foods can represent a key factor for food and nutrition security since, in general, traditional diets are sustainable, affordable, culturally acceptable, environmentally friendly, and healthy. Traditional food 'is a food with a specific feature or features, which distinguish it clearly from other similar products of the same category in terms of the use of traditional ingredients (raw materials of primary products), composition, or type of production and/or processing method [6]. Traditional food systems as well as local food production and consumption can *i*) mitigate the dietary transition to processed foods resulting from globalization, economic development, and demographic changes; *ii*) reduce the greenhouse gas emissions along the supply chain and carbon footprint from food transportation and distribution; *iii*) improve agricultural resilience; *iv*) promote agrobiodiversity and the conservation of local crops and livestock landraces; *iv*) and ensure food sovereignty.

Traditional foods are often recognized as healthy, and consequently, considered functional foods like many Mediterranean foods e.g., extra virgin olive oil or tomato-based products [7]. Functional foods are defined as "natural or processed foods that contain biologically active compounds which, in defined, effective, and non-toxic amounts, provide clinically proven and documented health benefit utilizing specific biomarker for the prevention, management, or treatment of chronic

disease or its symptoms," [8-9]. In turn, biological activity of functional foods depends on their content in bioactive compounds defined as "primary and secondary metabolites of nutritive and non-nutritive natural components generating health benefits by preventing or managing chronic disease or its symptoms," [9]. Food bioactive compounds mainly include isoprenoids, phenylpropanoids, and alkaloids with a plethora of biological activities such as antioxidant, antimicrobial, anticancer, immunomodulating, hormone-modulating, antiarthritic, antidiabetic, antihypertensive, hypocholesterolemic, and cardioprotective and neuroprotective activities [10-11]. Many studies have shown that functional foods can be effective in health and immunity maintenance (i.e., gastrointestinal health, mental health, bone health, wellness in ageing, and physical performance) and reduce the risk of chronic diet-related diseases such as cardiovascular disease, type 2 diabetes, obesity, metabolic disease, and musculoskeletal disease [11]. Therefore, traditional functional foods can be considered in a holistic vision and as a component of the 'one health' approach, due to the previously illustrated benefits for the environment, food systems, and human health.

CONCLUSION

Food insecurity is a multidimensional phenomenon with economic growth, poverty, inequality, and marginalization as key drivers, further exacerbated by the COVID-19 pandemic responsible for the unprecedented economic downturns caused by the pandemic containment measures (Table 1).

Table 1. Key messages [1].

• The global prevalence of undernourishment (PoU) was around 9.9% in 2020 (1.5% more than in 2019)
• Around 768 million people in the world suffered from hunger in 2020 (around 118 million more than in 2019)
• More than half of the undernourished are found in Asia and more than one-third in Africa
• The global prevalence of moderate and severe food insecurity was around 30% in 2020 (nearly one in three people)
• The global prevalence of severe food insecurity was around 12% in 2020
• The prevalence of moderate and severe food insecurity was 10% higher among women than men in 2020 (it was 6% higher in 2019)
• The high cost (around 4 USD per person per day) of healthy diets makes them unaffordable for about 3 billion people
• In 2020, around 5.7% (38.9 million) of children under 5 years of age were affected by overweight
• Foods systems are affected by many external and internal drivers of food insecurity, including climate-related natural disasters, economic slowdowns and downturns, conflict and food crisis, poverty and inequality
• COVID-19 pandemic exacerbated economic slowdowns and downturns
• New projections confirm that hunger will not be eradicated by 2030

In this complex scenario, transformation of food systems is pivotal to address these drivers of food insecurity, malnutrition, and unaffordability of healthy diets. Some transformation pathways have been

recommended to formulate portfolios of policies, investments, and legislation to enable the transformation of food systems and address the major factors of food insecurity and malnutrition (Table 2).

Table 2. Possible pathways towards transformation of food systems [1].

1. Integrating humanitarian, development, and peacebuilding policies in conflict-affected areas
2. Scaling up climate resilience across food systems
3. Strengthening 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
6. Strengthening food environments and changing consumer behavior to promote dietary patterns with positive impacts on human health and the environment

Abbreviations: COVID-19: Coronavirus disease, FAO: Food and Agriculture Organization, UN: United Nations, SDG: sustainable development goals, NoU: number of undernourishment, PoU: prevalence of undernourishment, FIES: food insecurity experience scale, USD: US dollar, DALYs: disability-adjusted life years.

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Conflict of interests: Nothing to declare.

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