

Review

# Assessing the Prevalence and Severity of Global Hunger and Food Insecurity: Recent Dynamics and Sub-Saharan Africa's Burden

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**Abstract:** One of today's most critical challenges is ensuring sufficient and safe food production and supply for the ever-expanding global population. Recently, many countries around the world, particularly those in Africa, have been grappling with severe hunger and food insecurity, frequently exacerbated by events such as escalating global prices, persistent insecurity, and the repercussions of the COVID-19 pandemic. This study undertook an extensive review of the prevalence and severity of hunger and food insecurity across diverse countries and regions. The review utilised several metrics, including Global Hunger Index (GHI) scores, Global Food Security Index (GFSI) scores, 2015–2022 data (related to two Sustainable Development Goal 2 (SDG2) targets) from the Food and Agriculture Organization (FAO), and other pertinent sources to assess the development of the current status of the countries included in this study. The 20 countries with 2023 GHI scores below five were collectively ranked from 1 to 20, signifying low hunger levels. However, the Central African Republic (CAR) received the lowest ranking, at 125 out of 125, with a score of 42.3, indicating an alarming level of hunger. Finland achieved the highest GFSI score of 83.7, with Oman showing the most notable GFSI improvement at +13.8, while Syria experienced a significant decline in the GFSI score by –10.5. Over time, many countries, particularly the developed ones, have witnessed significant improvements in their GHI and GFSI scores. Meanwhile, most countries in sub-Saharan Africa have experienced the greatest deterioration in their GFSI scores and notable increases in their GHI scores. The review documented the significant progress made by countries and regions in reducing levels of hunger and food insecurity while highlighting the substantial burden borne by sub-Saharan Africa (SSA) in combating global hunger and food insecurity.

**Keywords:** food security; zero hunger; prevalence of undernourishment; Africa; global hunger index (GHI); global food security index (GFSI)



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## 1. Introduction

In spite of numerous efforts to address hunger, there has been no significant decrease in the global prevalence of hunger in recent years. Many nations and geographical areas have been grappling with severe hunger in recent times, with the situation expected to worsen in early 2024 [1]. Though the Food and Agriculture Organisation (FAO) and its partners reported a plateau in the global prevalence of undernourishment (PoU) in 2021–2022, Western Asia, the Caribbean, and all sub-regions of Africa have persistently experienced an increase in hunger [2–4]. The onset of the COVID-19 pandemic, the Russia–Ukraine conflict, climate crises, poverty, increasing inequalities, and skyrocketing food prices have all intensified the prevailing hunger and elevated levels of food insecurity (FI) on a global scale [2,5]. It is worth noting that the weight of these burdens is being borne by significant demographic segments, including women and young people. However, both South Asia and sub-Saharan Africa (SSA) regions recorded the highest hunger levels in 2023, having a Global Hunger Index (GHI) score of 27.0 each, signifying a significant prevalence of hunger in these areas. Approximately 691 to 783 million individuals globally encountered hunger

in 2022. Taking the midrange (735 million), there was an increase of 122 million people facing hunger in 2022 compared to 2019, prior to COVID-19. Recent estimates suggest that nearly 600 million individuals will face chronic undernourishment by 2030, underscoring the substantial challenge of meeting the Sustainable Development Goal (SDG) target to eliminate hunger, especially in Africa [3,6].

Roughly 29.6 percent (2.4 billion) of the world's population experienced moderate to severe food insecurity in 2022, with approximately 11.3 percent (900 million) facing severe food insecurity. In 2022, 33.3 percent of adults (especially women) in rural regions experienced moderate or severe food insecurity, contrasted with 28.8 percent in peri-urban areas and 26.0 percent in urban areas [3,6]. Additionally, stunting in under-five children reached 22.3 percent, while child-wasting and overweightness (obesity) reached 6.8 and 5.6 percent in 2022, respectively. The term "hunger", according to the United Nations (UN), is referred to as "the periods when people experience severe food insecurity—meaning that they go for the entire day without eating due to lack of money, access to food, or other resources" [7]. Additionally, the FAO also defined hunger as "an uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. It becomes chronic when the person does not consume a sufficient amount of calorie (dietary energy) on a regular basis to lead a normal, active and healthy life" [3].

However, Sustainable Development Goal 2 (SDG 2) aims to establish a hunger-free world by 2030 [3,8–11]. Sustainable Development Goal 2, as one of the 17 SDGs, is designed to motivate member countries to eliminate hunger, attain food security, enhance nutrition, and foster sustainable agriculture by 2030 [8]. Food security is entrenched in SDG 2, and according to the UN definition, it is when "people having at all times, physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" [12]. Food insecurity (FI) is the absence of food security, where the conditions for food security are not fulfilled, and it can be understood as a continuum ranging from mild to severe [6,13]. While hunger is basically a condition of food deprivation or a lack of resources to acquire it, FI can manifest at various levels of severity, ranging from mild to moderate or severe.

However, this paper seeks to explore the recent hunger and food insecurity situation globally. Previous studies have x-rayed the fight against hunger in Africa [9,10] and zero hunger in the face of COVID-19 in Africa [14] as well as achieving zero hunger in Africa [15], monitoring the food system's transformation [11], and creating healthy, sustainable diets and development pathways to zero hunger [16,17].

However, this research conducted a comprehensive examination of the prevalence and severity of hunger and FI in different countries and regions. This is the first narrative review that utilised the most recent data from reputable organisations, including the years 2008, 2012, 2018, 2020, 2022, and 2023. These organisations include Welthungerhilfe (WHH) and Concern Worldwide (Global Hunger Index 2023); Economist Impact (Global Food Security Index 2022); Food and Agriculture Organisation (FAO) and partners (The State of Food Security and Nutrition in the World 2023). The resources include some metrics such as (i) Global Hunger Index (GHI) scores, (ii) Global Food Security Index (GFSI) scores, (iii) 2023 data from FAO and other partners, and other relevant resources (see Table 1a).

However, considering the four indicators used in determining the GHI scores for each country captured in the 2023 GHI, Table 1b reveals how these GHI indicators (undernourishment, child-stunting, child-wasting, and child mortality) capture the multifaceted nature of hunger. It is important to note that the four indicators are integral to the indicator set used to track progress towards the United Nations Sustainable Development Goals (SDGs). Values for the four component indicators of the GHI are determined for each country using the most recent published data available from internationally recognised sources [1]. Each of the four component indicators of the GHI is assigned a standardised score. These scores are based on thresholds that are set slightly above the highest country-level values observed worldwide for that indicator since 1988 [1].

**Table 1.** (a). Snapshot of data source, description, and references. (b) How the four indicators of the GHI capture the multifaceted nature of hunger.

(a)		
Data Source	Organisation/Description	References
Global Hunger Index (GHI) scores 2023	<p>Organisation(s): Welthungerhilfe (WHH) and Concern Worldwide.</p> <p>The Global Hunger Index (GHI) was first introduced in 2006 as a tool to assess hunger at global, regional, and national levels by researchers from the International Food Policy Research Institute (IFPRI) and Welthungerhilfe. The initial report calculated GHI scores for 1981, 1992, 1997, and 2003, with 2003 representing the most current data available at the time. In 2007, Concern Worldwide joined as a co-publisher of the report. IFPRI withdrew as a co-publisher following the 2017 release. The 2023 edition of GHI was used in this study with GHI scores computed for 2008 and 2023.</p> <p>Each country's GHI score is calculated based on a formula that combines four indicators that together capture the multidimensional nature of hunger. These indicators are (i) undernourishment, (ii) child-stunting, (iii) child-wasting, and (iii) child mortality.</p> <p>However, the GHI has faced some criticism, particularly regarding its conceptualisation and definition. Another limitation is that the results presented in the 2023 Global Hunger Index report supersede all previous GHI findings. The 2000, 2008, and 2015 scores and indicator data included in this report are the only data that can be reliably used for longitudinal comparisons of the GHI.</p>	<p>[10,18–20]  <a href="https://www.globalhungerindex.org/ranking.html">https://www.globalhungerindex.org/ranking.html</a> (accessed on 18 January 2024)</p>
Global Food Security Index (GFSI) scores 2022	<p>Organisation: Economist Impact</p> <p>The Global Food Security Index was created and developed by Economist Impact with the backing of Corteva Agriscience. The Economist Impact team has complete editorial authority over all aspects of the index, from data collection to analysis and predictions. The 2022 GFSI marks the 11th version of the index. Economist Impact revises the model each year to reflect the annual shifts in structural factors affecting food security. The GFSI is the leading provider of insights into the factors influencing global food security. It assesses food security in 113 nations across five regions: Asia Pacific, Europe, Latin America, the Middle East and Africa, and North America. The GFSI is based on four main pillars: affordability, availability, quality and safety, and sustainability and adaptation. The index relies on a dynamic benchmarking model built from 68 qualitative and quantitative drivers of food security.</p>	<p>[21]  <a href="https://impact.economist.com/sustainability/project/food-security-index/">https://impact.economist.com/sustainability/project/food-security-index/</a> (accessed on 10 February 2024)</p>
The State of Food Security and Nutrition in the world (SOFI) 2023	<p>Organisation(s): FAO, IFAD, UNICEF, WFP and WHO</p> <p>This report offers an overview of the global advancements made towards achieving the goals of eradicating hunger (SDG Target 2.1) and addressing all types of malnutrition (SDG Target 2.2). It also presents estimates on the population unable to access a nutritious diet. Since its 2017 release, this report has consistently emphasised that the escalation and intersection of conflicts, climate-related extremes, economic downturns, along with the rising costs of nutritious foods and increasing inequality, are hindering our progress towards meeting the SDG 2 targets. The data related to two SDG 2 targets: 2.1 indicators, namely the Prevalence of Undernourishment (PoU) and the prevalence of moderate/severe FI based on the Food Security Experience Scale (FIES), were incorporated.</p>	<p>[3]  <a href="https://openknowledge.fao.org/server/api/core/bitstreams/c121526c-9c63-4e3b-a145-64a391255984/content/cc3017en.html">https://openknowledge.fao.org/server/api/core/bitstreams/c121526c-9c63-4e3b-a145-64a391255984/content/cc3017en.html</a>  <a href="https://doi.org/10.4060/cc3017en">https://doi.org/10.4060/cc3017en</a> (accessed on 7 January 2024)</p>

Table 1. Cont.

(b)		
How the four indicators of the Global Hunger Index (GHI) capture the multifaceted nature of hunger		
Undernourishment	Child-stunting and child-wasting	Child mortality
Measures inadequate food access, a critical indicator of hunger.	Extend beyond calorie availability to encompass aspects of diet quality and utilisation.	Acknowledges that death is the most severe consequence of hunger, with children being particularly vulnerable.
Encompasses the entire population, including both children and adults.	Reflect the specific vulnerability of children to nutritional deficiencies.	Enhances the GHI's ability to capture deficiencies of essential vitamins and minerals.
Serves as a lead indicator for international hunger reduction targets, such as Sustainable Development Goal 2 (Zero Hunger).	Are sensitive to unequal distribution of food within the household, and serves as nutrition indicator for SDG 2 (zero hunger)	Complements wasting and stunting indicators, which only partially reflect the mortality risk associated with undernutrition.
Undernourishment contributes one-third (1/3) of the GHI score	Child-stunting and child-wasting each contribute one-sixth (1/6 + 1/6) of the score	Child mortality contributes one-third (1/3) of the GHI score.
Threshold for undernourishment is 80% based on the maximum observed value of 76.5%	Threshold for child-stunting is 70% based on the maximum observed value of 68.2%. While threshold for child-wasting is 30% based on the maximum observed value of 26.0%.	Threshold for child mortality is 35% based on the maximum observed value of 32.6%

(a) Source: [3,10,18–21]; (b) Source [1].

## 2. Hunger and Food Insecurity Are Everywhere

Global hunger, as evidenced by the PoU (SDG indicator 2.1.1), remained significantly higher in 2022 than the pre-pandemic levels. Approximately 9.2% of the global population experienced chronic hunger in 2022, up from 7.9% in 2019. However, according to FAO et al. [3] estimates, the level of hunger continued to decrease from 2005 from 12.1% (793.4 million) to 8.6% (597.8 million) in 2010. There was a sharp increase in global hunger in 2019, rising from 7.9% (612.8 million) in 2019 to 8.9% (701.4 million) in 2020, while hunger levels experienced a slight reduction between 2021 and 2022, moving from 9.3% (738.9 million) to 9.2% (735.1 million). However, the percentage of the population grappling with hunger is notably higher in Africa in comparison to other global regions, with about 20% affected, in contrast to 8.5% in Asia, 6.5% in Latin America and the Caribbean, and 7.0% in Oceania.

In order to track the progress of countries and regions towards ending hunger, the Global Hunger Index (GHI), which was first published in 2005, was explored. The 2023 GHI encompassed 125 countries from five regions, including Asia and the Pacific, Europe, Latin America, sub-Saharan Africa (SSA), and the Middle East and North Africa (MENA). The underlying data of the 2023 edition of GHI were used, exploring the GHI scores of 2008 and 2023 [1]. The GHI serves as a tool for comprehensively assessing and monitoring hunger across global, regional, and national scales [1]. GHI scores are derived from numerical values of four component indicators, namely (i) undernourishment, (ii) child-stunting, (iii) child-wasting, and (iv) child mortality [1].

In 2022, around 29.6 percent of the global population (2.4 billion people) were moderately or severely food insecure, indicating they lacked access to sufficient food. This represents an increase of 391 million people compared to 2019, before the pandemic. The levels of moderate or severe FI increased slightly in Africa, Northern America, and Europe from 2021 to 2022 [3]. In Asia, there was a non-significant decrease during the same period. Latin America and the Caribbean, particularly South America, showed positive advance-

ments in food security. However, the Caribbean sub-region experienced a decline in its food security situation [3].

The GFSI is the leading source of information on the factors influencing food security worldwide, while the 2022 GFSI is the 11th edition of the index. The GFSI was created and developed by Economist Impact with the backing of Corteva Agriscience. The 2022 GFSI indicated a decline in the global food environment. Following its peak in 2019, the GFSI has been decreasing due to soaring food prices and an unprecedented level of hunger [21]. In terms of the food security environment, the underlying data of the most recent 2022 GFSI were employed to explore the current state of food security of each country and region. It is worth noting that the higher the GFSI scores, the better the food security status, while the lower the GFSI scores, the worse the food security status of the 113 countries captured in the 2022 GFSI. Just like in the case of GHI, the same five regions (as mentioned above) were also considered in the 2022 GFSI for the sake of uniformity [21].

This study presents a snapshot of hunger and FI prevalence and severity across various countries and regions, as reflected in the 2023 GHI and 2022 GFSI. To gauge score improvements or deterioration over the specified period, the 2023 GHI scores were compared with those from 2008 for each country, while 2022 GFSI scores were compared with those from 2012 for each country.

### 3. Prevalence and Severity of Hunger and Food Insecurity Worldwide

This section explores the prevalence and severity of hunger and food insecurity in the world using the most recent hunger and food security data from trustworthy and reliable organisations such as Welthungerhilfe and Concern Worldwide (2023 GHI), Economist Impact (2022 GFSI), and FAO and partners [1,3,21]. The 2023 Global Hunger Index (GHI) captured 136 countries, but there were sufficient data to compute 2023 GHI scores for and rank only 125 countries. Additionally, the underlying data from the 2022 Global Food Security Index (GFSI) captured 113 countries [21]. In order to critically explore the hunger and food insecurity dynamics among countries included in these data sources, we compared each country's previous scores and ranks in both GHI and GFSI to determine each country's hunger and food security improvement or deterioration.

#### 3.1. Hunger and Food Security in Asia and the Pacific

According to 2023 GHI data, China was one of the top twenty countries, with scores below five, and held a shared first position out of the 125 ranked countries included in the 2023 GHI [1]. Subsequently, China secured the top ranking in the Asia and Pacific region. From Table 2a, Pakistan and India had the highest GHI scores of 26.6 and 28.7, respectively, in 2023 in the Asia and Pacific region. When we compare the 2023 GHI scores with scores in 2008, Tajikistan (ranked 62/125) was recognised as the most improved country in terms of hunger reduction (−16.2). The region did not record any countries that were further plunged into higher hunger levels in 2023 (a situation where the 2023 GHI scores > 2008 GHI scores) [1]. However, many countries in this region are in the moderate hunger level in 2023 GHI; however, countries like Pakistan witnessed heavy flooding and the arrival of El Nino in 2023, which potentially reduced grain production, perhaps resulting in higher prices and reduced availability and accessibility of essential staples in the coming future [22].

**Table 2.** (a) GHI scores of Asia and Pacific. (b) GFSI scores of Asia and Pacific.

(a)				
Global Hunger Index (Asia and Pacific)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
=1	China	7.1	<5	-
21	Uzbekistan	14.9	5.0	−9.9
24	Kazakhstan	11.0	5.5	−5.5
34	Azerbaijan	15.0	6.9	−8.1



Table 2. Cont.

(a)				
Global Hunger Index (Asia and Pacific)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
54	Vietnam	20.1	11.4	−8.7
=55	Thailand	12.2	10.4	−1.8
56	Malaysia	13.7	12.5	−1.2
60	Sri Lanka	17.6	13.3	−4.3
62	Tajikistan	29.9	13.7	−16.2
66	Philippines	19.1	14.8	−4.3
=67	Cambodia	25.6	14.9	−10.7
69	Nepal	29.0	15.0	−14
72	Myanmar	29.7	16.1	−13.6
74	Laos	30.4	16.3	−14.1
77	Indonesia	28.5	17.6	−10.9
81	Bangladesh	30.6	19.0	−11.6
102	Pakistan	31.1	26.6	−4.5
111	India	35.5	28.7	−6.8
(b)				
Food Security Environment (Asia and Pacific)				
Rank/113	Country	Score (2012)	Score (2022)	Δ
6 ▲1	Japan	75.4	79.5	+4.1
= 14 ▲2	New Zealand	72.6	77.8	+5.2
22 ↔	Australia	70.8	75.4	+4.6
=25 ▲24	China	60.5	74.2	+3.7
28 ▼3	Singapore	68.4	73.1	+4.7
32 ▲11	Kazakhstan	62.7	72.1	+9.4
39 ↔	South Korea	63.1	70.2	+7.1
=41 ▼9	Malaysia	64.2	69.9	+5.7
46 ▲17	Vietnam	54.5	67.9	+13.4
63 ▼1	Indonesia	55.4	60.2	+4.8
=64 ▼3	Thailand	55.5	60.1	+4.6
66 ▼9	Azerbaijan	56.9	59.8	+2.9
67 ▲5	Philippines	52.1	59.3	+7.2
=68 ▼1	India	53.8	58.9	+5.1
72 ▲6	Myanmar	49.4	57.6	+8.2
73 ▲2	Uzbekistan	50.4	57.5	+7.1
74 ▲10	Nepal	45.8	56.9	+11.1
75 ▲5	Tajikistan	47.1	56.7	+9.6
78 ▲11	Cambodia	44.3	55.7	+11.4
79 ▼9	Sri Lanka	52.9	55.2	+2.3
80 ↔	Bangladesh	47.1	54.0	+6.9
81 ▲9	Laos	44.1	53.1	+9.0
84 ▲10	Pakistan	43.5	52.2	+8.7

(a) Source: Authors' compilation using underlying data from 2023; GHI scores [1]; (b) Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

It is worth noting that the lower the GHI scores, the better, while higher GHI scores indicate deteriorating hunger levels in such countries. The GHI scores are categorised as (i) low (if GHI score  $\leq 9.9$ ), (ii) moderate (if GHI score 10.0–19.9), (iii) serious (if GHI score 20.0–34.9), (iv) alarming (if the GHI score 35.0–49.9), and (v) extremely alarming (if GHI score  $\geq 50.0$ ) [1].

Table 2b reveals the food security environment of Asia and Pacific region, where the GFSI scores are categorised as (i) very good (if scores 80+), (ii) good (if scores 70.0–79.9), (iii) moderate (if score 55.0–69.9), (iv) weak (if scores 40.0–54.9), and (v) very weak (if score 0–39.9) [21]. The score categories of GHI and GFSI are in the opposite direction. A higher

GHI means great concerns for hunger prevalence and severity, while higher GFSI scores symbolise a better food security environment [1,21].

Japan (ranked 6/113) had the best food security environment in the 2022 GFSI (79.5) among the countries in the region. This was followed by New Zealand and Australia, with GFSI scores of 77.8 and 75.4, respectively. Vietnam recorded the most improved score, moving from 54.5 in 2008 to 67.9 in 2022 (+13.4), and also recorded a 17-place improvement in rank. In terms of the change in score (2022 compared with 2012), no countries in this region recorded a reduction in the GFSI scores. Bangladesh, Lao, and Pakistan recorded the three lowest scores in the region (scores 54.0, 53.1, and 52.2, respectively) [21]. The current GHI and GFSI scores in the Asia and Pacific region indicated that the region performed fairly well in their efforts to reduce the prevalence of hunger and improve food security in the specified periods [1,21].

GHI severity of hunger scale/colour key (for Tables 2a, 3a, 4a, 5a and 6a):

Low: GHI ≤ 9.9	Moderate: GHI 10.0–19.9	Serious: GHI 20.0–34.9	Alarming: GHI 35.0–49.9	Extremely alarming: GHI ≥ 50

Scores are normalised 0–100; “=” denotes tie in rank; Δ = change in score, 2023 compared with 2008;

GFSI Colour key (for Tables 2b, 3b, 4b, 5b, 6b and 7a,b):

<b>Very Good</b>	<b>Good</b>	<b>Moderate</b>	<b>Weak</b>	<b>Very weak</b>
Score 80+	Score 70–79.9	Score 55–69.9	Score 40–54.9	Score 0–39.9

Scores are normalised 0–100, where 100 = best conditions; “=” denotes tie in rank; Δ = change in score, 2022 compared with 2012; ▲ = Rank improved ▼ = Rank deteriorated ↔ = No change in rank; Sorted by food security environment in 2022, best to worst.

### 3.2. Hunger and Food Security in Europe

According to the 2023 GHI, many of the countries in the European region were among the groups (1–20) that co-ranked first, with their GHI scores below five. Table 3a presents the GHI scores of the European region, indicating that five countries in this region, namely, Hungary, Slovakia, Romania, Belarus, and Serbia, were jointly ranked first. This shows a very low hunger level in the region. However, it is important to observe that most of these countries (jointly ranked first) did not attain the ranking in 2008 (except Belarus), as shown in Table 3a, but all of them were in the category of low hunger levels (GHI score ≤ 9.9) [1]. Many countries in this region (especially Northern, Southern, and Western Europe) are not captured in the 2023 GHI due to a “very low” benchmark for either one or both of the PoU and child mortality data from the year 2000, which are pivotal in the inclusion of countries in the index. Europe was recorded as the region with the lowest 2023 GHI score, but it is also reported that in recent years, rising domestic food prices have diminished the affordability of food across Europe [23].

Out of the 113 countries captured in the 2022 GFSI (Table 3b), twenty-six European countries were included in the index. The first five countries (Finland (83.7), Ireland (81.7), Norway (80.5), France (80.5), and the Netherlands (80.1)) attained the status of “very good” with a score of 80+, indicating a robust and improved food security environment (Economist Impact, 2022). Finland had the best GFSI score (83.7) in the European region and among all the 113 countries captured in 2022 GFSI [21].

About 62 percent of countries in this region recorded a “good” GFSI score (70.0–79.9), while Bulgaria was the country with the most improved score (+9.5). When comparing scores in 2022 and 2012, only Norway had its score slightly reduced (−0.4), while other countries recorded a significant improvement in their food security environment (+0.8 to +9.5). The United Kingdom recorded the most improved rank (11 places up), while Spain recorded the most deteriorated rank (12 places down) in the European region in the 2022 GFSI [21]. Even with the region’s “very good” and “good” scores, [3] reported that 10.5% of

the population in Eastern Europe encountered moderate to severe FI in 2020–2022. Ukraine recorded the lowest score (57.9) in the region in 2022, and the reason for this may not be far-fetched. The on-going Russia–Ukraine conflict has visibly impacted food security within Ukraine, posing challenges to the livelihoods of food producers due to lowered production levels and heightened costs associated with inputs, storage, and logistics [3,23].

**Table 3.** (a) GHI scores of Europe. (b) GFSI scores of Europe.

(a)				
Global Hunger Index (Europe)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
=1	Hungary	5.6	<5	-
=1	Slovakia	5.7	<5	-
=1	Romania	5.8	<5	-
=1	Belarus	<5	<5	-
=1	Serbia	5.8	<5	-
23	Bulgaria	7.7	7.3	−0.4
26	Russia	5.8	5.8	-
44	Ukraine	7.1	8.2	+1.1
(b)				
Food Security Environment (Europe)				
Rank/113	Country	Score (2012)	Score (2022)	Δ
1 ▲1	Finland	78.4	83.7	+5.3
2 ▲1	Ireland	76.9	81.7	+4.8
3 ▼2	Norway	80.9	80.5	−0.4
4 ↔	France	76.8	80.5	+3.4
5 ▲7	Netherlands	73.4	80.1	+6.7
=7 ▼1	Sweden	75.7	79.1	+3.4
9 ▲11	United Kingdom	71.6	78.8	+7.2
10 ▼1	Portugal	74.8	78.7	+3.9
11 ▲4	Switzerland	73.2	78.2	+5.0
12 ▼2	Austria	74.4	78.1	+3.7
=14 ▼2	Denmark	73.4	77.8	+4.4
16 ▲1	Czech Republic	72.3	77.7	+5.4
17 ▼6	Belgium	73.6	77.5	+3.9
19 ▼7	Germany	73.4	77.0	+3.6
20 ▼12	Spain	74.9	75.7	+0.8
21 ▲3	Poland	68.5	75.5	+7.0
27 ▼6	Italy	71.5	74.0	+2.5
29 ▲6	Bulgaria	63.5	73.0	+9.5
31 ▼4	Greece	67.5	72.2	+4.7
34 ▼5	Hungary	66.1	71.4	+5.3
36 ▼4	Slovakia	64.2	71.1	+6.9
=43 ▼2	Russia	63.0	69.1	+6.1
45 ▼4	Romania	63.0	68.8	+5.8
55 ▼5	Belarus	60.2	64.5	+4.3
61 ▲6	Serbia	53.4	61.4	+8.0
71 ▼11	Ukraine	55.8	57.9	+2.1

(a) Source: Authors' compilation using underlying data from 2023 GHI scores [1]; (b) Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

### 3.3. Hunger and Food Security in Latin America

Out of the 19 Latin American countries captured in this study in the 2023 GHI, 12 (led by Chile and Uruguay) fell into the category “low hunger level” (GHI score  $\leq 9.9$ ), and six of these countries (Chile, Uruguay, Costa Rica, Mexico, Argentina, and Brazil) have maintained this hunger status since 2008 (see Table 4a). A mere 32% of the countries within this region recorded a moderate level of hunger, indicating a predominantly low



to moderate level of hunger in Latin America in the 2023 GHI [1]. However, Haiti was the only country in this region with an alarming hunger level (40.2) in the 2008 scores and fell into the serious hunger level (31.1) in the 2023 GHI scores. Argentina (+0.9) and Venezuela (+8.5) recorded an increase in their 2023 GHI scores when compared with the 2008 scores. According to 2023 GHI scores, Venezuela had the highest level of hunger severity (+8.5), while Haiti was the country with the most improvement in reducing the level of hunger (−9.1) in the region [1]. Since 2015, nine Latin American countries (Trinidad and Tobago, Bolivia, Brazil, Argentina, Costa Rica, Ecuador, Paraguay, Haiti and Venezuela) have experienced a rise in hunger [3]. It was reported in recent estimates that the expense of maintaining a healthy diet in Latin America and the Caribbean surpasses that of any other global region. The devastating effects of COVID-19 and income inequality have further aggravated hunger levels in this region [3].

From the underlying data of the 2022 GFSI, (Table 4b) 19 Latin American countries were captured, where Costa Rica recorded the best GFSI score of 77.4. Out of the 19 countries, five (Costa Rica (77.4), Chile (74.2), Uruguay (71.8), Peru (70.8), and Panama (70.0)) were in the category of a “good” score (70.0–79.9) [21]. Comparing the 2022 GFSI score with 2012 in this region, Bolivia recorded the most significant improvement (+12.2), while three countries (Colombia (−2.2), Venezuela (−4.9), and Haiti (−5.4)) experienced a decline in their respective GFSI scores, indicating a decline in the countries’ food security environment [21]. Out of the 113 countries captured, Haiti was ranked 112th (also the lowest rank in the region) and was the only country with the lowest GFSI score (38.5), falling into the category of “very weak” (0–39.9) [21]. Additionally, Bolivia had the most improved ranking (2012–2022), moving 19 places upwards, while Colombia, Haiti, and Venezuela recorded the most deteriorated ranks, moving 19, 21, and 27 places downwards, respectively (see Table 4b). According to the FAO and partners’ recent estimates, the number of severely food insecure people in Latin America rose from 32 million in 2015 to 70.8 million in 2022. Meanwhile, those experiencing moderate to severe FI jumped from 144 million in 2015 to 220.8 million in 2022 [3]. In Haiti, criminal violence and challenging economic circumstances persist in disrupting income-generating endeavours and contributing to elevated food prices [24,25]. The critical food deprivation experiences in Colombia and Venezuela require concerted efforts to curtail rising inflation rates and reduce gross domestic product (GDP) growth. The persisting effects of El Niño, with reduced rainfall forecast, are likely to have a severe impact on food production in Venezuela [26–28].

**Table 4.** (a) GHI scores of Latin America. (b) GFSI scores of Latin America.

(a)				
Global Hunger Index (Latin America)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
=1	Chile	<5	<5	-
=1	Uruguay	5.3	<5	-
22	Costa Rica	<5	5.1	-
=28	Mexico	9.9	6.0	−3.9
=28	Paraguay	10.1	6.0	−4.1
31	Argentina	5.5	6.4	+0.9
32	Brazil	6.8	6.7	−0.1
35	Colombia	10.2	7.0	−3.2
36	Peru	14.0	7.2	−6.8
42	Panama	13.0	7.9	−5.1
43	El Salvador	12.0	8.1	−3.9
46	Dominican Rep.	13.9	8.6	−5.3
58	Nicaragua	17.5	13.0	−4.5
65	Ecuador	18.1	14.5	−3.6
67	Honduras	19.2	14.9	−4.3
71	Bolivia	22.1	14.7	−7.4
75	Venezuela	8.8	17.3	+8.5

Table 4. Cont.

(a)				
Global Hunger Index (Latin America)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
82	Guatemala	24.0	19.1	−4.9
115	Haiti	40.2	31.1	−9.1
(b)				
Food Security Environment (Latin America)				
Rank/113	Country	Score (2012)	Score (2022)	Δ
18 ▲1	Costa Rica	71.7	77.4	+5.7
=25 ▲1	Chile	68.3	74.2	+5.9
33 ▲15	Uruguay	60.9	71.8	+10.9
37 ▲2	Peru	63.1	70.8	+7.7
40 ▲7	Panama	61.2	70.0	+8.8
=43 ▲3	Mexico	61.8	69.1	+7.3
48 ▲4	Ecuador	59.4	65.6	+6.2
51 ▼17	Brazil	63.8	65.1	+1.3
=52 ▲19	Bolivia	52.8	65.0	+12.2
=52 ▼1	Dominican Rep.	59.5	65.0	+5.5
54 ▼19	Argentina	63.5	64.8	+1.3
56 ▼3	El Salvador	58.8	64.2	+5.4
58 ↔	Guatemala	56.2	62.8	+6.6
60 ▲4	Honduras	54.1	61.5	+7.4
=64 ▼19	Colombia	62.3	60.1	−2.2
70 ▼5	Paraguay	54.0	58.6	+4.6
76 ↔	Nicaragua	50.3	56.6	+6.3
106 ▼27	Venezuela	47.5	42.6	−4.9
112 ▼21	Haiti	43.9	38.5	−5.4

(a) Source: Authors' compilation using underlying data from 2023 GHI scores [1]; (b) Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

### 3.4. Hunger and Food Security in Sub-Saharan Africa (SSA)

The only region expected to witness a significant rise in hunger (as indicated by the number of undernourished individuals) is Africa, where approximately 300 million people may face hunger in 2030. Table 5a presents the GHI scores of SSA. According to the 2023 GHI data, South Africa had the best score of 13.0, while four other countries (Ghana, 13.7; Senegal, 15.0; Cameroon, 18.6; Botswana, 19.9) recorded less than 20.0 scores, indicating *moderate* hunger levels [1]. None of the countries in the SSA region were classified in the *low* hunger level (GHI  $\leq$  9.9). Madagascar's hunger status deepened based on the GHI scores from 2008 to 2023, with an increase of +4.4, and it remained the only country with the highest GHI score of 41.0, placing it in the *alarming* hunger level [1]. This categorisation was also shared with two other countries (Niger, 35.1; Congo Dem. Rep, 35.7). Nonetheless, Angola achieved the most improved score (−17.0) between the 2008 and 2023 GHI scores, signalling a substantial advancement in the country's efforts to reduce extreme hunger [1]. Most of the countries in this region recorded a significant reduction (from Guinea, −2.2 to Angola, −17.0) in their scores, but it is important to note that many of them are still grappling with the *serious* to *alarming* hunger (GHI score 20.0–49.9) levels. The SSA recorded the highest level (21.7%) of undernourished individuals globally [29].

Additionally, SSA also recorded the highest child mortality rate of 7.4% globally, while the region's child-stunting rate of 31.5% was closer to that of South Asia of 31.4% [30,31].

Table 5. (a) GHI scores of sub-Saharan Africa. (b) GFSI scores of sub-Saharan Africa.

(a)				
Global Hunger Index (Sub-Saharan Africa)				
Rank/125	Country	Score (2008)	Score (2023)	$\Delta$
58	South Africa	16.8	13.0	−3.8
62	Ghana	22.2	13.7	−8.5
69	Senegal	21.8	15.0	−6.8
79	Cameroon	29.0	18.6	−10.4
85	Botswana	26.8	19.9	−6.9
86	Cote d'Ivoire	36.0	20.6	−15.4
=88	Malawi	29.2	21.1	−8.1
=88	Togo	29.6	21.1	−8.5
90	Kenya	29.5	22.0	−7.5
91	Benin	26.4	22.6	−3.8
94	Tanzania	30.2	23.2	−7
95	Uganda	29.0	25.2	−3.8
96	Rwanda	33.1	25.4	−7.7
97	Burkina Faso	33.7	25.6	−8.1
98	Mali	32.2	25.6	−6.6
99	Angola	42.9	25.9	−17
101	Ethiopia	40.5	26.2	−14.3
103	Sudan	-	27.0	-
104	Guinea	29.3	27.1	−2.2
109	Nigeria	31.2	28.3	−2.9
110	Zambia	44.9	28.5	−16.4
113	Mozambique	35.6	30.5	−5.1
116	Sierra Lone	45.4	31.3	−14.1
119	Chad	49.9	34.6	−15.3
120	Niger	39.5	35.1	−4.4
122	Congo (Dem. Rep)	40.2	35.7	−4.5
124	Madagascar	36.6	41.0	+4.4

(b)				
Food Security Environment (sub-Saharan Africa)				
Rank/113	Country	Score (2012)	Score (2022)	$\Delta$
59 ▼3	South Africa	57.1	61.7	+4.6
82 ▲13	Kenya	43.0	53.0	+10.0
83 ▼10	Ghana	50.5	52.6	+2.1
85 ▲3	Mali	44.5	51.9	+7.4
86 ▲13	Senegal	42.5	51.2	+8.7
87 ▼10	Botswana	50.2	51.1	+0.9
88 ▼5	Rwanda	45.9	50.6	+4.7
89 ▲18	Burkina Faso	38.9	49.6	+10.7
90 ▲17	Tanzania	38.9	49.1	+10.2
=91 ▲15	Benin	39.2	48.1	+8.9
=91 ▼6	Malawi	45.5	48.1	+2.6
93 ▲10	Uganda	41.0	47.7	+6.7
94 ▼2	Mozambique	43.8	47.3	+3.5
95 ▼8	Cote d'Ivoire	45.0	46.5	+1.5
96 ▼3	Cameroon	43.6	46.4	+2.8
97 ▲3	Niger	42.1	46.3	+4.2
98 ↔	Togo	42.7	46.2	+3.5
99 ▲11	Guinea	50.5	45.1	+9.3
100 ▲9	Ethiopia	38.7	44.5	+5.8
101 ▼5	Angola	42.9	43.7	+0.8
102 ▼16	Zambia	45.3	43.5	−1.8
103 ▲8	Chad	35.5	43.2	+7.7

Table 5. Cont.

(b)				
Food Security Environment (sub-Saharan Africa)				
Rank/113	Country	Score (2012)	Score (2022)	Δ
104 ▲9	Congo (Dem. Rep)	33.7	43.0	+9.3
105 ▲6	Sudan	35.5	42.8	+7.3
107 ▼11	Nigeria	42.9	42.0	−0.9
=108 ▼7	Burundi	42.0	40.6	−1.4
=108 ▼3	Madagascar	39.4	40.6	+1.2
110 ▼8	Sierra Lone	41.5	40.5	−1.0

(a) Source: Authors' compilation using underlying data from 2023 GHI scores [1]. (b) Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

Out of 113 countries captured in the 2022 GFSI edition (Table 5b), 28 SSA countries were included. From the 2023 GHI data, the SSA countries had 40% of the 10 most deteriorated GFSI scores from 2012 to 2022 [21]. Table 5b reveals the GFSI score of SSA in 2012 and 2022, revealing the prevalence and severity of FI levels in the region. However, eight countries (Burkina Faso and Tanzania (38.9), Benin (39.2), Ethiopia (38.7), Chad and Sudan (35.5), Congo Dem. Rep (33.7), and Madagascar (39.4)) were found in the most deteriorated GFSI score (0–39.9) in 2012. It is important to observe that only South Africa recorded the best (highest) GFSI scores of 57.1 and 61.7 in 2012 and 2022, respectively. It is surprising to note that no country in SSA recorded a GFSI score categorised as *very good* (score 80+) or *good* (score 70–79.9) between 2012 and 2022 [21]. Ninety-six percent (27/28) of the countries in this region fell in the category of a *weak* GFSI score (40–54.9) in 2022. In addition, Burkina Faso recorded the most improved rank (18 places upward) and score (+10.7) in the region between 2012 and 2022, while four countries (Zambia (−1.8), Nigeria (−0.9), Burundi (−1.4), and Sierra Leone (−1.0)) had their GFSI score further deteriorated within the two periods. Zambia recorded the most deteriorated rank (16 places downward), while Sierra Leone recorded the lowest rank (112/113) in the region in the 2022 GFSI (see Table 5b) [21].

Sub-Saharan Africa was the only region that performed below the global average of 62.2 in the 2022 GFSI with 47.0 [5,21]. Recent estimates revealed that about one in every four individuals in Africa encountered FI in 2022. Moderate FI increased from 45.4% in 2015 to 60.9% in 2022, while severe FI rose from 17.2% in 2015 to 24% in 2022 [3]. Countries in the SSA region, like the Congo Dem. Rep., Ethiopia, and Somalia are among the hunger hotspot countries (others are Afghanistan, Haiti, Yemen, Pakistan, and the Syrian Arab Republic) of very high concern in 2023–2024 due to worsening critical circumstances [25].

### 3.5. Hunger and Food Security in Middle East and North Africa (MENA)

Out of the 125 countries included in the 2023 GHI scores, 10 belonging to the Middle East and North Africa (MENA) region are included in this study (see Table 6a). Seventy percent (7/10) of the countries were categorised in the *low* hunger level (GHI score  $\leq 9.9$ ), with three countries (United Arab Emirates, Turkey, and Kuwait) ranked among the 20 countries jointly ranked first (1/125), with below five GHI scores [1]. However, Syria and Yemen were the two countries that witnessed a deterioration in their GHI score (Syria, +9.9; Yemen, +2.1) between 2008 and 2023. Yemen is the only country found in the *alarming* hunger level (GHI score 35.0–49.9) in this region in 2008 and 2023 (Table 6a). It is important to observe that Yemen and Syria are among the eight countries considered “hunger hotspots of significant concern” [25]. All of these hotspots feature a substantial population grappling with or projected to encounter severe levels of FI, along with exacerbating factors that are anticipated to heighten life-threatening circumstances in the early months of 2024 [25]. Yemen ranked as the third-highest in the 2023 GHI score (39.9), recording a high level of child undernutrition (stunting, 48.7%; wasting, 14.4%) in 2023. The enduring conflict in

Yemen, now in its ninth year, has been severely damaging to the economy, and the nation's children have endured substantial suffering [32].

Algeria recorded the most significant reduction in hunger level (−4.3) in the region, moving from a GHI score of 11.1 in 2008 to a 6.8 (low) hunger level in 2023 [1]. All the North African countries (Tunisia, Algeria, and Morocco) except Egypt are at a *low* hunger level. However, North African countries relatively enjoy low to *moderate* hunger levels when compared with SSA, where most of the countries have *serious* and *alarming* hunger levels [1].

**Table 6.** (a) GHI scores of Middle East and North Africa. (b) GFSI scores of Middle East and North Africa.

(a)				
Global Hunger Index (Middle East and North Africa)				
Rank/125	Country	Score (2008)	Score (2023)	Δ
=1	United Arab Emirates	6.8	<5	-
=1	Turkey	5.7	<5	-
=1	Kuwait	<5	<5	-
27	Tunisia	7.4	5.9	−1.5
33	Algeria	11.1	6.8	−4.3
45	Oman	11.2	8.3	−2.9
47	Morocco	12.2	9.0	−3.2
57	Egypt	16.9	12.8	−4.1
100	Syria	16.2	26.1	+9.9
123	Yemen	37.8	39.9	+2.1
(b)				
Food Security Environment (Middle East and North Africa)				
Rank/113	Country	Score (2012)	Score (2022)	Δ
23 ▲15	United Arab Emirates	63.2	75.2	+12.0
24 ▲4	Israel	67.0	74.8	+7.8
30 ▼7	Qatar	69.9	72.4	+2.5
35 ▲20	Oman	57.4	71.2	+13.8
38 ▼7	Bahrain	64.7	70.3	+5.6
=41 ▲13	Saudi Arabia	58.1	69.9	+11.8
47 ▼10	Jordan	63.3	66.2	+2.9
49 ▼5	Turkey	62.4	65.3	+2.9
50 ▼20	Kuwait	65.7	65.2	−0.5
57 ▲9	Morocco	53.9	63.0	+9.1
62 ▼3	Tunisia	56.0	60.3	+4.3
=68 ▲5	Algeria	50.5	58.9	+8.4
77 ▼10	Egypt	53.8	56.0	+2.2
111 ▼7	Yemen	40.0	40.1	+0.1
113 ▼31	Syria	46.8	36.3	−10.5

(a) Source: Authors' compilation using underlying data from 2023 GHI scores [1]; (b) Source: Authors' compilation using underlying data from 2022 GFSI scores [18].

The 2022 GFSI data (Table 6b) showed that 87% of the countries in this region recorded a moderate GFSI score (55–69.9) in 2022 [21]. The United Arab Emirates (UAE) had the best GHI score (75.2), while Oman emerged as the country with the most improved rank (20 places upward) and score (+13.8) in 2022. Syria recorded the worst GFSI score (36.3) and the most deteriorated rank (31 places downward) from 2012 to 2022 from the 15 countries reported in this region. In addition, Kuwait and Syria remained the only two countries that had their GFSI scores decline from 65.7 to 65.2 (−0.5) and from 46.8 to 36.3 (−10.5) in 2012–2022, respectively (see Table 6b) [21]. Syria recorded the worst GFSI score in the 2022 ranking, with the 113th position (113/113).



According to the 2023 Global Report on Food Crises (GRFC), the on-going conflicts in Yemen and Syria, along with escalating economic crises throughout the region, resulted in heightened levels of severe FI in 2022 [2]. The report also projected that about 18% of the analysed population (38 countries/territories) will face high levels of severe FI in 2023 [2]. In 2022, approximately 34.1 million individuals encountered elevated levels of severe FI in eight countries within the MENA region, marking an increase from 31.9 million in 2021 [2].

### 3.6. The Improvement and the Deterioration of GFSI Scores (2012–2022)

The underlying data of the 2022 GFSI revealed the identification of 10 countries with the most improved scores alongside the identification of another 10 countries with the most deteriorated scores in the 2022 edition [21]. Table 7a reveals the top 10 countries with the most improved GFSI scores, while Table 7b indicates the countries with the most deteriorated GFSI scores from 2012 to 2022 [21]. Oman recorded the most improved GFSI score (+13.8), while Burkina Faso (the only SSA in this category) recorded the least improved score (+10.7). In addition, 50% of the countries (Table 7a) fell in the category of a *moderate* score (55–69.9), 40% belonged to the *good* score, while only Burkina Faso belonged to the *weak* score. Of the countries with the most deteriorated food security environment score, Syria recorded the highest score (−10.5) and belonged to the *very weak* GFSI score (36.3), along with Haiti (38.5) [21]. Further, four countries in the SSA (Zambia, −1.8; Burundi, −1.4; Sierra Leone, −1.0; and Nigeria, −0.9) region were part of this category (most deteriorated GFSI), while Norway was the only European country with the least score (−0.4), though the country still belonged to the *very good* GFSI score (80.9–80.5) from 2012 to 2022. It is worth noting that most of the countries in this category (7/10) had *weak* GFSI scores (see Table 7b) [21].

**Table 7.** (a) Most improved GFSI score 2022 vs. 2012. (b) Most deteriorated GFSI score 2022 vs. 2012.

(a)				
2022 Rank	Country	2012 Score	2022 Score	Δ
35	Oman	57.4	71.2	+13.8
=25	China	60.5	74.2	+13.7
46	Vietnam	54.5	67.9	+13.4
=52	Bolivia	52.8	65.0	+12.2
23	United Arab Emirates	63.2	75.2	+12.0
=41	Saudi Arabia	58.1	69.9	+11.8
78	Cambodia	44.3	55.7	+11.4
74	Nepal	45.8	56.9	+11.1
33	Uruguay	60.9	71.8	+10.9
89	Burkina Faso	38.9	49.6	+10.7
(b)				
2022 Rank	Country	2012 Score	2022 Score	Δ
113	Syria	46.8	36.3	−10.5
112	Haiti	43.9	38.5	−5.4
106	Venezuela	47.5	42.6	−4.9
=64	Colombia	62.3	60.1	−2.2
102	Zambia	45.3	43.5	−1.8
108	Burundi	42.0	40.6	−1.4
110	Sierra Leone	41.5	40.5	−1.0
107	Nigeria	42.9	42.0	−0.9
50	Kuwait	65.7	65.2	−0.5
3	Norway	80.9	80.5	−0.4

Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

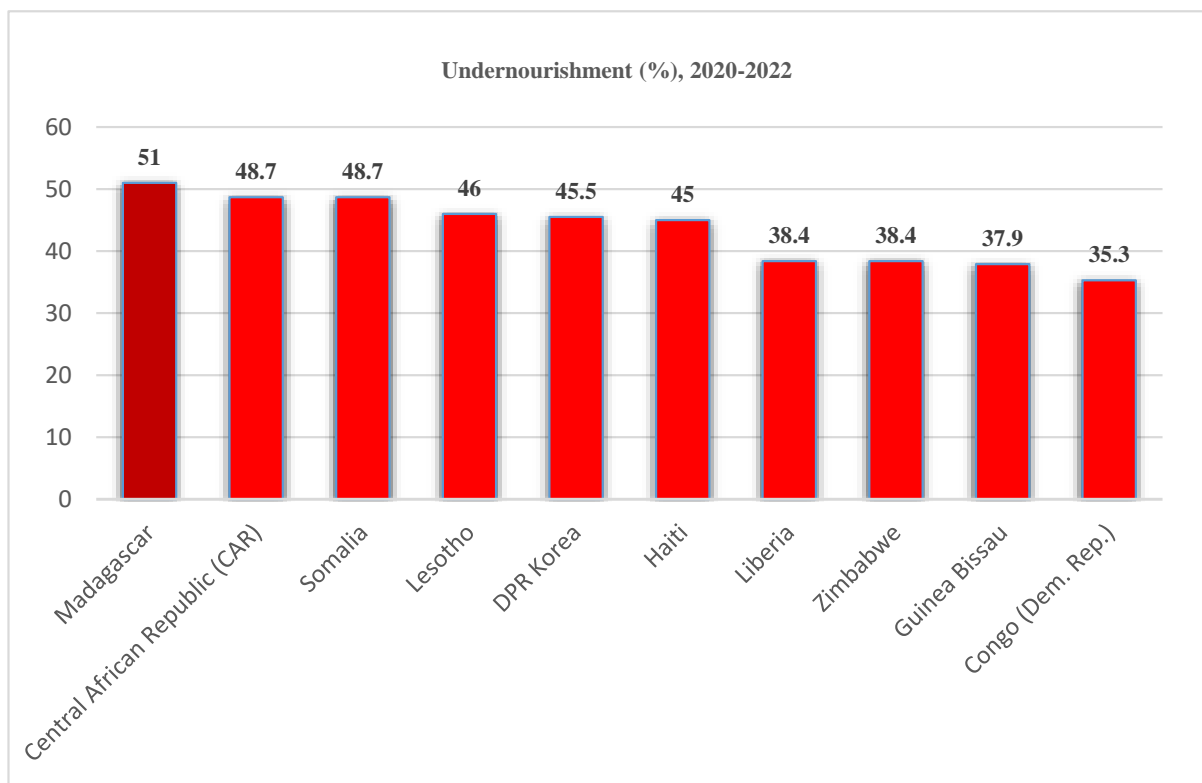
#### 4. Exploring Hunger Severity Where Hunger Indicators Reached Their Peak

As mentioned above, the GHI scores are computed based on the values of four component indicators, namely, the prevalence of undernourishment (PoU), child-stunting, child-wasting, and child mortality [1]. The 2023 GHI scores indicated that from 2015 onwards, the global advancement in addressing hunger had shown minimal change, with a reduction of less than one percentage point, decreasing from 19.1% to 18.3%. Even though the 2030 global goals aim for zero hunger by 2030, the 2023 GHI scores and current realities indicate that 58 countries are unlikely to achieve low hunger levels, casting doubt on the feasibility of achieving zero hunger by 2030 [1]. It is important to highlight that several countries, including Bangladesh, Chad, Djibouti, Lao PDR, Mozambique, Nepal, and Timor-Leste, have achieved remarkable progress in reducing hunger since 2015. However, six countries, Niger, the Central African Republic (CAR), Madagascar, Congo Dem. Rep., Lesotho, and Yemen—were found to have GHI scores in the alarming threshold. Additionally, three other countries—Burundi, Somalia, and South Sudan—are provisionally designated as *alarming* [1].

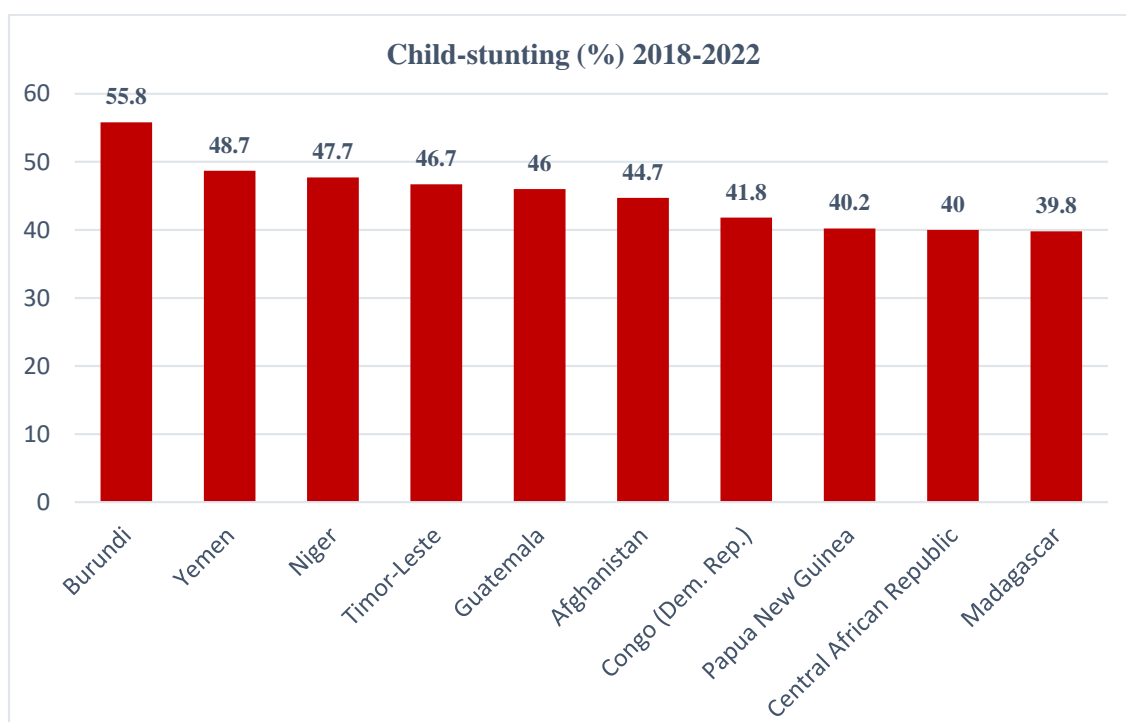
Utilising the hunger indicators for the 2023 GHI scores, it was found that the CAR (although CAR was not captured in the 2022 GFSI) had the highest 2023 GHI score of 42.3 and PoU of 48.7% during 2020–2022, signalling that approximately half of the country's population is experiencing undernourishment. Additionally, 40% of children in the Central African Republic (CAR) experience stunted growth, and 5.3% suffer from wasting [1]. The Central African Republic faces severe levels of hunger, exacerbated by conflicts, abject poverty, forced migration, and an underutilised workforce [1,33,34].

Further, Madagascar reported the highest PoU at 51%, with 38.9% of children experiencing stunted growth and 7.2% suffering from wasting. The country also endured the devastating impact of climate change, pushing it perilously close to widespread famine in recent times. Fundamental structural deficiencies further deepen Madagascar's fragility [35–37]. In the period 2020–2022, eighty percent of the top 10 countries with the highest percentages of undernourishment (ranging from 51.0% to 35.3%) were located in sub-Saharan Africa (see Figure 1a), highlighting the region's considerable responsibility for addressing hunger on a global scale [1]. In the period of 2018–2022, half of the top 10 countries with the most significant prevalence of child-stunting were located in sub-Saharan Africa (see Figure 1b).

The third indicator utilised to calculate the 2023 GHI scores, which focuses on child-wasting, revealed that 5 out of the 10 countries (Niger, Mali, Mauritius, Sudan, and Mauritania) with the greatest prevalence of child-wasting were located in SSA [1]. Though India had the highest child-wasting of 18.7% globally, Sudan had the highest prevalence of child-wasting (13.7%) in SSA from 2018 to 2022 [21]. None of the countries in Europe were among those with the highest prevalence of wasting from 2018 to 2022 (see Figure 1c). Additionally, the prevalence of child mortality was the fourth indicator employed in calculating the 2023 GHI scores. It was surprising to observe that all of the top 10 countries with the highest burden of child mortality in 2021 were located in sub-Saharan Africa. Niger exhibited the highest child mortality rate at 11.5%, whereas Benin demonstrated the lowest prevalence of child mortality, standing at 8.4% within this category (see Figure 1d) [1]. It is important to highlight that South Sudan has fallen into an *alarming* hunger level, reporting a child mortality of approximately 10% in the region. Nearly one-fifth of South Sudan's population experienced undernourishment from 2020 to 2022 [2]. Further, Somalia exhibited the second-highest rate of child mortality at 11.2% in 2021, along with a PoU of 48.7% from 2020 to 2022. These challenges were exacerbated by rising global prices, persistent insecurity, and the impact of the COVID-19 pandemic [2].

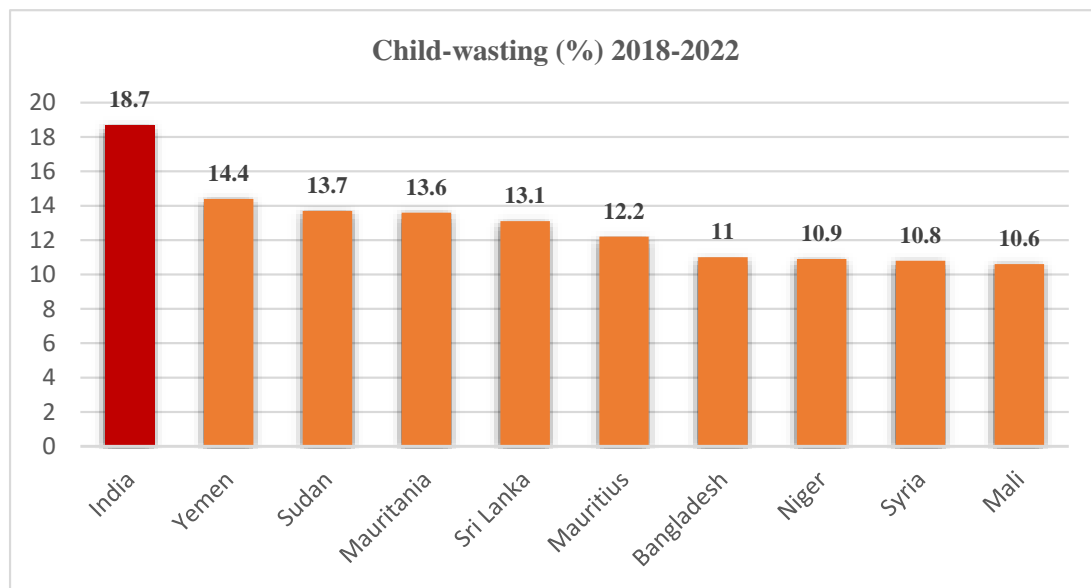


(a)

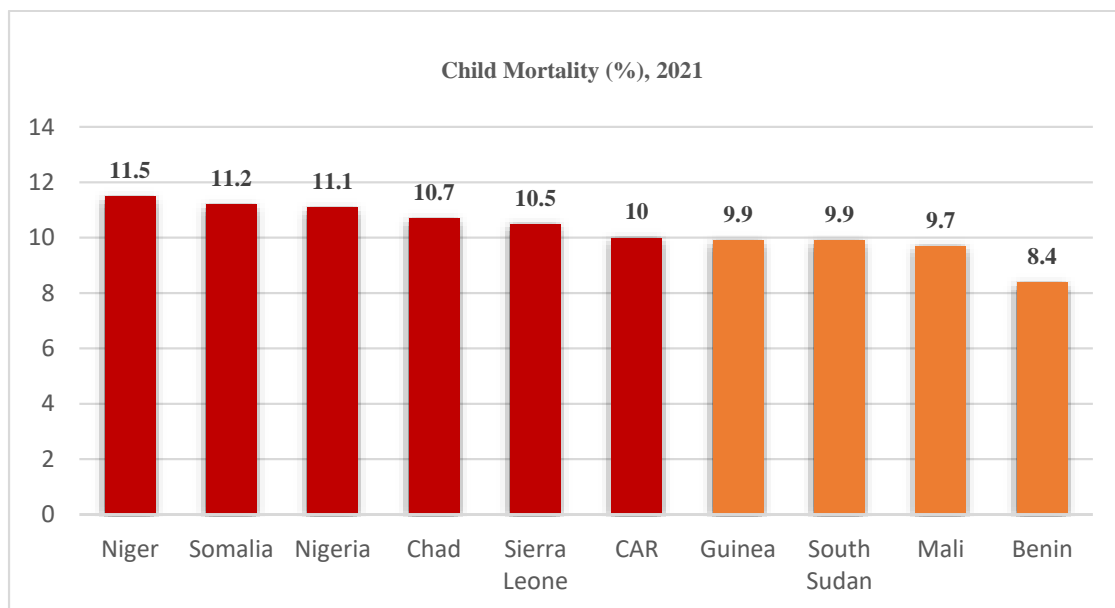


(b)

Figure 1. Cont.



(c)



(d)

**Figure 1.** (a) Top 10 countries with highest burden of undernourishment during 2020 to 2022. (b) Top 10 countries with highest burden of child-stunting during 2018–2022. (c) Top 10 countries with highest burden of child-wasting during 2018–2022. (d). Top 10 countries with highest burden of child mortality during 2018–2022. Source: Authors' compilation using underlying data from 2023 GHI scores [1].

### 5. Sub-Saharan Africa Suffers the Highest Burden of Food Insecurity Globally

Based on the foundational data from the 2022 GFSI, seven out of the top ten countries with the highest GFSI scores were from the European region, while two originated from North America (Canada and the United States), and one (Japan) emerged from the Asia and Pacific region. In Africa, especially the SSA, the proportion of the population facing FI who are unable to access high-quality diets ranks among the highest globally. As noted above, the percentage of the African population facing severe FI increased from 17.2% in

2015 to 24.0% in 2022, surpassing the global severe FI rate of 11.8% and that of any other region worldwide (Figure 2) [21]. In addition, moderate FI in Africa rose from 45.4% in 2015 to 60.9% in 2022, surpassing the global moderate FI rate of 29.6% in 2022 and that of any other region worldwide in the same period [3]. Although Asia is the largest region, it is important to emphasise that the worldwide prevalence of severe FI in 2022 was reduced (9.7%), in contrast to Africa, where severe FI reached 24% in the same year [3].

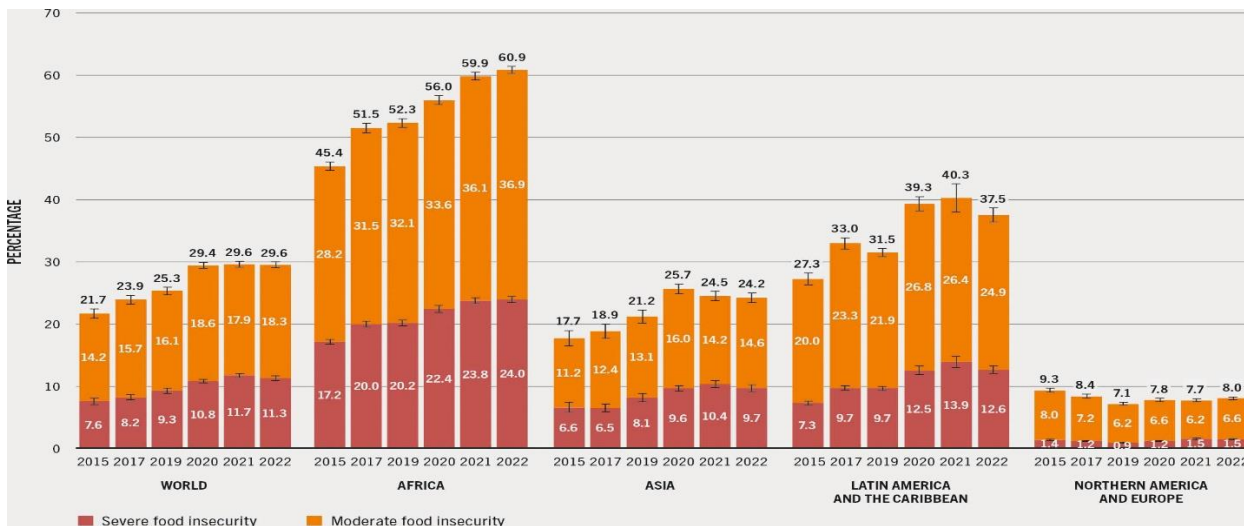


Figure 2. Sub-Saharan Africa bears the highest burden of moderate or severe food insecurity globally 2015–2022. Source: [3].

Additionally, among the bottom 10 countries with the least favourable GFSI scores in 2022 (as indicated in Table 8b), 60% were from SSA, 20% from the MENA region (Yemen and Syria), and 20% were from Latin America (Haiti and Venezuela). In the category of the SSA’s 2022 GFSI scores, the range spanned from 40.5 (Sierra Leone) to 43.0 (Congo Dem. Rep), indicating a *weak* score. Meanwhile, Syria (36.3) and Haiti (38.5) fell within the group of *very weak* 2022 GFSI scores [21]. In Table 8a, the United States recorded the highest GFSI score improvement (+7.2), while Norway had a slightly deteriorated score from 2012 to 2022. In Table 8b, the Congo Dem. Rep. recorded the largest GFSI score improvement of +9.3, whereas Syria recorded the lowest GFSI score and rank (36.3 and 113/113) in 2022 and also the most significant decline in score (−10.5) within this category [21].

Table 8. (a) Top 10 most favourable GFSI scores in 2022. (b) Bottom 10 least favourable GFSI in 2022.

(a)				
2022 Rank	Δ	Country	2022 Score	Δ
1	▲1	Finland	83.7	+5.3
2	▲1	Ireland	81.7	+4.8
3	▼2	Norway	80.5	−0.4
4	↔	France	80.2	+3.4
5	▲7	Netherlands	80.1	+6.7
6	▲1	Japan	79.5	+4.1
=7	▲11	Canada	79.1	+7.0
=7	▼1	Sweden	79.1	+3.4
9	▲11	United States	78.8	+7.2
10	▼1	Portugal	78.7	+3.9



Table 8. Cont.

(b)				
2022 Rank	Δ	Country	2022 Score	Δ
113	▼31	Syria	36.3	−10.5
112	▼21	Haiti	38.5	−5.4
111	▼7	Yemen	40.1	+0.1
110	▼8	Sierra Leone	40.5	−1.0
=108	▼7	Burundi	40.6	−1.4
=108	▼3	Madagascar	40.6	+1.2
107	▼11	Nigeria	42.0	−0.9
106	▼27	Venezuela	42.6	−4.9
105	▲6	Sudan	42.8	+7.3
104	▲9	Congo (Dem. Rep)	43.0	+9.3

Source: Authors' compilation using underlying data from 2022 GFSI scores [21].

Additionally, Figure 2 shows moderate and severe FI levels in the world and other regions from 2015 to 2022. Moderate FI in Africa increased from 28.2% in 2015 to 36.9% in 2022, while severe FI rose from 17.2% in 2015 to 24% in 2022 [3]. The unprecedented rise in FI in Africa was reported as the highest globally. Also, the prevalence of severe FI in Latin America and the Caribbean is the second-highest globally, increasing from 7.3% in 2015 to 12.6% in 2022 [3]. However, North America and Europe recorded moderate or severe FI levels of less than 10% from 2015 to 2022, but it is worth noting that moderate FI increased slightly in the region from 6.2% in 2021 to 6.6% in 2022 [3]. While global moderate or severe FI remained the same (29.6%) between 2021 and 2022, Africa witnessed worsening FI levels from 2015 to 2022 [3,38].

## 6. Limitations of the Study

In this investigation, the latest global hunger and food security dynamics were examined, drawing on data from trustworthy and reliable organisations. However, one of the limitations of this study is the incomplete representation of all countries across the indices and classifications utilised. Additionally, the current 2023 GHI and 2022 GFSI reports cannot be directly compared with previous editions of the GHI and GFSI because the results in the 2023 GHI and 2022 GFSI reports supersede any other previous GHI and GFSI results.

## 7. Conclusions

The world is currently facing intersecting crises that are intensifying social and economic disparities and undoing advancements made against hunger. Global hunger showed little change from 2021 to 2022, yet it continues to significantly surpass levels witnessed before the COVID-19 pandemic. The current study provides evidence at both country and regional levels regarding recent changes in hunger and food security dynamics. In nearly all of the 125 ranked countries in the 2023 GHI and 113 countries in the 2022 GFSI, instances of levels of hunger and food insecurity were documented. While there were modest improvements in GHI and GFSI scores, particularly in developed countries, a majority of countries in sub-Saharan Africa (SSA) demonstrated a deterioration in their GHI and GFSI scores, accompanied by significant increases and declines in their GHI and GFSI scores, respectively. This study calls on governments, especially SSA governments, to prioritise addressing hunger and food insecurity on both national and international platforms. Collaboration among member countries is crucial to end hunger and achieve food and nutritional security, especially in SSA countries. This study offers the subsequent policy recommendations: (i) centre the universal right to food at the core of the transformation of food systems, (ii) allocate resources to develop the abilities of young individuals in the transformation of food systems, and (iii) allocate resources towards creating sustain-

able, fair, and adaptable food systems that provide meaningful and appealing livelihood opportunities for young individuals.

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## References

1. von Grebmer, K.; Bernstein, J.; Geza, W.; Ndlovu, M.; Wiemers, M.; Reiner, L.; Bachmeier, M.; Hanano, A.; Ni Cheilleachair, R.; Sheehan, T.; et al. *Global Hunger Index: The Power of Youth in Shaping Food Systems*; Welthungerhilfe (WHH): Bonn, Germany; Concern Worldwide: Dublin, Ireland, 2023.
2. FSIN; Global Network against Food Crises. *2023 Global Report on Food Crises: Joint Analysis for Better Decision*; Global Network against Food Crises: Rome, Italy, 2023.
3. FAO; IFAD; UNICEF; WFP; WHO. *The State of Food Security and Nutrition in the World 2023. Urbanization, Agrifood Systems Transformation and Healthy Diets across the Rural–Urban Continuum*; FAO: Rome, Italy, 2023.
4. Otekunrin, O.A.; Mukaila, R.; Otekunrin, O.A. Investigating and Quantifying Food Insecurity in Nigeria: A Systematic Review. *Agriculture* **2023**, *13*, 1873. [[CrossRef](#)]
5. Otekunrin, O.A.; Ayinde, I.A.; Sanusi, R.A.; Onabanjo, O.O. Dietary diversity, nutritional status, and agricultural commercialization: Evidence from rural farm households. *Dialog. Health* **2023**, *2*, 100121. [[CrossRef](#)] [[PubMed](#)]
6. Otekunrin, O.A. Countdown to the global goals: A Bibliometric Analysis of Research Trends on SDG 2—Zero Hunger. *Curr. Res. Nutr. Food Sci. J.* **2023**, *11*, 1338–1362. [[CrossRef](#)]
7. Action Against Hunger. What Is Hunger? 2023. Available online: <https://www.actionagainsthunger.org/the-hunger-crisis/world-hunger-facts/what-is-hunger/> (accessed on 17 August 2023).
8. United Nations. *Sustainable Development Goal 2*. 2017. Available online: <https://sustainabledevelopment.un.org/sdg2> (accessed on 10 March 2024).
9. Otekunrin, O.A.; Otekunrin, O.A.; Momoh, S.; Ayinde, I.A. How far has Africa gone in achieving the Zero Hunger Target? Evidence from Nigeria. *Glob. Food Secur.* **2019**, *22*, 1–12. [[CrossRef](#)]
10. Otekunrin, O.A.; Otekunrin, O.A.; Sawicka, B.; Ayinde, I.A. Three decades of fighting against hunger in Africa: Progress, challenges and opportunities. *World Nutr.* **2020**, *11*, 86–111. [[CrossRef](#)]
11. Fanzo, J.; Haddad, L.; Schneider, K.R.; Bene, C.; Covic, N.M.; Guarin, A.; Herforth, A.W.; Herrero, M.; Sumaila, U.R.; Aburto, N.J.; et al. Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals. *Food Policy* **2021**, *102*, 102163. [[CrossRef](#)]
12. FAO. Rome declaration on the world food security and world food summit plan of action. In *Proceedings of the World Food Summit 1996*, Rome, Italy, 13–17 November 1996.
13. Piperata, B.A.; Scaggs, S.A.; Dufour, D.L.; Adams, I.K. Measuring food insecurity: An introduction to tools for human biologists and ecologists. *Am. J. Hum. Biol.* **2023**, *35*, e23821. [[CrossRef](#)] [[PubMed](#)]
14. Otekunrin, O.A.; Otekunrin, O.A.; Fasina, F.O.; Omotayo, A.O.; Akram, A. Assessing the Zero Hunger Target Readiness in Africa in the Face of COVID-19 Pandemic. *Caraka Tani J. Sustain. Agric.* **2020**, *35*, 213–227. [[CrossRef](#)]
15. Atukunda, P.; Eide, W.B.; Kardel, K.R.; Iversen, P.O.; Westerberg, A.C. Unlocking the potential for achievement of the UN Sustainable Development Goal 2—‘Zero Hunger’—In Africa: Targets, strategies, synergies and challenges. *Food. Nutr. Res.* **2021**, *65*, 7686. [[CrossRef](#)] [[PubMed](#)]
16. Otekunrin, O.A.; Otekunrin, O.A. Healthy and Sustainable Diets: Implications for Achieving SDG2. In *Zero Hunger, Encyclopedia of the UN Sustainable Development Goals*; Leal Filho, W., Ed.; Springer International Publishing: Cham, Switzerland, 2021; pp. 1–21.
17. Blesh, J.; Hoey, L.; Jones, A.D.; Friedmann, H.; Perfecto, I. Development pathways toward “zero hunger”. *World Dev.* **2019**, *118*, 1–14. [[CrossRef](#)]
18. Wiesmann, D. *A Global Hunger Index: Measurement Concept, Ranking of Countries, and Trends*. *Food Consumption and Nutrition Division Discussion Paper 212*; International Food Policy Research Institute: Washington, DC, USA, 2006.
19. von Grebmer, K.; Bernstein, J.L.; Hammond, F.; Wiemers, M.; Chéilleachair, R.N.; Foley, C.; Gitter, S.; Ekstrom, K.; Fritschel, H. *2019 Global Hunger Index: The Challenge of Hunger and Climate Change*; Welthungerhilfe: Bonn, Germany; Concern Worldwide: Dublin, Ireland, 2019.
20. Aiga, H. Hunger measurement complexity: Is the Global Hunger Index reliable? *Public Health* **2015**, *129*, 1288–1290. [[CrossRef](#)] [[PubMed](#)]
21. Economist Impact. *Global Food Security Index 2022*. 2022. Available online: <https://impact.economist.com/sustainability/project/food-security-index/> (accessed on 11 December 2023).

22. Mamun, A.; Glauber, J. “Rice Markets in South and Southeast Asia Face Stresses from El Niño, Export Restrictions.” IFPRI Blog (International Food Policy Research Institute). 2023. Available online: <https://www.ifpri.org/blog/rice-markets-south-and-southeast-asia-face-stresses-el-ni%C3%B1o-export-restrictions> (accessed on 22 February 2024).
23. Jungbluth, F.; Zorya, S.; Ensuring Food Security in Europe and Central Asia, Now and in the Future. World Bank Blogs, 3 February 2023. Available online: <https://blogs.worldbank.org/europeandcentralasia/ensuring-food-security-europe-and-central-asia-now-and-future> (accessed on 10 February 2024).
24. Famine Early Warning Systems Network (FEWS NET). Latin America and the Caribbean—Food Security Outlook, 2023 (October 2023–May 2024). Available online: <https://reliefweb.int/report/haiti/latin-america-and-caribbean-food-security-outlook-october-2023-may-2024> (accessed on 15 March 2024).
25. WFP; FAO. Hunger Hotspots. *FAO–WFP Early Warnings on Acute Food Insecurity: November 2023 to April 2024 Outlook*. Rome. Available online: [https://reliefweb.int/report/world/hunger-hotspots-fao-wfp-early-warnings-acute-food-insecurity-february-may-2022-outlook?gad\\_source=1&gclid=EAIaIQobChMlv-vlxv65hgMVmt4WBR14yiFxEAAAYASAAEgKkjvD\\_BwE](https://reliefweb.int/report/world/hunger-hotspots-fao-wfp-early-warnings-acute-food-insecurity-february-may-2022-outlook?gad_source=1&gclid=EAIaIQobChMlv-vlxv65hgMVmt4WBR14yiFxEAAAYASAAEgKkjvD_BwE) (accessed on 4 March 2024).
26. OECD (Organisation for Economic Co-operation and Development). *OECD Economic Outlook, Volume 2023 Issue 1. June 2023*; OECD Publishing: Paris, France, 2023.
27. Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM). Colombia. In: IDEAM. [Cited 19 September 2023]. 2023. Available online: [http://www.ideam.gov.co/web/tiempo-y-clima/prediccion-climatica/-/document\\_library\\_display/ljPLJWRaQzCm/view/125477056](http://www.ideam.gov.co/web/tiempo-y-clima/prediccion-climatica/-/document_library_display/ljPLJWRaQzCm/view/125477056) (accessed on 5 March 2024).
28. CPC (Climate Prediction Center). South America. In *NMME Probabilistic Forecasts for International Regions*; CPC: College Park, MD, USA, 2023.
29. FAO. Data: Suite of Food Security Indicators. 2023. Available online: [www.fao.org/faostat/en/#data/FS](http://www.fao.org/faostat/en/#data/FS) (accessed on 12 July 2023).
30. UN IGME (United Nations Inter-agency Group for Child Mortality Estimation). *Levels and Trends in Child Mortality: Report 2022*; UNICEF: New York, NY, USA, 2022.
31. UNICEF (United Nations Children’s Fund). *Undernourished and Overlooked: A Global Nutrition Crisis in Adolescent Girls and Women*; UNICEF: New York, NY, USA, 2023.
32. UNICEF. “Yemen Crisis.” Updated 22 May 2023. Available online: <https://www.unicef.org/emergencies/yemen-crisis> (accessed on 25 March 2024).
33. United Nations. UN Needs \$68.4 Million to Help Central African Republic Where 2.2 Million Are Acutely Food Insecure. *Press Release*. 5 July 2022. Available online: <https://news.un.org/en/story/2022/07/1121952> (accessed on 3 February 2024).
34. WFP; ICASEES (Institut Centrafricain des Statistiques, des Etudes Economiques et Sociales); République Centrafricaine, Cluster Sécurité Alimentaire. *Résultats Préliminaires: ENSA 2021 (Enquête Nationale sur la Sécurité Alimentaire)*. 2022. Available online: <https://reliefweb.int/report/central-african-republic/r-sultats-pr-liminaires-ensa-2021-enqu-te-nationale-de-s-curit> (accessed on 17 January 2024).
35. Baker, A. Climate, Not Conflict. Madagascar’s Famine Is the First in Modern History to Be Solely Caused by Global Warming. *Time*. 20 July 2021. Available online: <https://time.com/6081919/famine-climate-change-madagascar/> (accessed on 10 February 2024).
36. UN News. In Madagascar, Pockets of Famine as Risks Grow for Children, Warns WFP. 2 November 2021. Available online: <https://news.un.org/en/story/2021/11/1104652> (accessed on 7 March 2024).
37. Rice, S. Madagascar’s Famine Is More than Climate Change. *Georgetown Journal of International Affairs*. 24 January 2022. Available online: <https://gja.georgetown.edu/2022/01/24/madagascars-famine-is-more-than-climate-change/> (accessed on 25 March 2024).
38. FAO; IFAD; UNICEF; WFP; WHO. *The State of Food Security and Nutrition in the World. Transforming Food Systems for Food Security, Improved Nutrition and Affordable Healthy Diets for All*; FAO: Rome, Italy, 2021.

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