Review Article

Navigating the nexus: Challenges to global food security and 2030 agenda—An overview

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Abstract: The world faces a complex nexus of interconnected issues, ranging from climate change and resource depletion to economic disparities and geopolitical tensions. These challenges pose formidable obstacles to ensuring access to safe, nutritious, and sufficient food for all. Examining the multifaceted landscape of global food security, this overview explores the intricate relationships between environmental sustainability, agricultural practices, and the socio-economic well-being of communities. About 924 million individuals (11.7% of the world's population) face acute food insecurity—a rise of 207 million since the COVID-19 pandemic. There are several causes, including broken food supply networks, high unemployment rates, income loss, and growing food prices. By navigating the nexus of issues surrounding food security and aligning efforts with the United Nations' 2030 Agenda for Sustainable Development, the international community can pave the way for a more resilient, sustainable, and equitable global food system.

Keywords: hunger; food security; climate change; 2030 agenda; sustainable development goals; stunting; wasting; overweight

1. Introduction

In the 21st century, global food security stands as a formidable challenge, with profound implications for human well-being, social stability, and environmental sustainability. As the world's population continues to grow and environmental stressors escalate, the complexities surrounding food production, distribution, and access become increasingly intricate. The interconnected nature of global challenges, including climate change, resource scarcity, economic disparities, and geopolitical conflicts, underscores the urgency of addressing food security as a holistic and integrated endeavor. Against the backdrop of these challenges, nations around the world have committed to the United Nations' ambitious 2030 Agenda for Sustainable Development, with its second goal aiming for zero hunger. Yet, the journey towards achieving this objective is riddled with complexities, requiring a nuanced understanding of the interplay between various factors that contribute to food insecurity. As we navigate through the complexities of food insecurity, it becomes imperative to recognize the interconnectedness of various sectors and the need for a comprehensive, sustainable approach. Despite decades of progress, the world is still grappling with the triple challenge of undernourishment, overweight/obesity, and nutritional deficiencies related to diet and micronutrients. The fight against hunger and food insecurity will require sustained and targeted efforts, particularly in Asia and Sub-Saharan Africa, where the world's largest populations suffer from chronic hunger[1]. Reducing undernutrition has far-reaching implications for health and poverty reduction. By shedding light on the challenges at hand and exploring potential pathways to address them, this paper aims to contribute to the discourse on global food security, ultimately striving towards a more nourished, resilient, and equitable world.

2. Sustainable Development Goal-2 and global nutrition targets

Resolution 65.6 of the 2012 World Health Assembly (WHA) endorsed a Comprehensive Implementation Plan on Maternal, Infant, and Young Child Nutrition. Six global nutrition targets were set with a focus on

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Sustainable Development Goal (SDG) 2.2: End all forms of malnourishment. The WHA targets have been extended to 2030 in order to align with the SDG 2030 Agenda[2]. In light of the increasing prevalence of adult obesity and non-communicable diseases, a WHA target was set to halt the increase of adult obesity and thus reduce the risk of non-communicable diseases by 25% by 2025[3].

3. Facing the surge: Undernourished on the rise—A global call to action

Around 735 million people or 9.2% of the global population are undernourished (**Figure 1**). Africa has the highest rate of hunger—almost 20%—compared with Asia (8.5%), Latin America and the Caribbean (6.5%), and Oceania (7.0%). Nearly 600 million people are expected to suffer from chronic undernourishment by 2030, which underscores the enormous difficulty in reaching the SDG aim of ending hunger[4]. This is around 23 million more compared with if the war in Ukraine had not broken out, and about 119 million more compared with a scenario in which neither the COVID-19 pandemic nor the conflict in Ukraine had transpired. Asia is predicted to make the most progress, while Latin America and the Caribbean are forecast to make none at all and hunger in Africa is predicted to rise sharply by 2030[5]. The prevalence of moderate or severe food insecurity globally (SDG Indicator 2.1.2) remained steady for the second year in a row in 2022 after a substantial increase from 2019 to 2020; however, it was still much higher than the pre-pandemic level of 25.3%.

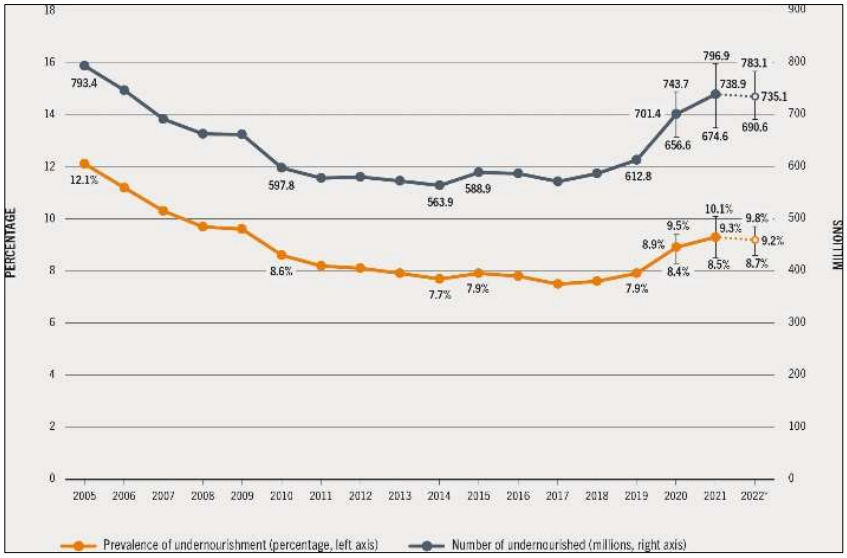

Figure 1. Prevalence of undernourished population, 2005–2022[4].
Source: The state of Food Security and Nutrition in the world, 2023.

As per the Global Hunger Index (GHI) 2023[6], hunger is at a moderate level worldwide. However, Sub-Saharan Africa and South Asia have serious levels of hunger at a GHI of 27[1] (**Figure 2**). Europe and Central Asia have the lowest 2023 GHI score of 6.1, which is regarded as low.

[1] GHI scores the share of people who are undernourished, child wasting rate, child stunting rate, and child mortality rate.

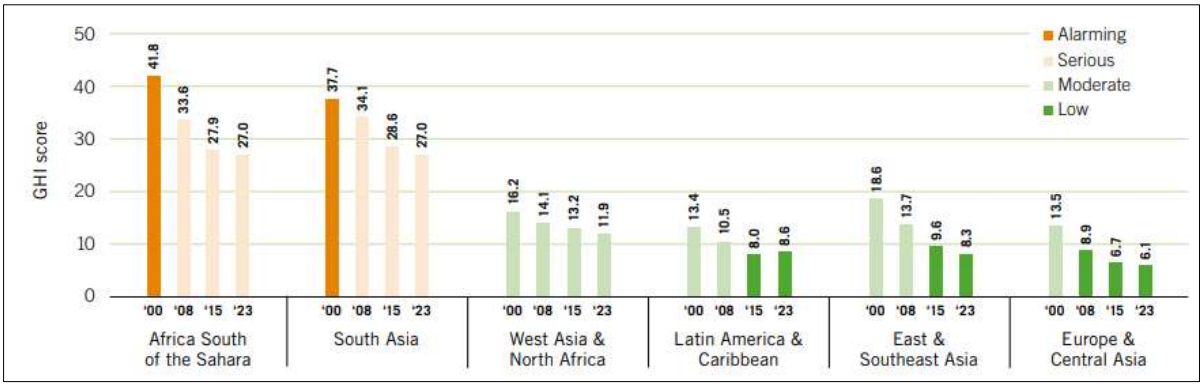

Figure 2. State of hunger in the world, 2000–2023[6].
Source: Global Hunger Index, 2023.

4. Navigating the nutritional landscape: Assessing progress towards global nutrition targets

According to the Joint Malnutrition Estimate 2023[7], stunting affected 148.1 million (22.3%) of all children under five years of age. Child wasting continues to stagnate, with an estimated 45 million (6.8%) of children in 2022. The incidence of overweight/obesity in children slightly lowered since 2020, with 37 million (5.6%) children affected in 2022 (**Figure 3**).

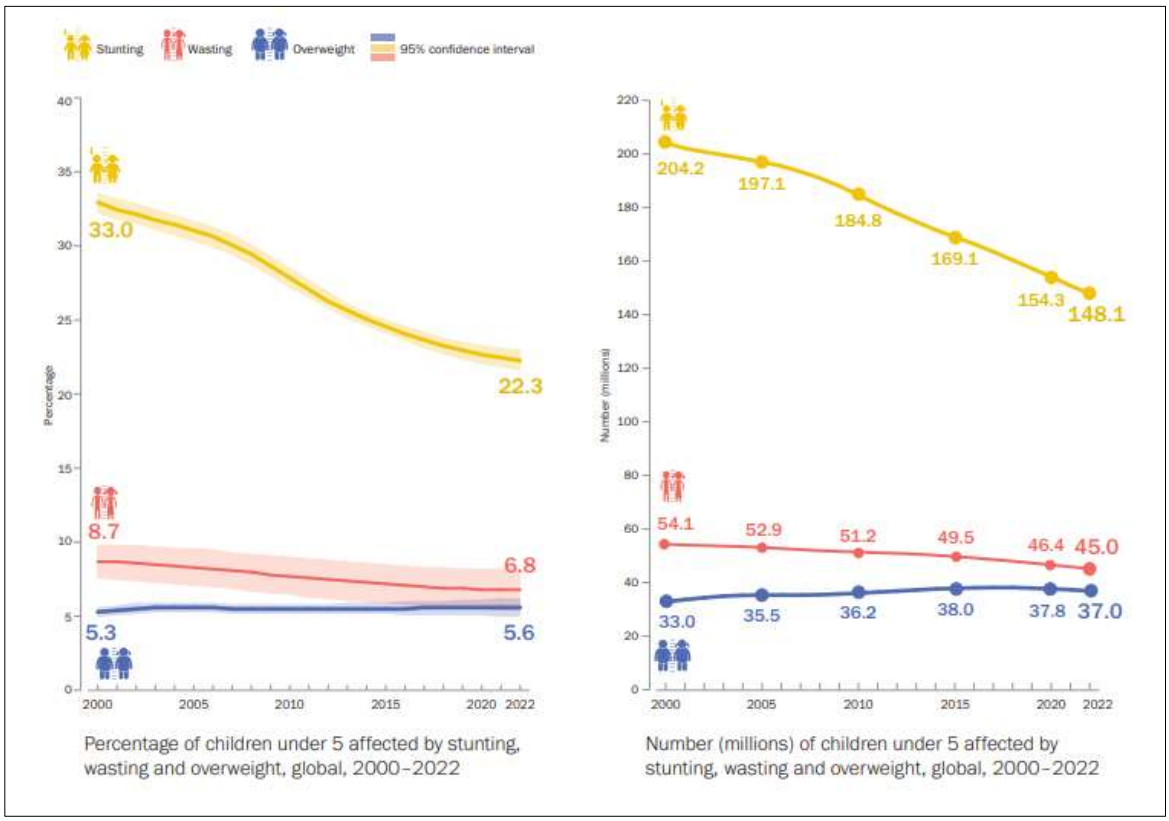

Figure 3. Prevalence and number of under-five children affected by stunting, wasting, and overweight[7].
Source: UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates, 2023.

Stunting rates have, indeed, decreased throughout the last 20 years. However certain regions stunting in under-five children are still high, with Asia (76.6 million) and Africa (63.1 million) having the highest rates. Sub-Saharan Africa's stunting rates have increased for reasons of poverty, inequality, lack of access to

healthcare, and rising food insecurity[8]. The worst-affected region is Southern Asia at 30.7% prevalence, where three out of ten children are stunted, which is way higher than the global prevalence of 22%[9]. The average prevalence of overweight is the lowest in Asia's subregions, which is at 2.5. The prevalence of wasting in the Southern Asia subregion is 14.1%, greater than the 6.7% global average[10]. Overall, diet diversity, maternal education, and the level of family poverty are main factors that explain the variation in child stunting rates in South Asia[11]. Furthermore, in South Asia and Sub-Saharan Africa, stunting is a result of poor sanitation and inadequate young child and maternal nutrition[12].

Worldwide, 45 million (6.8%) of under-five children are wasted, far higher than the SDG's and Global Nutrition's targets 3 and 5, respectively[13]. Southern Asia accounts for 56% (25.1 million) of under-five wasting and about 27% of those live in Africa. Of the 31.6 million children affected by wasting in Asia, almost 80% live in Southern Asia. Evidence from South Asia shows that low maternal body mass index, short maternal height, a large proportion of households in the lowest quintile of wealth, and a lack of maternal education are factors linked to wasting in children under five[14,15].

The high child wasting in South Asia is a worrying trend, which necessitates improved prenatal and postpartum nutrition and healthcare for mothers, not just to avoid low birth weight but also, crucially, for their own health and well-being[16]. In low- and middle-income nations, child wasting peaks between 0 and 3 months of age and is common between 12 to 15 months of age[17]. Preventive measures are therefore required for children under the age of six months, as well as for expectant and nursing mothers. Lancet had estimated an increase in child wasting by 14.3% (6.7 million), with around 58% of children in South Asia and roughly 22% in Sub-Saharan Africa as an impact of COVID-19[18].

Overweight in both children under five and adults is on the rise. The burden of being overweight in both under-fives and adults has been on the rise[19]. Globally, about 37 million (5.6%) of children under five are overweight. Almost half of the total live in Asia (17.7 million); the other big proportion is in Africa (10.2 million). Trends indicate a significant increase in overweight children in Oceania, Australia, and New Zealand in the decade between 2012 and 2022. The number increased from 9.3 million to 13.9 million in Oceania, and from 12.4 million to 19.3 million children in Australia and New Zealand in the last decade. The majority of regions are off-track to achieving the target of overweight children. In fact, there has not been any improvement in the past 20 years for under-fives worldwide.

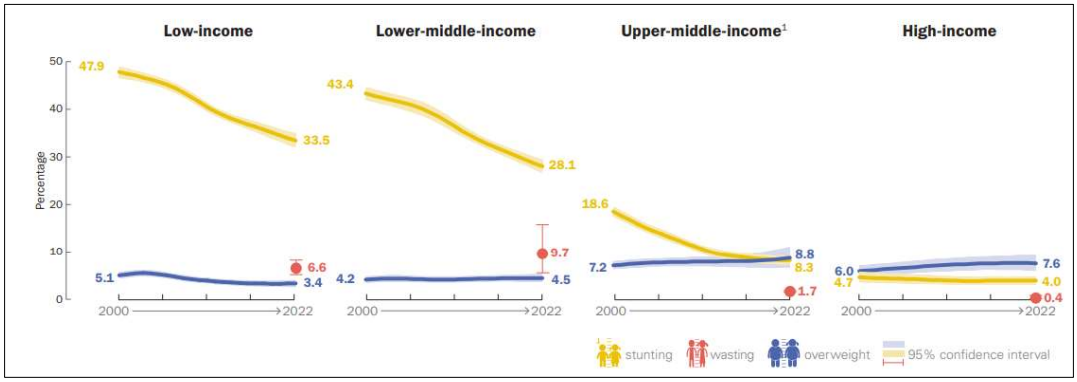

Figure 4. Prevalence of malnutrition by income classification, 2000–2022.
Source: UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates, 2023.

Figure 4 shows the prevalence of malnutrition in children by income classification of countries. Overweight is increasing at an alarming rate, particularly in upper-middle-income and high-income countries, whereas stunting is declining across all income levels. Almost two-thirds (76%) of wasted children under five are in low- and middle-income countries, as compared with 64% of stunted children.

Among the Global Nutrition targets, only exclusive breastfeeding appears to be on track to achieve at least the 50% rate by 2025 (**Figure 5**). In 2021, 47.7% of children were exclusively breastfed worldwide, with South Asia, East Africa, and Southeast Asia above the global average at 60.2%, 59.1%, and 48.3%, respectively. Northern America, Oceania, and Western Asia regions are off track, with no progress or worsening trends for low birth weight and exclusive breastfeeding. Some parts of Asia, Latin America, and Oceania show worsening trends in childhood obesity[20].

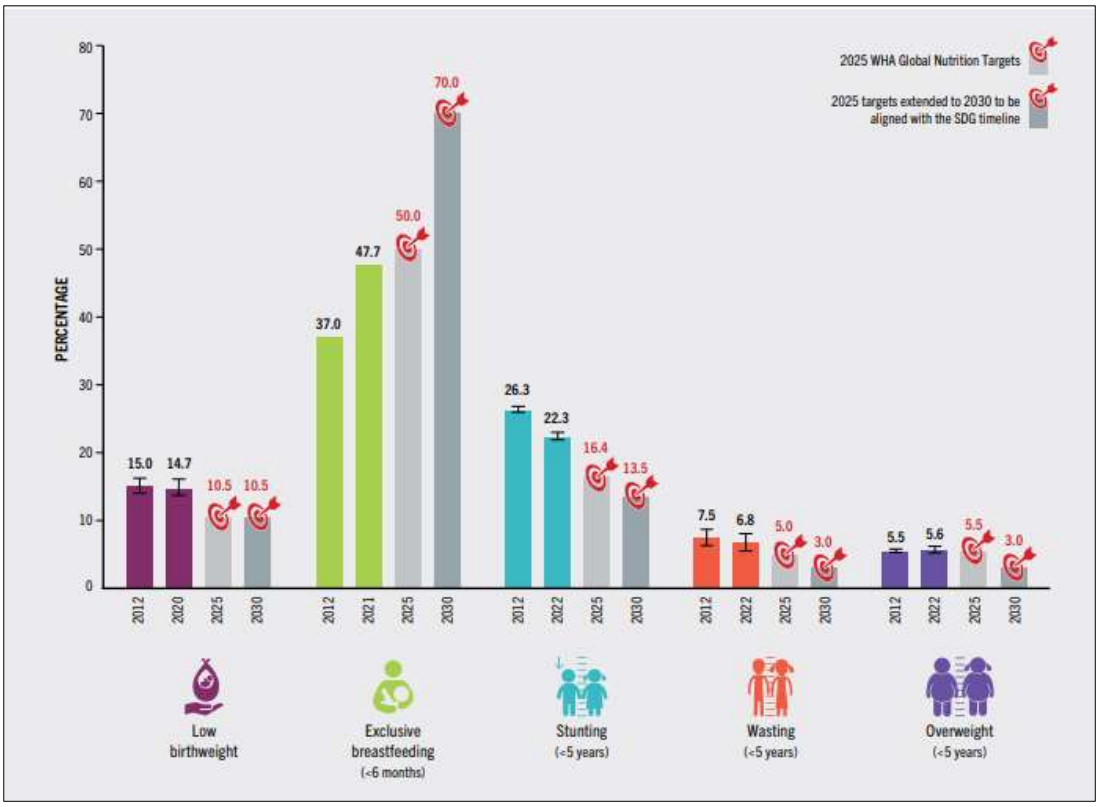

Figure 5. Progress on global nutrition.
Source: The State of Food Security and Nutrition in the World, 2023.

Almost 15% of children born worldwide have a low birth weight (less than 2500 g). Progress in reducing low birth weight has stalled in recent decades[21]. South Asia, Sub-Saharan Africa, and Latin America are the three main regions with low birth weight, with 24.4%, 13.9%, and 9.6%, respectively. The goal to reduce low birth weight by 30% by 2030 has made slow progress. Multiple pregnancies, infections, and non-infectious diseases can lead to low birth weight and negative outcomes, such as neonatal mortality, poor cognitive development, and future cardiovascular disease risk[22,23]. Interventions that improve early and sustained access to quality prenatal care and prenatal services, nutritional counseling, and early primary newborn care are critical to preventing and treating low birth weight[24,25].

Adult obesity continues to increase in all regions, tripling over the last four decades[26]. More than a billion people in the world are obese—650 million adults, 340 million teenagers, and 39 million children. This number continues to grow. The World Health Organization estimates that by 2025, around 167 million people—adults and children—will be overweight or obese[27]. Obesity and overweight rank fifth among the world's major causes of mortality[28]. It also increases risk factors for noncommunicable diseases, such as cardiovascular disease, diabetes, and certain cancers[29].

5. Double jeopardy: Impact of COVID-19 and Ukraine crisis on global food security

The COVID-19 pandemic has disrupted global trade, supply chains, and labor markets, leading to unprecedented challenges in food production, distribution, and access. Lockdowns, trade restrictions, and labor shortages have disrupted agricultural activities, jeopardizing harvests and leading to increased food prices. The economic fallout has exacerbated food insecurity, pushing vulnerable populations deeper into hunger and malnutrition[30]. The pandemic pushed 140 million new people into extreme poverty, living on less than US$1.90 a day in 2020[31]. The Lancet estimates a minimum need of $2.4 billion for four life-saving interventions: preventing wasting in at-risk children; treatment of wasted children; twice-a-year vitamin A supplementation for children aged 6–59 months (90% coverage); and mass communication to protect, promote, and support breastfeeding, focusing on caregivers or families of children aged 0–23 months[32].

Simultaneously, the conflict in Ukraine has added an additional layer of complexity to global food security. The war has disrupted agricultural production in the region, leading to decreased yields and displacement of rural communities[33]. The geopolitical implications have reverberated across global markets, impacting the availability and affordability of key food commodities.

6. Zero hunger: Unpacking the significance of SDG 2

The objectives of SDG 2 must be in line with the four primary components of food security—food availability, food access, food utilization, and the overall stability of these three components—in order to end hunger. Food systems[2] and the health of the poor have been put under pressure by the fast-changing food value chain and diet of low- and middle-income nations, as well as urbanization and the trend toward the higher use of packaged foods[34]. Sustaining progress is still hampered by extreme poverty and malnutrition, and the pandemic has made financial and resource restrictions worse. Food insecurity is exacerbated by locust outbreaks and climate shocks[35,36].

Investing in agricultural and sustainable food production is essential to reducing the risk of hunger, enhancing food security, and enhancing resilience to shocks and catastrophes[37]. In addition to improving health, achieving zero hunger will benefit the economy, education, equality, and social development. Along with social protection, sustained investment to increase food access in rural and urban regions can aid in the recovery.

7. Food security: Navigating challenges and crafting strategies for sustainable future

The 1996 World Food Summit declared, “Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life[38].” An estimated 2 billion people were already vulnerable to moderate-to-severe food insecurity before the pandemic struck.

The immune system is weakened by both overnutrition and malnutrition, leaving sufferers more susceptible to COVID-19 and starting a vicious cycle of disease and starvation[39]. The vulnerable and impoverished have been severely impacted by changes to the existing unequal nutrition and healthcare

[2] A food system is defined as a system that embraces all the elements (environment, people, inputs, processes, infrastructure, institutions, markets, and trade) and activities that relate to the production, processing, distribution and marketing, preparation, and consumption of food, as well as the outputs of these activities, including socio-economic and environmental outcomes.

systems[40]. Pre-existing medical conditions and increased susceptibility due to micronutrient deficiencies have been made worse by the pandemic[41].

The COVID-19 pandemic and the Russia-Ukraine situation[42] have combined to cause the worst food catastrophe since World War II, with up to 1.7 billion people living in poverty and hunger, a number that has reached a record high. As a result of the supply chain disruption, there was food waste, as there was less demand, and farmers who lacked proper storage were left with unsold produce. Those nations where food insecurity is more common were severely impacted by supply chain disruptions[43,44]. Travel restrictions and the closure of labor facilities in order to manage the pandemic had an impact on food production cycles that relied on migrant workers[45].

Figure 6 indicates that Russia and Ukraine are significant producers of maize, wheat, and barley, making up an average of 27%, 23%, and 15%, respectively, of worldwide exports between 2016 and 2020[46]. Even the World Food Programme, which sources 50% of its grain supply from the Ukraine-Russia region, is currently dealing with sharp cost hikes as a result of its ongoing efforts to address global food crises.

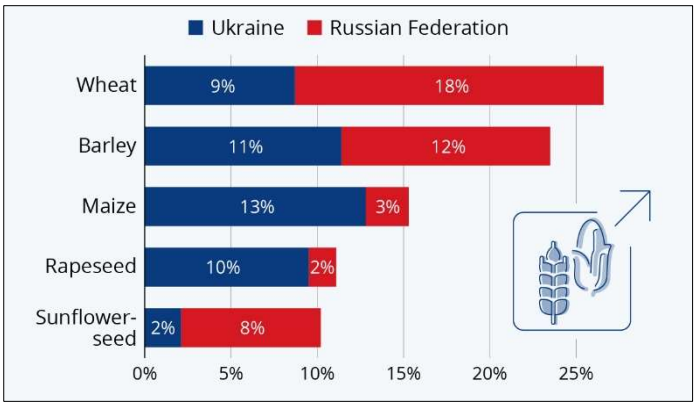

Figure 6. Ukraine and Russia's global export share, 2016–2020.
Source: https://www.statista.com/chart/27225/russian-and-ukrainian-share-of-global-crop-exports/.

The downturn in the economy has exacerbated pre-existing disparities and affected the availability of food[47,48]. There is a significant risk of illness since one in three persons does not have access to facilities for handwashing and safe drinking water[49,50]. As frontline employees, unpaid caregivers, and food system workers, women—whose role is critical in ensuring their family's food security—have had to shoulder more responsibilities. In addition, the stresses of lost jobs and compelled confinement at home had led to a rise in the prevalence of domestic violence[51–53]. Cash transfers are essential for the most vulnerable in order to manage the health and economic risks brought on by the crisis. In Asia and Africa, around 90% of women labor in the unorganized sector are not covered by social security. Other issues with cash transfer systems in Tanzania, Pakistan, and India include the fact that women are frequently uninformed of their rights and advantages[54–56]. The nutrition of about 370 million children was impacted by the interruption of school food programs caused by the closure of schools during the lockdown[57]. The pandemic changed the overall food environment, with the consumption of calorie-dense staple foods in households shifting away from fruits and vegetables that are high in micronutrients[58]. Additionally, there has been a change in the direction of eating more processed meals[59]. In order to maintain food security and variety, there is a growing interest in home gardening and community-supported agriculture[60,61]. Delays in supply chains, which raised transportation costs, have also contributed to rises in food prices[62]. Food security and nutrition are immediately impacted by these localized price rises, since food becomes more expensive to get, particularly for the poor.

8. Recommendations and conclusion for advancing global food security

In order to end the intergenerational cycle of poverty and eradicate all types of malnutrition, policymakers must intensify their efforts. Raising the implementation of high-impact, nutrition-specific treatments across all low- and middle-income nations is predicted to reduce stunting by 40% and yield economic benefits of around $417 billion. An economic return of $11 will result from every $1 invested in stunting reduction. Beyond the fields of agriculture and health, more players and sectors must be involved. In order to combat malnutrition, a "food systems" approach calls for comprehensive policies that take into account both supply and demand. In order to create a resilient food system, it is imperative to strengthen strategic actions to meet people's needs both now and when the crisis passes.

Countries must first put regulations into place and direct funding towards lowering the price of nutritious foods. Policies and initiatives that mainstream nutrition beyond the fields of health and agriculture are essential. In order to meet the global nutrition objectives, food systems that are efficient, sustainable, and inclusive must produce and distribute wholesome food. To guarantee access to the poorest of the poor, immediate action is needed. In order to reduce food losses, policies must be oriented towards a nutrition-sensitive value chain that improves efficiency in food production, packaging, distribution, and marketing.

Secondly, in order to lessen the impact of the crisis on society and the economy, stronger social protection initiatives that provide access to wholesome food must be implemented. Increasing social protection spending can improve people's access to food and other necessities, especially for disadvantaged populations in both urban and rural areas. Farmers and other food system workers who are disproportionately impacted by the crisis should have stronger safeguards. The food, healthcare, and social protection systems all work together to help individuals achieve their nutritional needs. These safeguards would increase food systems' ability to withstand shocks, such as those caused by the COVID-19 pandemic and the war in Ukraine.

Third, in order to raise living standards and provide more employment possibilities, inclusive and sustainable economic growth must be supported. The pandemic has endangered the world economy and disrupted lives and livelihoods. Given their critical role in ensuring the food security of their families, women's empowerment will be essential to achieving better nutrition.

In order to establish strategies, cost-effective interventions, and investments in nutrition, the global 2030 nutrition agenda demands radical shifts and collaboration. These are necessary in addition to a decline in poverty, women's empowerment, and gains in maternal health.

Conflict of interest

The author declares no conflict of interest.

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