

Food Security Situation in Ghana and a Comparative Analysis with Neighboring Countries

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ABSTRACT

The Global Food Security Index (GFSI) conducted yearly by the Economist Intelligence Unit (EIU), provides a common framework for understanding the root causes of food insecurity by looking at the dynamics of food systems around the world. In order to measure level of food security, various indicators have been defined. The Global Food Security Index (GFSI) is an indicator that measures the level of food security of individual countries and allows comparison between them. The aim of this seminar paper is to analyze the state of food security and its individual dimensions in Ghana and a comparative analysis with selected neighboring countries (Côte d'Ivoire, Burkina Faso, Togo and Nigeria) in the Global Food Security Index (GFSI) 2012 - 2021 with the key focus on the 2021 GFSI. The current GFSI data for 2021 revealed that Ghana was best ranked among the selected neighboring countries at the 82nd position, while Nigeria was the worst ranked at the 97th position (out of 113 countries). Also, Ghana took the 4th position within the Sub-Saharan African countries and 2nd position within the West African sub-region. In addition, a comparative analysis on the overall ranking of Ghana and neighboring countries according to GFSI for the past decade (2012 – 2021) gives an obvious indication that Ghana had been leading the neighboring countries in terms of food security since the inception of the GFSI. Meanwhile, it can be concluded that there is the need for food security improvement in Ghana despite its leading role within the West African sub-region. The following were observed as weaknesses in ensuring food security in Ghana: lack of water and lack of adequate policies to ensure food security and political commitment to adaptation, followed by significant food loss, and undiversified diet. It is recommended that the government of Ghana will adequately resource the various institutions responsible for food security issues such as the Ministry of Food and Agriculture (MOFA) and National Food Buffer Stock Company (NAFCO) in order to ensure a sustainable food secured country.

Key words: Food security, Global food security index, Ghana.

INTRODUCTION

Evidence shows that there is a continuous rise in world hunger. According to available data, the number of people who suffer from hunger has been growing over the past three years, comparing to levels from a decade ago. The number of people around the globe affected by undernourishment or chronic food deprivation is estimated to have increased from about 804 million in 2016 to nearly 821 million in 2017. The situation is worsening in South America and most regions of Africa. Likewise, the decreasing trend in undernourishment that characterized Asia until recently seems to be slowing down significantly. Without increased efforts, there is a risk of falling short of achieving the Sustainable Development Goals (SDGs) target of hunger eradication by 2030 (FAO *et al.*, 2018). The world population has grown steadily, with most people now living in urban areas. Technology has changed, while the economy has become increasingly interconnected and globalized.

Many countries, however, have not witnessed sustained growth as part of the new economy. The economy of the world in general is not growing as much as expected. Conflict and instability have increased and become more difficult to handle, yielding greater population displacement (FAO *et al.*, 2019). Also, climate variability is a key driver behind the recent rises in global hunger and one of the leading causes of severe food crises. The transforming nature of climate variability and extremes is negatively affecting all aspects of food security (food availability, access, utilization and stability), as well as reviving other underlying causes of malnutrition related to childcare and feeding, health services and environmental health. The risk of food insecurity and malnutrition is greater nowadays because livelihoods of the poor are more exposed and vulnerable to changing climate variability and extremes (FAO *et al.*, 2018). Climate change and increasing climate variability are affecting agricultural productivity and natural resources, with impacts on food systems and rural livelihoods, including a decline in the number of farmers. All of these have led to major shifts in the way in which food is produced, distributed and consumed worldwide (FAO *et al.*, 2019).

At the commencement of the new millennium, world leaders gathered at the United Nations to carve a broad vision to fight poverty in many dimensions. The vision, which was translated into eight Millennium Development Goals (MDGs), has remained the development framework for the world for the past 15 years. As we reach the end of the MDG period, the world community has reason to celebrate. As a result of concerted global, regional, national and local efforts, the MDGs have saved the lives of millions of people and improved conditions for many people. Data and analysis have proven that, with targeted interventions, sound strategies, adequate resources and political will, the poorest countries in the world can make dramatic and unprecedented progress. According to report, there are uneven achievements and shortfalls in many areas (United Nations, 2015). The State of Food Security and Nutrition in the World marked the start of a new era in monitoring progress towards achieving a world without hunger and malnutrition in all of its forms, an aim set out in the 2030 Agenda for Sustainable Development. This transformational vision embedded in the 2030 Agenda provides an imperative for new ways of thinking, acting and measuring. Fortunately, data gathering and measurement tools are rapidly evolving to meet the monitoring challenges presented by the new agenda (FAO *et al.*, 2018). The 2030 Agenda for Sustainable Development spearheaded a transformational agenda recognizing that our world is transforming, bringing with it new challenges that must be under control if we are to live in a world without hunger, food insecurity and malnutrition in any forms (FAO *et al.*, 2019).

The Global Hunger Index (GHI) of 2017 indicates long-term progress in reducing hunger in the world. The advances have been uneven, however, with millions of people still experiencing chronic hunger and many places suffering acute food crises and even famine (Grebmer, *et al.*, 2017). The Global Hunger Index (GHI) of 2018 indicates that the world has made stepwise, long-term uneven advancement in reducing overall hunger. Areas of severe hunger and under-nutrition stubbornly persist, reflecting human misery for millions (Grebmer, *et al.*, 2018). The Global Hunger Index (GHI) of 2019 indicates that even though the world has made gradual progress in minimizing hunger on a global scale since 2000, the progress has been uneven. Hunger persists in many countries, and in some instances progress is even being reversed. The GHI highlights where more action is most needed (Grebmer, *et al.*, 2019). The 2020 Global Hunger Index (GHI) indicates that even though hunger globally has progressively declined since 2000, the progress in many places is too slow and therefore hunger remains severe. These areas are highly vulnerable to a worsening of food and nutrition insecurity exacerbated by the health, economic, and environmental crises of 2020 (Grebmer, *et al.*, 2020). The 2021 Global Hunger Index (GHI) points to a terrible hunger situation in a world coping with multiple crises. Progress toward Zero Hunger by 2030, already far too slow, is showing signs of stagnating or even being reversed (Grebmer, *et al.*, 2021). Meanwhile, the problem of hunger and measurement of food (in)security is still an issue which is occurring at the moment. The international community committed to eliminate all forms of hunger and malnutrition in accordance with the Sustainable Development Goals (SDGs) by 2030. The concept of food security that consists of a number of dimensions (availability, access, quality and stability of food) and indicators measuring all these aspects have changed over time (Božić and Papić, 2019).

This paper aims to analyze the state of food security and its individual dimensions in Ghana and a comparative analysis with selected neighboring countries (Côte d'Ivoire, Burkina Faso, Togo and Nigeria) in the Global Food Security Index (GFSI) 2012 - 2021 with the key focus on the 2021 GFSI. According to Božić and Nikolić (2020) the Global Food Security Index (GFSI) is one of the most commonly used indicators that describe and measure different dimensions of food security.

LITERATURE REVIEW

The Concept of Food Security and Situation in Ghana

The problems associated with food producers depend on the type of agriculture. In developing countries, food was produced on very small holdings cultivated by local methods. A relatively small excess of supply over demand was followed by a big drop in prices, as occurred in the late 1920s. At the center of this human tragedy is food insecurity, inability to access the safe and nutritious food necessary for a healthy and active lifestyle. World leaders and international bodies have many times made a commitment, and have acknowledged that there are sufficient resources and technical know-how to end hunger and poverty. Mobilization of resources to meet an emergency was seen at the time as the main cause of the food security problem. It was noted, however, that this raised difficulties depending on the global food stocks situation when a disaster struck. On the other hand, a number of benefits could be derived from the establishment of national reserves in developing countries, such as insurance against famine and other emergencies, protection against the effects of excessive and erratic fluctuations in the prices of staple foods (Shaw, 2007). Achieving food security means ensuring that sufficient food is available, that supplies are relatively stable and that everyone can obtain food. At least at the household level, if not at the national level, food security can be interpreted as being determined, among other things, by purchasing power. Changes in the latter are conditional on economic growth and the distribution of income and resources. More importantly, food security can be described as a phenomenon relating to individuals. It is the nutritional content of the individual household member that is the ultimate focus, and the risk of that adequate status not being achieved or becoming undermined (FAO, 2003).

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 (FAO, 2008; Peng and Berry, 2019). Relevantly, this definition requires that food should be available in sufficient quantity as well as in sufficient quality, should be culturally acceptable, and should be available at all times throughout the year (Ruel, 2013).

The concept of food security has expanded significantly over time, and due to its relevance, it is on the list of priorities of the United Nations Sustainable Development Goals (Božić and Nikolić, 2020). Organizations involved in development are increasingly concerned about food security and have concentrated their efforts on helping those who are not able to feed themselves sufficiently and adequately. Over decades, these bodies have received the support of governments, private entities and United Nations organizations. Many of their efforts have focused on provision of food in situations of crisis or emergency, and increasing the provision of cash or food for development. Although, securing an adequate supply of food, is by no means the same thing as securing adequate nutrition (Ruel, 2013).

Ghana's Global Food Security Strategy (GFSS) Country Plan presents a five-year integrated government strategy as required by the Global Food Security Act of 2016. This Country Plan reflects an evidence-based, integrated, interagency approach for Ghana to achieve the GFSS goal of reducing poverty, hunger, and malnutrition through the three objectives of agriculture-led growth, resilience, and nutrition while placing the country to become self-reliant. The Country Plan integrates input from stakeholders from the Government of Ghana, private sector, academic institutions, and civil society. Food and nutrition are high priorities for the Government of Ghana (GoG). The 2017 Global Food Security Index (by Economic Intelligence Unit), declared Ghana among the most food secure countries in Sub-Saharan Africa (South Africa and Botswana are the only others to top Ghana). Improving the productivity of crops, wild and capture fisheries, livestock, and enhancing the competitiveness of agriculture to ensure its integration into the domestic and international markets are very important to increasing incomes and transforming the agriculture economy. Ghana was one of the first African countries to sign the Comprehensive Africa Agriculture Development Program (CAADP) Compact in 2009. In this Africa Union-led effort, the Heads of State adopted new declarations at Malabo in 2014 to double agricultural productivity levels by 2025 and sustain a 6% growth rate for agriculture Gross Domestic Product (GDP) to end hunger and poverty. The three recommendations deriving out of the January 2018 Africa Union (AU) Biennial Review were that Ghana should: 1) increase the share of agriculture land under sustainable land management practices from the current low level of 0.04%, 2) increase public agriculture expenditure as a share of total public expenditure to the Malabo Declaration target of 10%, and 3)

put in place policies that would facilitate and promote intraregional African trade in agricultural commodities and services (GFSS, 2018). Although reports of Ghana being 5% food insecure, an important argument against this view is that household level in rural areas who are mostly farmers still experience food insecurity and hunger despite growing crops and even selling these crops in markets. Despite the various initiatives by international and state actors to address food insecurity and hunger, Ghana still experiences these issues (Asuru, 2020).

In fact, achieving food security in Ghana is highly dependent on the governance system in the country. However, improving political governance which constitutes voice and accountability, and political stability, significantly boosts food security in the country. In addition, addressing corruption and the effective application of the rule of law, which are the constituents of institutional governance, has the potential to positively enhance Ghana’s food security. Similarly, economic governance equally has a positive effect on food security. Without doubt, economic governance exerts the greatest impact on food security. Also, capital and labor positively influence Ghana’s drive to achieve food security (Asare-Nuamah *et al*, 2021).

Dimensions of Food Security

Food security is an important issue that has been discussed all over the world. Achievement in food security is based on the Food and Agriculture Organization’s policy and depends on four important indicators known as availability, accessibility, utilization, and stability (Manap, 2020). From the definition of food security, four main dimensions can be identified (table 1). And for food security objectives to be realized, all four dimensions must be fulfilled simultaneously:

Table 1: The Four Dimensions of Food Security

Physical AVAILABILITY of food	Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.
Economic and physical ACCESS to food	An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
Food UTILIZATION	Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
STABILITY of the other three dimensions over time	Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

Source: Adapted from FAO, 2008.

Food security is a crucial issue for national development and poverty alleviation and has been the main goal for many international and national organizations. The United States Agency International Development (USAID) has defined food security based on four important dimensions of food security i.e. food availability, food accessibility, food utilization, and food stability (Manap, 2020).

Availability

The sufficient quantity of food for all individuals within a country is known as food availability. Food availability consists of food production, food import, and food aid and is also known as food supply (Manap, 2020). This particular dimension addresses supply side of the food security and expects sufficient quantities of

quality food from domestic agriculture production or import. This is simple mathematical calculation on whether the food available in some territory or country is enough to feed the total population in that particular territory and calculated from the level of local agriculture production in that territory, stock levels and net import/export. This dimension of food security at different levels can be assessed by precipitation record, food balance sheet, food market survey, agricultural production planet. Likewise, indicators of food security for this dimension at different levels are food production, population flows, fertility rate, harvesting time, staple food production, food storage, consumption of wild foods and others. (Bajagai, 2022).

Accessibility

Food accessibility, which ensures that all individuals have access to adequate resources to get sufficient food to fulfill nutritional needs. There are two types of access, namely physical access, in terms of road infrastructure and economic access, in terms of purchasing power (Manap, 2020). Having enough food at national level or in certain territory cannot be taken as the evidence that all the household or individuals in the country or territory have enough food to eat. Food access is another dimension of food security which encompasses income, expenditure and buying capacity of households or individuals. Food access addresses whether the households or individuals have enough resources to acquire appropriate quantity of quality foods. Some of the indicators of this dimension at different levels are food price, wage rate, per capita food consumption, meal frequency, employment rate and others. and the dimension can be assessed by Vulnerability Analysis and Mapping (VAM), Food Access Survey, Food Focus Group Discussion, Intra household food frequency questionnaire and others. Interventions to improve this dimension of food security are among other things on-farm, off-farm and non-farm employment creation, school-feeding program, breast –feeding campaign and others. (Bajagai, 2022).

Utilization

The next dimension of food security based on USAID policy is known as utilization, whereby food utilization is assessed based on improved water supply which is very important to sustainable food security to boost economic growth (Manap, 2020). Food utilization is another dimension of food security which addresses not only how much food the people eat but also what and how they eat. It includes the food preparation, intra-household food distribution, water and sanitation and health care practices. The nutritional outcome of the food eaten by an individual will be appropriate and optimum only when food is prepared or cooked properly, where there is adequate diversity of the diet and proper feeding and caring practices are practiced. Stunting rate, wasting rate, prevention of diarrhoeal diseases, latrine usage, weight-for-age, goitre, anaemia, night blindness and many more. are the indicators at different level for this dimensions which can be assessed by demographic and health survey, immunization chart and others. (Bajagai, 2022).

Stability

The last part is food stability and it is based on improvement in political stability and reduction of corruption (Manap, 2020). This dimension addresses the stability of the other three dimensions over time. People cannot be considered food secure until they feel so and they do not feel food secure until there is stability of availability, accessibility and proper utilization condition. Instability of market price of staple food and inadequate risk bearing capacity of the people in the case of adverse condition (e.g. natural disaster, unexpected weather and more.), political instability and unemployment are the major factors affecting stability of the dimensions of food security. This dimension of food security can be assessed by Global Information Early Warning System, Anthropometric survey, weighing chart of pregnant women and many others, against certain indicators like food price fluctuation, pre-harvest food practice, migration and others. Interventions to address this dimension are savings and loan policy, inter-household food exchange, grain bank, food storage and many more (Bajagai, 2022).

Measuring Food (In) Security

The importance of nutrition, i.e. food security, for the development of a society, as well as the risk of hunger for all humanity, have included the elimination of hunger and all forms of malnutrition in the UN Sustainable

Development Goals (SDG) by 2030. In order to measure the level of hunger, i.e. food insecurity, and progress in achieving the goals of sustainable development of the UN, various indicators have been defined by numerous institutions such as: FAO, IFPRI, EIU and others. (Božić and Papić 2019). Second UN Sustainable Development Goal emphasizes food security as important for governments, multilateral organizations, and NGOs. These institutions trace national-level food security performance with an array of metrics and weigh intervention options considering the use of many possible drivers (Allee *et al.* 2021). The following are some of the most commonly used indicators for measuring food (in)security:

Global Hunger Index (GHI)

The Global Hunger Index (GHI) is an indicator that measures the level of hunger in the world, regions and individual countries and allows comparison between them. The index includes three dimensions and four indicators, which are also related to the achievement of the SDG 2 goal, which is aimed at eliminating hunger by 2030. The advantage of using GHI to measure hunger is the fact that it reflects the nutritional situation, not only of the total population, but also of its particularly sensitive segment consisting of children. The GHI data for the period 1992-2017 indicate some progress in the fight against hunger, which is still not enough since one of the nine inhabitants of the planet Earth is chronically hungry, which makes about 815 million people. It is especially worrying that a significant number of children under the age of five, in addition to reducing their share, have inadequate nutrition (Božić and Papić 2019).

GHI scores are calculated using a three-step process. In the first place, values for each of the four component indicators are determined from the available data for each country. The four indicators are undernourishment, child wasting, child stunting, and child mortality. Second, each of the four component indicators is given a standardized score on a 100-point scale, based on the highest observed level for the indicator globally. Thirdly, standardized scores are aggregated to calculate the GHI score for each country, with each of the three dimensions (inadequate food supply, child mortality, and child undernutrition, which is composed equally of child stunting and child wasting) given equal weight. This calculation results in GHI scores on a 100-point scale, where 0 is the best score (no hunger) and 100 is the worst. In practice, neither of these extremes is reached. A value of 0 would mean that a country had no undernourished people in the population, no children younger than five who were wasted or stunted, and no children who died before their fifth birthday. A value of 100 would signify that a country's undernourishment, child wasting, child stunting, and child mortality levels were each at approximately the highest levels observed worldwide in recent decades. According to GHI Severity Scale, ≤ 9.9 implies low hunger, 10.0–19.9 moderate, 20.0–34.9 serious, 35.0–49.9 alarming, and ≥ 50.0 extremely implies hunger is alarming (Grebmer, *et al.*, 2017).

Global Food Security Index (GFSI)

The Global Food Security Index (GFSI) is the important source of intelligence on the drivers of global food security. It assesses food security in 113 countries across four key pillars: food Affordability, availability, Quality and Safety, and Natural Resources and Resilience. The index is a dynamic quantitative and qualitative benchmarking model constructed from 58 unique indicators that measure the drivers of food security across both developing and developed countries. Over the past decade, GFSI has evaluated the underlying drivers of hunger and malnutrition and revealed the policies and practices advancing food security worldwide. The GFSI promotes conversation and collaboration among foodsystem stakeholders and provides evidence for decisive, meaningful action. The main sources of data used in the GFSI are the Economist Intelligence Unit, the World Bank Group, the UN Food and Agriculture Organization (FAO), the World Health Organization (WHO), the World Trade Organization (WTO), the OECD, Notre Dame Global Adaptation Initiative (NDGAIN), the World Resources Institute (WRI), Yale Environmental Performance Index (EPI), the US Department of Agriculture (USDA), and national agriculture and health ministries (The Economist Group, 2021).

Food Insecurity Experience Scale (FIES)

The Food Insecurity Experience Scale (FIES) is a survey-based measure of the severity of food insecurity. Methodology for the scale was adapted from earlier experiential food security measures and applied by FAO to nationally representative samples through the Voices of the Hungry (VoH) project." The FIES relies on

people's direct responses to a set of questions regarding their actual experiences in accessing food. The ability to use the individual as unit of analysis and making reference to experienced behaviors are some of those (Brunelli and Viviani, 2014). Food Insecurity Experience scale (FIES) is anticipated to make an important contribution to any suite of food and nutrition security indicators. It has particular potential as a cross-disciplinary indicator capable of promoting the link between different sectorial perspectives, for example, the link between nutrition and agriculture. It is an experience-based metric of severity of food insecurity that relies on people's direct responses to a series of questions regarding their access to adequate food. Accumulated evidence over the past two decades has convinced FAO of the potential for using this method of measurement to provide valid and reliable population estimates of food insecurity in the different countries of the world. The FIES can be used to provide information for purposes ranging from advocacy and policy formulation to basic research. Some of the potential uses of the FIES, and possible modifications for different purposes are: 1) Estimation of food insecurity prevalence. 2) Targeting and defining priorities for programs and resources. 3) Monitoring trends in food insecurity. 4) Identifying risk factors and consequences of food insecurity 5) Modifications to the FIES in other survey contexts (Ballard *et al*, 2013).

Hunger and Nutrition Commitment Index (HANCI)

The Hunger and Nutrition Commitment Index (HANCI) is a project of the Institute of Development Studies (IDS) with funding from Irish Aid. The project produces an annual index that ranks governments on their political commitment to tackling hunger and undernutrition. The HANCI index compares 45 developing countries whose hunger and undernutrition condition is considered severe or alarming. It ranks their political commitment based on 22 indicators. The indicators are split between indicators of commitment to hunger reduction (10 indicators) and indicators relating to commitment to addressing undernutrition (12 indicators). In both sets they are grouped under three themes – spending, policies and laws. Commitment to reduce hunger and commitment to reduce undernutrition are measured separately because, for instance, measures to improve sanitation are critical for improving nutrition, though less clearly related to hunger. Conversely, emergency food aid, or subsidized food in ration shops can help to reduce acute hunger, but are often not aimed at achieving a balanced diet. By separating the measurement of political commitment from outcomes, HANCI recognizes it from other food security metrics and scorecards such as the Global Hunger Index (IDS, 2022).

The Concept of Global Food Security Index (GFSI)

The Global Food Security Index (GFSI) conducted yearly by the Economist Intelligence Unit (EIU), provides a common framework for understanding the root causes of food insecurity by looking at the dynamics of food systems around the world. The GFSI seeks to answer the central question of how food-secure a country is. Food security is a complex, multifaceted situation influenced by culture, environment and geographic location. By creating a common framework on which a country's food security is based, the GFSI has created a country-level food-security measurement tool that addresses the issues of affordability, availability, and quality and safety in 113 countries around the world. Since its commencement, the GFSI has become a policy standard for governments and a country diagnostic tool for investment. Nongovernmental organizations, multilaterals and academia have turned to the GFSI as a research tool to identify key countries in which to focus campaign efforts for food-security policy changes and developments. Also, the private sector uses the GFSI to make strategic decisions, explore food consumption trends and develop corporate social responsibility initiatives (EIU, 2018).

The Global Food Security Index (GFSI) is a dynamic quantitative and qualitative benchmarking model constructed from 58 unique indicators that measure the determinants of food security across both developing and developed countries. The recent version of the GFSI integrates the Natural Resources and Resilience category into the main index. This category examines a country's exposure to the impacts of a changing climate; its susceptibility to natural resource risks; and how the country is adapting to these risks, all of which impact the incidence of food insecurity in a country. The category was first introduced into the GFSI in 2017 as an adjustment factor. The 2021 GFSI is the tenth edition of the index. Economist Impact updates the model annually to capture year-on-year changes in structural factors impacting food security (The Economist Group, 2022).

Although, the index does not capture intra-country details, by extracting major food security themes down to their core elements it provides a useful approach to understanding the risks to food security in countries, regions and around the world (EIU, 2018).

MATERIALS AND METHODS

This paper used foreign and domestic literature and the reports of institutions handling food security issues, such as IFPRI, FAO, EIU, UNICEF, WHO among others. The Global Food Security Index (GFSI) was used to analyze the state of food security in Ghana and selected neighboring countries within the Economic Community of West African States (ECOWAS).

The objective of the Global Food Security Index (GFSI) is to determine which countries are most and least vulnerable to food insecurity (EIU, 2019). Global Food Security Index (GFSI) considers the issues of food affordability, availability, quality and safety, and natural resources and resilience across a set of 113 countries. The index is a dynamic quantitative and qualitative standard model that assesses the drivers of food security across both developing and developed countries. The GFSI incorporated the Natural Resources and Resilience category into the main index in 2017 as an adjustment factor. The category assesses a country’s exposure to the impacts of a changing climate, alongside its susceptibility to natural resource risks and how the country is adapting to these risks, all of which impact the incidence of food insecurity in a country (EIU, 2020).

The index is based on a large number of factors that affect the food system, that is, the food security of the country, from political stability risks to climate threats. In addition to the analysis of documents, a comparative analysis was used in order to assess the position of Ghana in relation to the neighboring countries within the ECOWAS.

The key analysis was based on the 2021 GFSI which signifies the ten-year anniversary of the Global Food Security Index (GFSI) over the past decade of data analysis to inform action towards the UN Sustainable Development Goal of reaching zero hunger by 2030. There were also extended analysis to compare the differences and the changes that had occurred over the last decade (2012 – 2021), in terms of food security situations in Ghana and the selected neighboring countries within the ECOWAS. Due to the key focus on the 2021 GFSI, the 2021 iteration was used as a proxy to represent the conceptual framework for the analysis (Table 2).

Table 2: Conceptual framework of the GFSI in 2021 iteration

AFFORDABILITY	AVAILABILITY	QUALITY AND SAFETY	NATURAL RESOURCES & RESILIENCE
Change in average food costs	Sufficiency of supply	Dietary diversity	Exposure (Temperature rise, Drought, Flooding, Sea level rise)
Proportion of population under global poverty line	Agricultural research and development	Nutritional standards	Water (Agricultural water risk—quantity, Agricultural water risk—quality)
Inequality-adjusted income index	Agricultural infrastructure	Micronutrient availability	Land (Land degradation, Grassland, Forest change)
Agricultural import tariffs	Volatility of agricultural production	Protein quality	Oceans, rivers and lakes (Eutrophication, Marine biodiversity)
Food safety-net programs	Political and social barriers to access (Armed conflict, Political stability risk, Corruption, Gender inequality)	Food safety (Food safety mechanisms, Access to drinking water, Ability to store food safely)	Sensitivity (Food import dependency, Dependence on natural capital)
Market access and	Food loss		Political commitment to

agricultural financial services			adaptation
	Food security and access policy commitments		Demographic stress (Projected population growth, Urban absorption capacity)

Source: Systematization of author based on The Economist Group, 2021.

RESULTS AND DISCUSSIONS

Basic indicators of food security situation in Ghana (2021) – analysis of strengths, moderate and weaknesses

Basic Food security indicators in Ghana (2021) which represent strengths, moderate and weakness were analyzed to assess the state of food security in Ghana after a decade of food security assessment by the Economist Intelligence Unit’s Global Food Security Index (table 3). This provides an opportunity to identify the indicators that contribute to the improvement and stability of a food security situation, those that have moderate impact on food security and those that represent weaknesses¹.

Indicators that scored over 75 which represent “strengths” were sufficiency of supply, volatility of agricultural production, micronutrient availability and land. Comparatively, all the indicators that signify “strength” for Ghana, recorded scores that are higher than the average score (all country). These are indicators that contribute to the improvement of food security in Ghana. Sufficiency of supply is an indicator that measures the availability of food by considering the adequacy of food supply and dependency on food aid. This indicates that in the year 2021, Ghana exhibited strength in the provision of adequate food supply and less dependence on food aid from foreign donors. When it comes to the volatility of agricultural production, Ghana demonstrated stability in agricultural productivity which made it more flexible for the county’s prediction and planning for a consistent food supply². Micronutrient availability is a composite indicator that measures the availability of micronutrients in the food supply. This includes dietary availability of vitamin A, iron and zinc (EIU, 2019). The measurement of micronutrient availability as “strength” is an indication of the availability of the required food nutrients in the food supplied in the country. Moreover, Land is an indicator that measures the health of land, and how land degradation might impact agriculture. This includes assessment of land degradation, grassland and forest change (EIU, 2019).

Among the indicators that had a score ranging from 25 to 75 which represent “moderate” were change in average food costs, proportion of population under global poverty line, agricultural import tariffs, food safety net programs and agricultural infrastructure. This group of indicators consists of those that have medium impact on food security.

Sharp increases in the cost of the average basket of food goods can indicate a decline in affordability³. Also, in moderation included an indicator that measures the proportion of population under global poverty line. Poverty can lead to difficulty in being able to patronized food or food stuff to produce food. This is a measure of the existence of poverty, calculated as the percentage of the population living on less than US\$3.20/day at 2011 purchasing power parity (PPP) exchange rates (The Economist Group, 2021). Addition to this group of indicators is agricultural import tariffs. Agricultural tariffs can increase the cost of food imports, and therefore transfer food costs to consumers. Tariffs impose a cost on all products that are imported and therefore raising prices within the country that imposes the tariff. Higher prices then affect supplies as farmers respond by

¹ Among indicators that have a score over 75 represent “strengths”, indicators that have a score ranging from 25 to 75 represent “moderate” and indicators that have a score less than 25 represent “weakness” (Božić and Nikolić, 2020).

² Fluctuations in agricultural productivity can create difficulty in predicting and planning for a consistent food supply (The Economist Group, 2021).

³ Greater volatility in food prices since 2019 have affected how affordable food is—70 countries slip in this year’s GFSI rankings because of rising costs. Indeed, among the four pillars that make up the GFSI, Affordability has fallen the most over the decade (The Economist Group, 2021).

increasing output to maximize profit and this affect demand as consumers buy less to prevent excessive spending.

In addition to this group of “moderate” is the Food safety net program. Food safety-net programs help to provide consistent food access for food insecure populations, and when with dedicated funding are better able to serve their target populations⁴. Agricultural infrastructure on the other hand is an indicator that measures ability to store crops and transport them to market. It includes existence of adequate crop storage facilities, road infrastructure, port infrastructure, air transport infrastructure, rail infrastructure, and irrigation infrastructure (EIU, 2019).

The third group of indicators consists of those with a score less than 25, which is expressed as “weakness”. Among these indicators were food loss, food security and access policy commitments, dietary diversity, water, and political commitment to adaptation. Existence of higher levels of food loss leads to a reduction in the overall food availability in a country. Ghana scoring as low as 2.4 out of 100 signifies that in the year 2021, post-harvest operations, processing, and distribution of food within the food supply chain were very poorly handled. Water is an indicator that measures the health of fresh-water resources and how its depletion might impact agriculture. This includes agricultural water risk in terms of quantity and quality. The overall water availability (quantity) may influence agricultural water supply and water pollution may impact the quality and availability of water for agricultural purposes. A low score of 0.0 out of 100 in the 2021 GFSI report is an indication of lack of quality and available water facilities in the country.

The drinking water supply and sanitation sector in Ghana faces a number of challenges, including very limited access to sanitation, intermittent supply, high water losses, low water pressure, and pollution. The water supply and sanitation infrastructure is insufficient, especially in rural areas⁵.

Another indicator that can be described as “weakness” is political commitment to adaptation. It measures the degree to which countries are creating systems and adopting practices to manage the risk that exposure poses to the agricultural sector. Sub-indicators include: early warning measures/climate-smart agriculture; commitment to managing exposure; national agricultural adaptation policy; and disaster risk management (The Economist Group, 2021).

Table 3: Basic Food security indicators in Ghana (2021) which represent strengths, moderate and weakness

		Indicator	Score	Average score (all country)
Strengths (score above 75)	2.1	Sufficiency of supply	79.0	58.7
	2.4	Volatility of agricultural production	79.3	61.0
	3.3	Micronutrient availability	95.1	78.3
	4.3	Land	78.4	70.3
Moderate (score from 25 to 75)	1.1	Change in average food costs	51.0	70.4
	1.2	Proportion of population under global poverty line	68.5	73.9
	1.3	Inequality-adjusted income index	45.4	54.5
	1.4	Agricultural import tariffs	60.7	63.3
	1.5	Food safety net programs	75.0	72.1
	1.6	Market access and agricultural financial services	60.9	63.8
	2.2	Agricultural research and	33.5	42.1

⁴ Affordability is also closely linked to hunger. The GFSI shows that countries without comprehensive, well-funded national food safety-net programs have higher levels of hunger (and stunting in children). Funding for these nets is the measure that has dropped the most over the decade, followed by a greater dependency on food aid (The Economist Group, 2021).

⁵ https://en.wikipedia.org/wiki/Water_supply_and_sanitation_in_Ghana

		development		
	2.3	Agricultural infrastructure	34.7	47.5
	2.5	Political and social barriers to access	62.3	58.7
	3.2	Nutritional standards	50.0	62.1
	3.4	Protein quality	47.1	68.4
	3.5	Food safety	67.9	80.1
	4.1	Exposure	54.0	65.0
	4.4	Oceans, rivers and lakes	36.5	27.4
	4.5	Sensitivity	54.9	69.6
	4.7	Demographic stress	37.5	59.9
Weaknesses (score less than 25)	2.6	Food Loss	2.4	73.7
	2.7	Food security and access policy commitments	0.0	43.8
	3.1	Dietary diversity	22.4	48.3
	3.1	Water	0.0	19.7
	4.6	Political commitment to adaptation	9.6	45.3

Scores are normalized 0-100, where 100 = most favorable food security environment

Source: The Economist Group Database, GFSI 2021

Comparative analysis of food security in Ghana and neighboring countries

The past decade has shown how important it is to consider hunger⁶ from a food systems perspective. It involves weighing up the affordability, availability, quality and safety of food, and assessing how resilient nations are in protecting their natural resources to enable them to keep producing food now and in the future. Also, over the past ten years, new sub-measures have been added to the GFSI, reflecting the growing importance of markets, financial products, technology and innovation in enabling food security. The ten-year anniversary of the Global Food Security Index (GFSI) enable us to look back into the past decade to inform action towards the United Nations Sustainable Development Goal of reaching zero hunger by 2030 (The Economist Group, 2021).

The Global Food Security Index (GFSI) was used to assess food security situation in Ghana and the neighboring countries within the Economic Community of West African States (ECOWAS). For the 2021 GFSI, Ireland and Austria were the two most food secured countries, followed by United Kingdom, Finland and Switzerland. Ghana was ranked at 82nd position with a score of 52.0. With the selected neighboring countries, Burkina Faso was ranked at 85th position with a score of 48.1; Côte d'Ivoire was ranked at 86th position with a score of 48.0; Togo was ranked at 94th position with a score of 44.2 and Nigeria was ranked at 97th position with a score of 41.3 (Table 4). Meanwhile, as it occurred a decade ago, high-income nations in Europe still lead the index, taking up seven of the top ten places, with Ireland getting the top rank. Likewise, most of the Sub-Saharan African nations continue to dominate at the bottom of the index, with Burundi at the bottom (The Economist Group, 2021).

Despite the poorly ranked positions of Ghana and the selected neighboring countries in the 2021 GFSI, all the countries had experienced a positive score change over the past decade (2021 vs 2012), with Burkina Faso having the highest score change of +7.7 and Nigeria attaining the least score change of +2.3. A positive (+) score change signifies an improved scoring performance of a country, a neutral (zero) signifies no change in

⁶ According to GHI (2021), Ghana scored 14.9 (GHI=14.9). Ghana is characterized by moderate presence of hunger (10< GHI<19.9) and proportion of undernourished in the population of 6.1%. Food situation in Ghana had improved since 2012 (GHI=17.9) compared to 2006 (GHI=20.0), while in selected neighboring countries there is a more significant, serious level of hunger (20<GHI<34.9). Côte d'Ivoire, Togo, Burkina Faso and Nigeria scored 22.3, 23.7, 24.5 and 28.3 respectively.

performance and a negative (-) score change signifies a declined in a country’s performance. Moreover, Ghana took the 4th position within the Sub-Saharan African countries and 2nd position within the West African sub-region (Table 4).

Table 4: Top five countries, Ghana and neighboring (ECOWAS) countries according to GFSI in 2021

Country	Score		Rank (113)		
	2021	Change (2021 vs 2012)	All countries	Sub-Saharan Africa	ECOWAS
Ireland	84.0	+4.0	1	-	-
Austria	91.3	+1.7	2	-	-
United Kingdom	81.0	+6.1	3	-	-
Finland	80.9	+0.3	4	-	-
Switzerland	80.4	+1.5	5	-	-
Ghana	52.0	+3.2	82	4	2
Burkina Faso	48.1	+7.7	85	5	3
Côte d'Ivoire	48.0	+4.2	86	6	4
Togo	44.2	+5.2	94	13	8
Nigeria	41.3	+2.3	97	16	10

Source: Author’s processing and interpretation of data based on the Economist Intelligence Unit, GFSI 2021.

In addition, a comparative analysis on the overall ranking of Ghana and neighboring countries according to GFSI for the past decade (2012 – 2021) gives an obvious indication that Ghana had been leading the neighboring countries in terms of food security (table 5).

Table 5: Overall Ranking of Ghana and neighboring countries according to GFSI 2012 – 2021

Country	Overall GFSI Ranking for Ghana and neighboring countries (2012 - 2021)									
	Rank (113)									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Ghana	68	67	78	75	=78	76	73	=59	=77	82
Burkina Faso	88	92	100	=99	106	102	97	87	88	85
Côte d'Ivoire	76	76	76	76	84	85	81	84	82	86
Togo	97	105	106	101	93	93	=93	102	93	94
Nigeria	80	86	87	91	90	92	96	94	100	97

* Sign “=” before the rank number means that the country shares the rank with other countries with same score value.

Source: Author’s processing and interpretation of data based on the Economist Intelligence Unit, GFSI 2012 – 2021.

In the GFSI 2017, 2018 and 2019 reports, the Economist Intelligence Unit (EIU) included the fourth dimension, the Natural Resources and Resilience into the main index to assesses a country’s exposure to the impacts of a changing climate; its susceptibility to natural resource risks; and how the country is adapting to these risks. The category was included in the reports as an adjusted overall GFSI score. The category was first introduced into the GFSI in 2017 as an adjustment factor. Table 6, is a summary of values of GFSI and individual dimensions of food security for Ghana and neighboring countries for 2017, 2018 and 2019.

By inclusion of the correction factor in 2017 GFSI report, Ghana dropped by 1 place from the 76th position to 77th position, Côte d'Ivoire increased by 1 place from 85th to 84th position, Burkina Faso had the highest increase from 102nd position to 97th position by adding 5 points to the index, and Togo and Nigeria did not experience any change in rank. Meanwhile, Ghana was best ranked as compared to the other neighboring

countries in terms of overall ranking and with natural resources and resilience factor. Likewise, in 2018 and 2019 GFSI reports, Ghana continued to lead the neighboring countries in terms of overall ranking and with natural resources and resilience factor. Comparatively, Ghana was best ranked in terms of food security which includes the risks of natural resources and resilience to climate change, than the neighboring countries (table 6).

Table 6: Values of GFSI and individual dimensions of food security for Ghana and neighboring countries for 2017, 2018 and 2019 (these reports included Natural Resources & Resilience).

	Ghana					
	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)
Overall*	47.9	76	50.9	73	62.8	=59
Affordability	34.5	85	43.3	78	66.3	65
Availability	58.0	=55	56.5	61	61.7	47
Quality and Safety	53.6	70	54.7	=63	57.1	66
Natural Resources & Resilience	57.4	78	56.7	78	53	72
Overall with Natural Resources & Resilience	42.8	77	45.4	74	55.4	58
	Burkina Faso					
	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)
Overall*	33.1	=102	37.9	97	50.1	87
Affordability	19.8	106	24.9	105	49.0	97
Availability	44.4	96	50.3	80	55.9	73
Quality and Safety	35.7	95	35.9	93	41.6	95
Natural Resources & Resilience	69.5	=27	68.5	=30	62.6	=35
Overall with Natural Resources & Resilience	30.6	97	34.9	94	45.4	86
	Côte d'Ivoire					
	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)
Overall*	42.5	85	45.8	81	52.3	84
Affordability	37.4	82	40.8	81	53.5	87
Availability	49.7	80	54.3	67	58.1	62
Quality and Safety	35.3	96	34.6	96	33.1	=104
Natural Resources & Resilience	69.9	26	67.5	38	67.1	21
Overall with Natural Resources & Resilience	39.3	84	42.1	80	48.0	83
	Togo					
	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)
Overall*	37.2	93	38.4	=93	44.0	102
Affordability	28.5	92	31.2	92	45.6	100
Availability	48.2	86	48.2	89	47.2	98
Quality and Safety	28.7	108	29.7	105	31.0	106
Natural Resources & Resilience	60.5	64	58.7	=68	56.0	=59
Overall with Natural Resources & Resilience	33.5	93	34.4	95	39.2	=102
	Nigeria					
	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)

	2017		2018		2019	
	Score	Rank (113)	Score	Rank (113)	Score	Rank (113)
Overall*	38.4	92	38.0	96	48.4	94
Affordability	25.0	98	26.5	101	50.4	90
Availability	46.4	=93	44.4	100	45.8	99
Quality and Safety	49.9	75	49.4	77	50.7	79
Natural Resources & Resilience	60.7	61	58.7	=68	55.2	66
Overall with Natural Resources & Resilience	34.6	92	34.1	97	43.0	94

* - without Natural Resources & Resilience

Source: Economist Intelligence Unit, GFSI 2017, 2018, 2019 and EIU database 2017, 2018, 2019.

CONCLUSION AND RECOMMENDATION

This paper revealed the state of food security and its individual dimensions in Ghana and a comparative analysis with selected neighboring countries (Côte d'Ivoire, Burkina Faso, Togo and Nigeria) in the Global Food Security Index (GFSI) 2012 - 2021 with the key focus on the 2021 GFSI.

In order to measure the level of food security, various indicators such as Global Hunger Index (GHI), Global Food Security Index (GFSI), Food Insecurity Experience Scale (FIES), Hunger and Nutrition Commitment Index (HANCI) have been defined but the Global Food Security Index (GFSI) is an indicator that measures the level of food security of individual countries and allows comparison between them.

By the assessment of basic food security indicators in Ghana (strengths, moderate and weakness), it was revealed that after a decade of food security assessment by the Economist Intelligence Unit's Global Food Security Index 2021, all the indicators that signify "strength" for Ghana such as sufficiency of supply, volatility of agricultural production and micronutrient availability, recorded scores that are higher than the average score (all country). These are indicators that contribute to the improvement of food security in Ghana. Also, some of the indicators that were in moderation included change in average food costs, proportion of population under global poverty line, agricultural import tariffs, food safety net programs and agricultural infrastructure. This group of indicators consists of those that have medium impact on food security situation in Ghana. On the other hand, Ghana faced strong setback with indicators such as food loss, food security and access policy commitments, dietary diversity, water and political commitment to adaptation. These set of indicators constitute a major setback with respect to food security situation in the country and more especially, drinking water supply faces a number of challenges, including intermittent supply, high water losses, low water pressure, and pollution. The water supply infrastructure is insufficient, especially in rural areas.

Meanwhile, despite the poorly ranked positions of Ghana and the selected neighboring countries in the 2021 GFSI, all the countries had experienced a positive score change over the past decade (2021 vs 2012). The current GFSI data for 2021 show that Ghana was best ranked among the selected neighboring countries at the 82nd position, while Nigeria was the worst ranked at the 97th position (out of 113 countries). Also, Ghana took the 4th position within the Sub-Saharan African countries and 2nd position within the West African sub-region. In addition, a comparative analysis on the overall ranking of Ghana and neighboring countries according to GFSI for the past decade (2012 – 2021) gives an obvious indication that Ghana had been leading the neighboring countries in terms of food security since the inception of the GFSI.

Finally, it can be concluded that there is the need for food security improvement in Ghana despite its leading role within the West African sub-region. The key responsibility lies on the government of Ghana to put in place adequate mechanism to improve food security system in the country. As the most pronounced weaknesses in ensuring food security in Ghana were observed: lack of water and lack of adequate policies to ensure food security and political commitment to adaptation, followed by significant food loss, and undiversified diet. It is recommended that the government of Ghana will adequately resource the various

institutions responsible for food security issues such as the Ministry of Food and Agriculture (MOFA) and National Food Buffer Stock Company (NAFCO) in order to ensure a sustainable food secured country.

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