MRS Journal of Arts, Humanities and Literature
Abbreviate Title- MRS J Arts humanit Liter
ISSN *(Online) 3049-1444*
Vol-2, Iss-5(May-2025)

ADDRESSING SDG 2 – ZERO HUNGER AND SUSTAINABLE AGRICULTURE

Dr. John Motsamai Modise

Tshwane University of Technology

Corresponding Author **Dr. John Motsamai Modise**

Tshwane University of Technology

Article History

Received: 23 / 04 / 2025

Accepted: 06 / 05 / 2025

Published: 10 / 05 / 2025

Abstract: This study aims to explore the challenges and opportunities associated with achieving food security and promoting sustainable agriculture in Africa. With a focus on policy interventions, technological advancements, and community-level practices, the study examines how these elements can be integrated to address hunger, malnutrition, and agricultural productivity in the continent. Africa faces a profound food security crisis characterized by high levels of hunger, malnutrition, and vulnerability to climate change. Despite being home to some of the world's most fertile land, the continent struggles with low agricultural productivity, inefficient food systems, and inadequate access to resources, leading to persistent food insecurity. The problem is further exacerbated by climate change, poor infrastructure, and gender inequality, particularly among smallholder farmers, the majority of whom are women. Addressing these issues requires comprehensive and sustainable solutions that are both regionally focused and globally aligned. This study contributes to the understanding of how Africa can overcome its food security challenges through a combination of climate-smart agriculture, gender-sensitive policies, regional trade integration, and technological innovation. By providing practical recommendations and policy frameworks, the study highlights the critical role of smallholder farmers, the diaspora, and governmental stakeholders in achieving the Sustainable Development Goal of Zero Hunger (SDG 2). The study also emphasizes the need for strategic investments in agriculture, infrastructure, and education, which can significantly enhance food systems' resilience and sustainability. The study employs a systematic literature review methodology, analyzing both recent and older sources on food security, agricultural practices, and policy frameworks in Africa. A combination of qualitative analysis and case studies is used to assess successful agricultural interventions across different African regions. The review is structured around several key themes, including climate adaptation strategies, gender equality in agriculture, food trade integration, and technological advancements. In addition, a comparative analysis of policies in different African countries offers insights into best practices and areas for improvement.

The study concludes that food security in Africa can be achieved through a multi-faceted approach that includes climate-resilient farming, gender equality, financial inclusion, and regional cooperation. By empowering smallholder farmers, particularly women, and investing in innovative agricultural technologies, Africa can increase food production, reduce malnutrition, and build more sustainable food systems. Collaborative efforts from governments, the private sector, and the diaspora are essential for transforming Africa's agricultural sector and ensuring long-term food security. With focused attention on policy reforms, research innovation, and community empowerment, Africa has the potential to overcome its current food security challenges and build a more resilient, equitable, and sustainable future.

Keywords: *Food Security, Sustainable Agriculture, Climate-Smart Agriculture, Smallholder Farmers, Gender Equality in Agriculture, Climate Change Adaptation, Food Sovereignty, Agricultural Productivity, Nutritional Security, Rural Development, Agroecology, Diaspora Investment in Agriculture.*

Cite this article: Modise, Dr. J. M., (2025). ADDRESSING SDG 2 – ZERO HUNGER AND SUSTAINABLE AGRICULTURE. *MRS Journal of Arts, Humanities and Literature, 2 (5)84-100.*

INTRODUCTION

Sustainable Development Goal (SDG) 2—"Eliminate hunger, attain food security and enhanced nutrition, and foster sustainable agriculture"—continues to be a vital global imperative. Notwithstanding considerable endeavours, the global community is failing to achieve this objective by 2030. The 2024 State of Food

Security and Nutrition in the World report reveals that trends in hunger and food insecurity are regressing, with undernourishment levels akin to those observed in 2008–2009.

Worldwide, almost 181 million children under the age of five—approximately one in four—are suffering from severe food deprivation. These youngsters are up to 50% more predisposed to have life-threatening malnutrition, including diseases such as wasting. In South Africa, the situation is alarming, with 23% of children experiencing acute food poverty, so exposing them to considerable risk of malnutrition and associated health issues (Reuters, UNICEF, UNICEF, UNICEF).

The difficulties are exacerbated by persistent wars and climatic disturbances. In Gaza, the embargo has precipitated a grave humanitarian crisis, with more than 9,000 children receiving treatment for acute malnutrition since the year's commencement, including an 80% increase in March alone. In Sudan, more than 26 million individuals experience acute food insecurity, a situation worsened by civil conflict and significant displacement (AP News AP News+1AP News Plus One The Guardian).

Resolving these difficulties necessitates a comprehensive strategy that encompasses the optimisation of food delivery systems, the augmentation of agricultural productivity, and the assurance of equal resource access. The World Bank Group has declared a strategic shift in agriculture, increasing its financial commitment to $9 billion per year by 2030, with the objective of enhancing productivity and strengthening climate resilience (World Bank Group).

This proposal delineates pragmatic solutions to accomplish SDG 2, emphasising the eradication of hunger, enhancement of nutrition, and advancement of sustainable agriculture. By executing these measures, we may strive for a society in which all individuals have year-round access to safe, nutritious, and adequate food. Attaining Sustainable Development Goal (SDG) 2, which seeks to eradicate hunger, enhance nutrition, and foster sustainable agriculture, presents a significant challenge for a holistic global response. Notwithstanding decades of advancement, hunger and malnutrition continue to pose substantial obstacles to global health and development.

Worldwide, hunger and food insecurity have increased once more following decades of advancement. The 2024 State of Food Security and Nutrition in the World report by the Food and Agriculture Organisation (FAO) indicates that around 735 million individuals, or 9.5% of the global population, experience hunger, marking an increase from previous years (FAO, 2024). This reversal is ascribed to various circumstances, including economic shocks, military conflicts, and climate-related catastrophes, which have disproportionately impacted vulnerable communities. In nations such as South Sudan, Yemen, and the Horn of Africa, food insecurity is critically elevated, intensified by conflict and drought (FAO, 2024).

The UNICEF study on severe child food poverty indicates that over 1 in 4 children worldwide—181 million—are experiencing severe food poverty, increasing their vulnerability to malnutrition and associated health issues (UNICEF, 2024). These statistics indicate an inability to satisfy the nutritional requirements of at-risk groups, including children, pregnant women, and the elderly, who are disproportionately impacted by malnutrition. The paper highlights the increasing disparity in food distribution, especially in low-income nations and areas of war.

Malnutrition has historically been a pervasive issue, especially among children under the age of five. In 2019, almost 149 million children were stunted, indicating their height-for-age was considerably below the median for their age group, a condition that impairs their physical and cognitive development (UNICEF, 2019). Wasting, or insufficient weight-for-height, represents a significant form of malnutrition, impacting millions of children globally. The World Health Organisation (WHO) indicated that in 2020, around 45 million children under the age of five experienced wasting (WHO, 2020). The global community has established an ambitious objective to eradicate malnutrition in all its manifestations by 2030, aiming to diminish stunting and wasting by fifty percent by 2025.

In South Africa, food insecurity persists as a significant concern despite advancements in agricultural methodologies and food production. The South African Agricultural Census (2017) indicates that while the nation has advanced in modernising its agricultural industry, small-scale farmers, particularly women, still encounter obstacles in obtaining land, technology, and market access (Stats SA, 2017). Consequently, numerous South Africans suffer from dietary deficiencies, with 40% of children under five years old experiencing stunting, rendering the country one of the most malnourished in the area (UNICEF, 2020).

Furthermore, the repercussions of climate change are becoming more apparent, undermining food security by destabilising agricultural systems. Severe weather phenomena, including floods, droughts, and heatwaves, are impacting agricultural output and livestock production worldwide. In 2022, Africa faced catastrophic droughts, especially in the Horn of Africa, where food insecurity escalated to crisis levels due to extended dry periods (UNFCCC, 2022). The FAO and World Bank have cautioned that the economic repercussions of climate change on agriculture may result in millions more individuals experiencing food insecurity by 2050 (FAO, 2020).

The global agricultural system encounters trade distortions that intensify hunger and malnutrition. The removal of agricultural subsidies and trade barriers, as specified in Target 2.b of SDG 2, is essential for establishing a more equitable global food system. The Doha Development Round of trade negotiations aimed to rectify these distortions; nevertheless, progress has been sluggish, with numerous countries continuing to impose detrimental trade barriers (World Bank, 2020).

The United Nations' dedication to rural development has intensified in recent years. International organisations, like the World Bank, have pledged to enhance investments in agricultural infrastructure, technology, and climate-resilient agricultural techniques to assist small-scale farmers in poor nations. In 2021, the World Bank initiated a program to augment agricultural investment, especially in rural regions, emphasising the improvement of agricultural productivity, climate resilience, and gender equality (World Bank, 2021).

In summary, despite significant advancements, the battle against hunger and malnutrition continues to be one of the globe's most urgent issues. To attain SDG 2, it is imperative to enhance food accessibility, increase agricultural productivity, tackle malnutrition, and advocate for sustainable agricultural techniques that are adaptable to climate change. Ongoing endeavours by governments, international organisations, and civil society are essential for achieving the objectives established for 2030.

This part integrates contemporary and historical sources, offering a thorough perspective on the difficulties of food security and agricultural development. Do you require any additional adjustments or enhancements to the background?

PROBLEM STATEMENT

The challenges of hunger, food insecurity, and malnutrition persist as critical global concerns, directly affecting health, economic advancement, and social stability. Notwithstanding advancements in recent decades, prevailing patterns indicate that the globe is deviating from the attainment of Sustainable Development Goal (SDG) 2, which seeks to eradicate hunger, enhance nutrition, and foster sustainable agriculture by 2030.

In 2024, the Food and Agriculture Organisation (FAO) forecasts that 735 million individuals worldwide, constituting 9.5% of the global population, continue to experience hunger, marking a troubling regression from prior years (FAO, 2024). This is chiefly attributable to the synergistic impacts of conflict, climate change, and economic instability, resulting in diminished agricultural output, heightened food costs, and disturbed food systems, especially in poor nations. Countries in the Horn of Africa, including Somalia and Ethiopia, have experienced unparalleled food insecurity due to droughts and persistent conflicts (UNICEF, 2023).

In South Africa, a nation abundant in natural resources and agricultural capacity, food insecurity persists among its most vulnerable communities, especially in rural regions and informal settlements. A new UNICEF analysis reveals that 23% of children in South Africa endure extreme food poverty, encountering significant risks of malnutrition and stunting (UNICEF, 2024). Notwithstanding attempts to improve agricultural output and mitigate hunger, challenges such as inequitable access to land, water, and markets persist as substantial barriers, especially for small-scale farmers and women (FAO, 2020). The 2017 South African Agricultural Census revealed that despite advancements in specific areas of the agricultural industry, smallholder farmers continue to face challenges related to inadequate resources, restricted access to technology, and insufficient support for sustainable practices (Stats SA, 2017).

Alongside food shortages, malnutrition continues to be a widespread issue. The World Health Organisation (WHO) has shown that 149 million children under five years old are worldwide stunted, while 45 million experience wasting, underscoring the critical issue of undernutrition in young children (WHO, 2020). The 2021 UNICEF report indicated that malnutrition is responsible for more than 45% of global child fatalities, with stunting, wasting, and micronutrient deficiencies adversely affecting a child's physical and cognitive development in the long term (UNICEF, 2021). In South Africa, about 40% of children under five experience stunting, significantly impacting the country's future health and economic outlook (UNICEF, 2020).

The correlation between climate change and food security is becoming increasingly apparent. Alterations in meteorological patterns, including extended droughts, inundations, and extreme temperatures, have significantly affected agricultural productivity. The 2022 FAO study on climate change and agriculture emphasised that extreme weather events resulted in crop failures globally, leading millions into food insecurity (FAO, 2022). Southern Africa has endured several years of intense droughts, diminishing crop output and elevating food costs (World Bank, 2021).

Furthermore, the international agricultural market persists in experiencing trade imbalances. Notwithstanding attempts to mitigate these distortions via trade agreements, subsidies, and import restrictions, numerous developing nations continue to encounter inequitable trading practices that obstruct their agricultural advancement. The World Bank and WTO have recognised that rectifying these biases is essential for enhancing global food systems and ensuring that agricultural markets benefit both producers and consumers (World Bank, 2020). The elimination of agricultural export subsidies constitutes a significant obstacle to achieving equitable trade in agriculture, notably impacting African nations due to these market constraints (WTO, 2021).

In conclusion, the issues of food insecurity, malnutrition, and unsustainable farming practices constitute a multifaceted array of concerns that cannot be addressed with singular measures. Resolving these concerns necessitates a comprehensive strategy that encompasses enhancing food accessibility, boosting agricultural productivity, mitigating climate change, and guaranteeing equitable resource distribution. Notwithstanding continuous endeavours, significant efforts are still required to tackle the fundamental causes of food insecurity and malnutrition worldwide, especially in at-risk areas like Africa and South Asia.

This problem statement integrates contemporary and historical sources to offer a thorough perspective on the present issues of hunger, food security, and malnutrition.

AIM OF THE STUDY

The principal objective of this project is to investigate and assess options that can facilitate the attainment of Sustainable Development Goal (SDG) 2, which aims to eradicate hunger, enhance nutrition, and advance sustainable agriculture by 2030. This study aims to elucidate the primary factors contributing to food insecurity and malnutrition, evaluate the effects of existing agricultural methods, and pinpoint sustainable ways to improve food systems, especially in developing nations.

The study will specifically:

Evaluate the elements leading to food insecurity and malnutrition, emphasising the intricate relationships among climate change, conflict, economic volatility, and access to resources like land and technology. The FAO (2024) identifies climatic change and economic instability as significant determinants of global food security. In regions such as Southern Africa, persistent droughts and economic disruptions are resulting in decreased food production, which in turn is contributing to elevated levels of hunger and malnutrition.

Assess the efficacy of existing agricultural practices and regulations designed to enhance food production, mitigate gender imbalances in farming, and expand access to sustainable agricultural techniques.
The World Bank (2021) emphasises that smallholder farmers are vital for food security, although they encounter significant obstacles, including restricted access to markets, technology, and financial services. This study seeks to evaluate how enhancing these elements can bolster food system resilience.

Analyse the impact of governmental policies, international collaboration, and private sector investment on improving food security and aiding small-scale farmers, especially women, indigenous populations, and rural communities. UNICEF (2023) and FAO (2020) underscore the necessity of comprehensive policies that assist small-scale farmers and foster inclusive growth. This study seeks to offer practical solutions to more effectively tackle food insecurity by assessing current policies and suggesting new ones.

Identify environmentally sound and economically viable sustainable agriculture practices, particularly considering the escalating pressures from climate change and resource depletion. A new research by the UNFCCC (2022) highlights the necessity of climate-smart agriculture, encompassing measures such as conservation tillage, crop diversity, and water management to enhance resilience in food production systems. Examine the effects of global trade and agricultural market reforms, specifically concerning export subsidies and trade obstacles, on food security in poor nations.

The WTO (2021) asserts that eliminating trade obstacles and subsidies may foster more fair global food systems. This study will examine the present condition of agricultural trade policies and their effects on food security. This study will provide significant insights into the discourse on sustainable food security and nutrition, especially concerning developing nations and at-risk populations. It will also offer a platform for policymakers, agricultural professionals, and international organisations to devise effective, sustainable solutions for alleviating hunger and malnutrition. This section integrates recent sources to delineate a precise objective for the study, maintaining coherence with current issues in food security and agriculture.

Research Objectives and Questions

The following research objectives and questions are designed to investigate the complex issues surrounding food security, malnutrition, and sustainable agriculture in the context of **SDG 2**. These objectives and questions are interlinked to provide a comprehensive framework for understanding the factors contributing to food insecurity and identifying actionable solutions.

Objective 1: Assess the factors contributing to food insecurity and malnutrition

Research Question 1.1: What are the primary drivers of food insecurity and malnutrition in vulnerable regions, particularly in developing countries like South Africa?

Research Question 1.2: How do climate change, conflict, and economic instability interact to exacerbate food insecurity and malnutrition, especially in rural areas?

Interlink: This objective explores the **root causes** of food insecurity and malnutrition, addressing **climate-related shocks**, **conflicts**, and **economic factors** that significantly impact the **availability** and **accessibility** of nutritious food, especially for vulnerable populations.

Objective 2: Evaluate the effectiveness of current agricultural practices and policies in improving food security

Research Question 2.1: How effective are current agricultural practices and policies in enhancing food production and improving food security in smallholder farming communities?

Research Question 2.2: To what extent do gender disparities affect agricultural productivity and food security in developing countries, particularly for women farmers?

Interlink: This objective seeks to evaluate whether current **agricultural policies** and **practices** are effective in addressing food insecurity and improving agricultural productivity, with a particular focus on how **gender inequalities** impact **women farmers' access** to resources and opportunities (FAO, 2020).

Objective 3: Examine the role of government policies and international cooperation in addressing food insecurity

Research Question 3.1: How do government policies and international initiatives support or hinder the achievement of food security and nutrition goals in developing nations?

Research Question 3.2: What role do international organizations and financial institutions play in promoting sustainable agricultural practices and improving food security in vulnerable regions?

Interlink: This objective examines the effectiveness of both **national policies** and **international cooperation** in supporting food security goals, including efforts to **scale up agricultural investments** and address global trade barriers (WTO, 2021).

Objective 4: Identify and analyze sustainable agricultural practices that contribute to food security and resilience

Research Question 4.1: What are the most effective **sustainable agricultural practices** that can be implemented to improve food security in resource-constrained regions, particularly in areas affected by climate change?

Research Question 4.2: How can smallholder farmers be supported in adopting these sustainable practices to increase productivity and enhance climate resilience?

Interlink: This objective aims to identify **sustainable practices** (e.g., **climate-smart agriculture**) that can help build **resilience** in agricultural systems, addressing both the environmental and economic challenges faced by smallholder farmers (UNFCCC, 2022).

Objective 5: Investigate the impact of global trade and agricultural market reforms on food security

Research Question 5.1: How do **trade restrictions** and **export subsidies** affect food security in developing countries, especially in the context of **global agricultural market reforms**?

Research Question 5.2: What measures can be taken to **correct trade distortions** and promote **fair agricultural trade** to improve food security globally?

Interlink: This objective connects **global trade dynamics** with food security, assessing the impact of **trade barriers** and **agricultural subsidies** on vulnerable countries, and suggesting reforms that can promote **equitable food systems** (World Bank, 2020).

Objective 6: Analyze the role of financial investment and technological innovation in improving food security

Research Question 6.1: What role do financial investments and technological innovations play in improving food security, particularly in rural and underdeveloped areas?

Research Question 6.2: How can international financial institutions, governments, and private investors support the

adoption of **innovative technologies** and practices that enhance food security?

Interlink: This objective highlights the **importance of investment** in **agricultural innovation** and **technology**, exploring how **financial resources** can be effectively mobilized to promote **sustainable** and **climate-resilient** food systems (World Bank, 2021).

Summary of Objectives and Questions

Each objective and research question is designed to address a specific aspect of the **SDG 2** agenda, from understanding the root causes of food insecurity to evaluating the role of global trade and financial investment in shaping food systems. By focusing on these interlinked issues, the study aims to provide comprehensive insights into how to **end hunger**, improve **nutrition**, and foster **sustainable agriculture** by **2030**.

This formulation of research objectives and questions ties together the various aspects of food security, malnutrition, and sustainable agricultural practices while ensuring a thorough investigation of the issues at hand.

SIGNIFICANCE OF THE STUDY

This study holds significant value both in the context of global food security challenges and within the scope of national and regional agricultural development, particularly for vulnerable populations in **developing countries**. The significance of the study can be outlined as follows:

Contributing to the Achievement of Sustainable Development Goal (SDG) 2

The primary aim of SDG 2 is to end hunger, improve nutrition, and promote sustainable agriculture by 2030. This study directly contributes to understanding the **root causes of food insecurity** and **malnutrition** and explores sustainable solutions that can help **reduce hunger** and **malnutrition** globally. By analyzing **agricultural policies**, **sustainable farming practices**, and the role of **international trade**, this research can provide actionable recommendations for **policymakers** and **international organizations** working to achieve SDG 2.

Informing Policy and Strategic Interventions in Agriculture

The study will provide valuable insights into the effectiveness of existing **government policies and international initiatives aimed at improving food security. By evaluating the relationship between climate change, trade policies, and food security, the research will identify key areas where policy interventions can be improved, ensuring that smallholder farmers, particularly in vulnerable regions, have access to resources and opportunities that enhance food security. This is especially critical for countries like South Africa, where agriculture is a cornerstone of the economy, but challenges like land access and gender disparities** continue to impede progress.

Enhancing Agricultural Productivity and Resilience

This study will explore **sustainable agricultural practices** that can help smallholder farmers increase their productivity while adapting to climate change. By investigating the role of **climate-smart agriculture**, the research can highlight successful practices that can be scaled up to build more **resilient food systems**. Given the growing pressures from **climate change** and **resource depletion**, these findings will be critical for developing agricultural strategies that can **adapt to environmental challenges** while improving food security.

Empowering Women and Vulnerable Groups

A key focus of the study is on the **gender disparities** in agriculture and food security, with particular attention to **women farmers** and **indigenous peoples**. Women represent a significant portion of small-scale farmers, especially in rural areas, but often face barriers such as **limited access to land**, **credit**, and **agricultural technologies**. This study aims to provide insights into how these barriers can be overcome through more inclusive agricultural policies and **gender-responsive approaches** that empower women and other marginalized groups. In doing so, it can contribute to the creation of more **equitable food systems** and improve the livelihoods of these groups.

Improving Food Security at the Global and Local Levels

By analyzing **global trade dynamics** and the impact of **export subsidies**, this research will shed light on how international trade policies influence food security in developing countries. The study will propose measures to correct **trade distortions** and **promote fair agricultural trade**, ensuring that the global agricultural market operates in a way that supports food security for **developing nations**. This is particularly important for countries that rely on agriculture as a key economic sector, yet struggle with market barriers and **unfair trade practices**.

Practical Recommendations for International Development Organizations

The findings of this study will offer **evidence-based recommendations** for **international development organizations**, **financial institutions**, and **NGOs** working on food security issues. It will provide a better understanding of the **challenges** faced by smallholder farmers and vulnerable populations, enabling these organizations to design and implement more effective programs that enhance **food access**, **agricultural productivity**, and **nutrition**. The study's focus on **sustainable practices**, **investment** in **agriculture**, and **international cooperation** aligns with the priorities of major global institutions like the **FAO**, **World Bank**, and **UNICEF**.

Fostering Long-Term Solutions for Hunger and Malnutrition

The significance of this research extends beyond short-term interventions by fostering long-term, **sustainable solutions** to hunger and malnutrition. It will explore how to integrate **technology**, **innovation**, and **financial investment** into food systems to create lasting improvements in **agricultural productivity** and **food security**. This will be particularly useful for regions vulnerable to **food price volatility** and **climate-related disasters**, where long-term solutions are crucial for building resilience and ensuring food security for future generations.

Academic Contribution and Knowledge Advancement

The study will contribute to the broader academic understanding of food security, sustainable agriculture, and malnutrition, particularly in the context of **developing countries**. It will fill gaps in the existing literature by providing a comprehensive analysis of **policy frameworks**, **sustainable agricultural practices**, and the role of **trade** in shaping food security outcomes. Additionally, it will offer a comparative perspective on how different regions address food security, providing valuable lessons that can be applied globally.

In summary, the significance of this study lies in its potential to contribute to global efforts to **end hunger**, improve **nutrition**, and promote **sustainable agriculture**. Through a detailed analysis of the **drivers of food insecurity**, **agricultural practices**, and **policy interventions**, the research will offer **evidence-based solutions** to address these challenges at both the local and global levels. Furthermore, by focusing on **vulnerable groups** such as **women** and **smallholder farmers**, this study will play a critical role in advancing **inclusive** and **sustainable development** practices, ensuring food security for current and future generations.

GAPS OF THE STUDY

While this study aims to provide a comprehensive analysis of food security, malnutrition, and sustainable agricultural practices, several gaps remain in the existing literature and research that it seeks to address. These gaps include both **theoretical** and **practical** aspects of food security and agricultural development, particularly in the context of **developing countries** and **vulnerable populations**.

Limited Understanding of the Interactions Between Climate Change and Food Security

While there has been significant research on the **impact of climate change** on agricultural productivity, fewer studies have comprehensively explored how **climate-induced shocks**, such as **droughts**, **floods**, and **extreme weather events**, directly interact with **socio-economic factors** like **poverty**, **conflict**, and **trade** to influence **food insecurity**. This study aims to fill this gap by investigating how these interconnected factors exacerbate food insecurity and malnutrition, especially in **rural areas**.

Existing gap: Limited research on the **compound effects** of climate change combined with **socio-economic vulnerabilities** on food security.

Inadequate Focus on Gender Disparities in Agricultural Practices

Although **gender inequalities** in agriculture are widely acknowledged, there remains a gap in understanding the **specific barriers** that **women farmers** face in accessing **land**, **financial services**, **technology**, and **market opportunities**. This study will focus specifically on how these disparities affect food security and agricultural productivity, particularly in rural and developing regions.

Existing gap: Lack of focused studies on how **gender disparities** in **smallholder farming** affect food security and nutrition outcomes.

Underexplored Role of Global Trade and Agricultural Subsidies in Food Security

While the effects of **trade policies** and **export subsidies** on food security have been discussed in global forums, there is limited research on how these policies impact **smallholder farmers** in **developing countries**. This study will address this gap by analyzing how trade **restrictions**, **subsidies**, and **market access** affect the **ability of vulnerable populations** to access sufficient and nutritious food.

Existing gap: Insufficient research on the direct impact of **trade policies** and **global agricultural markets** on **local food security** in **developing countries**.

Lack of Integration of Sustainable Agricultural Practices with Climate Adaptation Strategies

There is a growing body of research on **sustainable agricultural practices**, but there is a gap in understanding how these practices can be integrated with **climate adaptation strategies** to improve food security and resilience in **climate-vulnerable regions**. This study will examine how **climate-smart agriculture** can be combined with traditional farming practices to create more **climate-resilient** food systems.

Existing gap: Lack of research on how **sustainable agricultural practices** can be integrated with **climate adaptation strategies** for **enhanced food security**.

Insufficient Focus on the Role of Technology and Innovation in Enhancing Food Security

Technological innovations, such as **precision agriculture**, **mobile platforms**, and **genetically modified crops**, have the potential to significantly improve food security. However, there is a gap in the literature regarding the practical implementation of these technologies in **developing regions** and how they can be **scaled up** for broader use. This study will explore the role of **technology** and **innovation** in increasing food production and improving access to **nutritious food**.

Existing gap: Limited studies on the **scaling-up** of **innovative agricultural technologies** in **resource-constrained** regions to improve food security.

Lack of Comprehensive Evaluation of International Cooperation in Food Security

While there have been numerous studies on the role of **international organizations** (e.g., **FAO**, **World Bank**) in improving food security, there is limited research on the **effectiveness** and **impact** of **global cooperation** on local food systems. This study will address this gap by assessing how **international initiatives** can be more effectively **aligned** with **local needs** to enhance food security outcomes, particularly for **vulnerable communities**.

Existing gap: Limited research on the **effectiveness** of **global cooperation** in addressing **food security** challenges at the **local level**.

Scarcity of Longitudinal Data on Food Security and Agricultural Productivity

Longitudinal studies tracking changes in **food security** and **agricultural productivity** over time are scarce, particularly in regions affected by both **economic instability** and **climate shocks**. This study aims to address this gap by incorporating **long-term data** on food security trends, the impact of agricultural practices, and the role of **policy interventions** in sustaining food systems over time.

Existing gap: A lack of **longitudinal studies** tracking the **long-term impacts** of **policy interventions** and **sustainable practices** on food security.

Limited Research on Multi-Stakeholder Approaches to Food Security

The complexity of food security issues requires **multi-stakeholder collaboration** between **governments**, **private sectors**, **NGOs**, and **international organizations**. While some studies have explored stakeholder engagement, there is insufficient

research on how these various actors can **coordinate efforts** effectively to address food insecurity at a **regional or national level**. This study will focus on **multi-stakeholder collaboration** in tackling food security challenges, especially in **post-conflict** or **disaster-prone regions**.

Existing gap: Insufficient exploration of **multi-stakeholder collaboration** and its effectiveness in addressing **food insecurity** in **vulnerable regions**.

By addressing these gaps, this study will contribute valuable insights to the academic literature on food security, sustainable agriculture, and the role of global trade and policies in shaping food systems. It will also provide practical recommendations for policymakers and international organizations working to improve food security and **reduce malnutrition** in vulnerable populations. Furthermore, the study will highlight the **synergies** between **climate resilience**, **gender equality**, and **sustainable agriculture**, providing a more holistic approach to addressing food insecurity in developing countries.

THEORETICAL FRAMEWORK

This study's theoretical framework is based on numerous fundamental theories and concepts that elucidate the intricate relationships among food security, malnutrition, and sustainable agriculture. These ideas establish the basis for comprehending how policy interventions, agricultural practices, and global dynamics influence food systems, particularly in developing nations. By synthesising both established basic theories and contemporary frameworks, the study creates a comprehensive perspective for examining the challenges related to SDG 2.

One Framework for Food Security and Livelihoods

The Food Security and Livelihoods Framework is a well-established conceptual paradigm employed to comprehend the multifaceted aspects of food security. The framework highlights that food security is determined by food availability, access, and utilisation, with temporal stability being a vital element (Maxwell & Smith, 1992). In accordance with this framework:

- Availability denotes the physical existence of food, influenced by factors including agricultural productivity, trade, and distribution systems.
- Access pertains to individuals' capacity to acquire food, shaped by economic constraints, social disparities, and political processes.
- Utilisation pertains to the efficiency with which the body can assimilate food, directly linked to nutrition and health.
- Stability pertains to the necessity for food systems to exhibit resilience against disruptions, including climate change, economic crises, and conflicts (Maxwell & Smith, 1992).
- This paradigm will direct the examination of food security, ffocussing on the multi-dimensional facets of food access, particularly in areas susceptible to climate change and economic volatility.

The FAO (2021) emphasises that the economic accessibility of food is increasingly influenced by global trade policies and local resilience to economic crises, which are essential for comprehending the stability and access aspects of food security.

Sustainable Livelihoods Framework

The Sustainable Livelihoods Approach (SLA) emphasises the resources and tactics employed by individuals and communities to sustain their livelihoods. This methodology underscores the significance of assets (natural, human, social, financial, and physical) and the environment of vulnerability (including economic shocks, climate change, and market volatility) in influencing individuals' capacity to attain food security and enhance nutritional outcomes (Scoones, 1998).

This study will utilise the SLA to analyse how smallholder farmers, especially women and marginalised groups, employ diverse livelihood strategies to achieve food security. This study will examine the impact of gender and resource accessibility on the implementation of sustainable agricultural techniques, including climate-smart agriculture and agro-ecological methods, to improve food production and nutrition (Devereux & Maxwell, 2001).

Gichuki et al. (2020) underscore the significance of the SLA framework in examining how vulnerable rural populations utilise available resources and methods to mitigate climatic shocks and enhance food security via diverse livelihoods.

Political Economy of Food Systems

The political economy of food systems examines the impact of political and economic frameworks on the production, distribution, and consumption of food. The political economy perspective is based on the premise that global trade, market accessibility, and governmental regulations influence food availability and access (Patel, 2009). This methodology will elucidate the influence of trade policies (e.g., export subsidies and market barriers) on food security, especially in developing nations reliant on agriculture as a principal economic sector.

This paradigm examines the impact of international cooperation and institutional arrangements (e.g., WTO and FAO) on global food systems and their potential to unwittingly increase or mitigate food poverty in vulnerable places.

Baldwin (2019) asserts that trade liberalisation and global agriculture policies have resulted in heightened market volatility, disproportionately impacting small-scale producers in developing nations.

Framework for Social Ecological Systems (SES)

The Social Ecological Systems (SES) Framework emphasises the comprehension of intricate relationships between social systems, including communities, governments, and markets, and ecological systems, such as agricultural ecosystems, climatic systems, and natural resources (Berkes & Folke, 1998). This concept posits that the sustainability of food systems relies on the equilibrium between society demands and environmental capacities.

This study will employ the SES framework to examine the resilience of food systems, specifically how sustainable agricultural methods, such as agroforestry and sustainable crop rotation, might alleviate the effects of climate change and enhance long-term food security. The UNFCCC (2022) underscores the significance of sustainable agriculture practices in climate adaptation, advocating for systems that bolster food security while concurrently safeguarding the environment.

Dependency Theory

Dependency theory asserts that the global economic system is marked by exploitation and inequality, wherein developing nations are frequently ensnared in dependent ties with industrialised countries, resulting in enduring poverty and food insecurity (Frank, 1966). This theory elucidates why emerging nations, although possessing arable land and labour resources, may have challenges in food security owing to inequitable access to money, technology, and global markets.

The research will employ dependence theory to evaluate how global commerce and market access impede the food sovereignty of developing nations, specifically regarding agricultural and sustainable food systems. It will also examine how trade liberalisation and global economic integration may exacerbate food insecurity among disadvantaged communities. Galtung (2018) updated dependence theory to emphasise how trade imbalances and economic reliance perpetuate the susceptibility of developing nations, especially in sub-Saharan Africa, to food poverty.

The theoretical framework integrates traditional and contemporary theories to examine the complex nature of food security and sustainable agriculture. These frameworks offer an extensive comprehension of the political, economic, social, and environmental elements that influence food systems. The study seeks to address food insecurity in developing nations by integrating global trade dynamics, climate change adaptation, and gender disparities, thereby filling existing gaps in the literature.

REVIEW OF LITERATURE

This study's literature assessment on food security, sustainable agriculture, and malnutrition is structured around six principal themes that pertain to the overarching framework of SDG 2 (End hunger, achieve food security, and improved nutrition). This section will present a comprehensive overview of current research on food security, its interconnections with agriculture, climate change, and trade policy, particularly in developing nations, while emphasising both theoretical and empirical viewpoints.

Defining Food Security and Its Aspects

The concept of food security has developed over time. The FAO (2008) defines food security as a state in which all individuals, at all times, has physical and economic access to adequate, safe, and nutritious food that satisfies their dietary requirements and preferences for an active and healthy lifestyle. This definition encompasses four essential dimensions:

Availability the provision of food in the region, encompassing production, reserves, and commerce. Access: Economic and physical availability of food. Utilisation: The body's capacity to assimilate and derive advantages from the nutrients in food, directly linked to nutrition and health. Stability: The capacity of food systems to endure disruptions and maintain consistency throughout time, especially during economic crises, climate change, or conflict. Maxwell & Smith (1992) assert that food security is intricately linked to a household's livelihood plan, encompassing elements such as income, land access, and social capital. Gundersen et al. (2017) assert that food security in both wealthy and developing countries is increasingly affected by global economic changes and trade regulations. In emerging nations, susceptibility arising from poverty, social inequality, and political instability often intensifies food insecurity. The FAO (2021) indicates that worldwide food insecurity is escalating, particularly in sub-Saharan Africa and South Asia, where economic inequalities and climate-related disturbances significantly affect food accessibility and nutrition.

Sustainable Agriculture and Food Security

The nexus between sustainable agriculture and food security is pivotal to SDG 2, since agricultural productivity serves as a fundamental catalyst for food availability. Studies indicate that sustainable agricultural approaches, including agro-ecology, agroforestry, and conservation agriculture, enhance food production while safeguarding natural resources (Altieri, 2002). Pretty et al. (2018) assert that these approaches bolster resilience in smallholder agriculture by improving soil health, conserving water, and diminishing reliance on external inputs such as artificial fertilisers and pesticides. Nonetheless, obstacles remain in the extensive implementation of these methods, especially in areas where climate change jeopardises agricultural systems. Lal (2015) underscores the necessity of climate-smart agriculture (CSA), which encompasses methods that augment agricultural productivity while bolstering resilience to climate change. Climate-Smart Agriculture (CSA) has demonstrated efficacy in mitigating susceptibility to extreme weather events and enhancing yields, particularly in rain-fed agricultural systems. The FAO (2022) emphasises the significance of sustainable agricultural practices in bolstering climate resilience and augmenting food security, particularly in response to climate-induced threats.

The Influence of Gender on Food Security

Gender significantly influences food security, as women frequently serve as the principal supervisors of food production in several developing nations. Doss (2018) contends that gender inequalities in access to land, credit, education, and technical advancements impede women's capacity to enhance household food security. The FAO (2020) indicates that women are disproportionately impacted by food insecurity due to their limited access to productive resources and their higher likelihood of engaging in subsistence farming, which is more vulnerable to economic and environmental disruptions. Agarwal (1994) asserts that enhancing women's access to land and financial resources can markedly elevate food production and nutritional outcomes for households. Quisumbing et al. (2020) assert that gender equality in agriculture can lead to heightened agricultural productivity, improved nutritional outcomes, and strengthened community resilience. The significance of gender-sensitive agricultural policy is paramount for the attainment of SDG 2, as it directly correlates with women's capacity to enhance household food security via improved access to resources and expertise. The World Bank (2021) asserts that enhancing women's access to resources and land tenure rights can substantially increase food security and household nutrition, especially in rural regions.

Climate Change and Food Security

Climate change poses a substantial danger to global food security, especially in areas that depend predominantly on agriculture for sustenance. Research conducted by Lobell et al. (2011) indicates that increasing temperatures, droughts, floods, and alterations in precipitation patterns are diminishing crop yields, particularly in tropical and subtropical areas. These climate-related alterations not only impact food production but also cause disruptions in food supply networks, elevate food prices, and

diminish access to nutritious food. The FAO (2021) indicates that smallholder farmers experience the effects of climate change more severely due to their restricted adaptive potential. Climate-smart agriculture is frequently advocated as a method to enhance resilience to climate change; nevertheless, obstacles persist in the widespread adoption of these techniques due to resource limitations, knowledge deficiencies, and insufficient financial assistance for at-risk communities (Vermeulen et al., 2012). The FAO (2021) cautions that climate change may drive hundreds of millions into food insecurity by 2050, especially in low-income nations reliant on agriculture.

International Trade Regulations and Nutritional Stability

Global trade policies and their effects on food security have been extensively studied. Baldwin (2019) examines how trade liberalisation, agricultural subsidies, and export restrictions frequently favour industrialised nations at the expense of underdeveloped countries. Trade distortions, including subsidies in affluent nations, can induce price instability in global food markets and hinder the competitiveness of smallholder farmers. Timmer (2010) contends that global trade can bolster food security by augmenting food availability via imports and exports; but, it may also intensify disparities among nations if not meticulously regulated. Developing nations may encounter difficulties in accessing global markets or ensuring that food imports comply with local nutritional standards. The FAO (2021) indicates that trade restrictions and agricultural subsidies in affluent nations persist in distorting global food markets, hence hindering initiatives to enhance food security in underdeveloped areas.

The literature on food security underscores the intricate relationship among agriculture, gender, climate change, and global trade. The primary findings demonstrate that sustainable farming methods, gender equality, and climate adaption measures are essential for enhancing food security, particularly in developing nations. Nonetheless, obstacles persist in expanding these activities owing to resource limitations, trade regulations, and societal disparities. This literature review emphasises the necessity of a multifaceted strategy for tackling food security, incorporating climate-smart agriculture, gender-sensitive policies, and international collaboration to fulfil SDG 2.

THEMATIC FOCUS OF THE RESEARCH

This study examines key concepts critical to comprehending the interrelated challenges of food security, malnutrition, and sustainable agriculture within the context of SDG 2. Each theme will examine the principal elements leading to food security concerns, especially in developing nations. These themes will inform the investigation and analysis throughout the study.

One: Food Security and Its Aspects

The notion of food security is complex, and numerous research have examined it from diverse viewpoints. Food security traditionally includes four fundamental dimensions: availability, access, utilisation, and stability. These characteristics are essential for comprehending the operation of food systems at both the household and national scales. Maxwell & Smith (1992) emphasise that food security is a dynamic process encompassing not just the physical availability of food but also its cost, quality, and capacity to fulfil nutritional requirements throughout time. In developing countries, the factors of accessibility and utilisation frequently provide significant challenges, as poverty, inequality, and climate change intensify vulnerabilities. The FAO (2021) highlights that worldwide food insecurity is increasing, especially in sub-Saharan Africa and South Asia, where climatic disturbances and economic inequalities hinder access to healthy food.

Two: The Function of Sustainable Agriculture

Sustainable agriculture is crucial for attaining food security, particularly as the global population expands and environmental issues escalate. Agroecology, agroforestry, and organic farming are increasingly acknowledged for their capacity to improve food security amid climate variability. Altieri (2002) contends that sustainable agricultural techniques enhance soil fertility, promote biodiversity, and improve water management, all of which are crucial for the long-term viability of food production in vulnerable areas. These practices are essential for smallholder farmers, who frequently depend on traditional knowledge and regionally adapted methods. Nonetheless, significant regulatory support and financial commitment are need to expand these practices, particularly in regions where access to technology, capital, and market opportunities is constrained. Pretty et al. (2018) assert that the adoption of agroecological farming systems can improve resilience and productivity, especially in poor areas where climate change is straining conventional agricultural practices.

Three: Climate Change and Its Effects on Food Security

Climate change constitutes a significant obstacle to global food security, especially in areas already susceptible owing to economic instability, political turmoil, and inadequate infrastructure. Climate change consequences, such as droughts, flooding, and heightened temperature variability, directly influence agricultural output and food production. Lobell et al. (2011) contend that climate change is expected to intensify food insecurity in sub-Saharan Africa and certain regions of Asia, where agriculture relies predominantly on rain-fed farming methods.

Adaptation techniques, including climate-smart agriculture (CSA), which integrates sustainable farming practices and climate resilience, are essential for securing food in these regions. These measures assist farmers in adapting to fluctuating rainfall patterns, optimising water utilisation, and improving soil health. The FAO (2021) study on food security underscores that climate change would exacerbate food insecurity, especially in vulnerable areas such as sub-Saharan Africa, where agriculture is acutely affected by climate variability.

Four: Gender and Food Security

Gender serves as a crucial driver of food security, as women frequently assume the roles of primary carers and food providers in numerous areas. Women have substantial obstacles to attaining food security due to inequitable access to resources, including land, capital, and education. Agarwal's (1994) research highlights that granting women access to productive resources and land tenure rights can enhance food security by boosting agricultural productivity and assuring improved household nutrition. In numerous regions of Africa and Asia, where women predominantly manage family food production, these differences markedly exacerbate the gender gap in food security. Empowering women not only strengthens the resilience of food systems but also boosts household nutrition and child health outcomes. Quisumbing et al. (2020) contend that mitigating gender disparities in agriculture is essential for attaining SDG 2 and enhancing the welfare of entire communities. The World Bank (2021) indicates that enhancing women's access to resources, including land,

money, and agricultural extension services, results in improved food security for households and communities in rural regions.

Five: International Commerce and Nutritional Stability

Global trade profoundly affects food security, as the international exchange of food and agricultural commodities influences both food supply and price stability. Trade policies, especially trade barriers, subsidies, and export restrictions, can distort food markets and hinder food security initiatives, particularly in developing nations. Baldwin (2019) examines the adverse effects of trade liberalisation and the elimination of agricultural subsidies on smallholder farmers in developing countries, who frequently find it challenging to compete with subsidised agricultural goods from affluent nations. The global food system is susceptible to market instability and price variations, which can intensify food insecurity in areas with a significant reliance on food imports. Timmer (2010) asserts that trade distortions, especially those stemming from subsidies in affluent nations, have historically compromised the competitiveness of agricultural sectors in the Global South, resulting in food price instability and heightened food poverty. FAO (2021) asserts that global trade policies favouring export-oriented agriculture over smallholder farming can diminish food accessibility in developing nations reliant on imports to satisfy domestic food requirements.

Six: Malnutrition and Its Association with Food Security

Malnutrition serves as both a catalyst and a result of food insecurity. Undernutrition, stunting, and wasting are directly associated with insufficient access to healthy and adequate food. Children under five, pregnant women, and adolescent females are especially susceptible to the detrimental impacts of malnutrition. The FAO (2021) indicates that despite advancements in certain areas, malnutrition continues to influence roughly 3 billion individuals worldwide, with extensive repercussions on health, development, and economic growth. The examination of malnutrition within food security frameworks underscores the necessity for nutrition-sensitive initiatives, which prioritise not only the enhancement of food supply but also the assurance that food quality sufficiently meets the nutritional requirements of at-risk groups. The WHO (2021) addresses the worldwide malnutrition burden, especially in children under five, emphasising that tackling both undernutrition and overnutrition is essential for enhancing overall food security.

This study examines the intricate and interrelated aspects of food security, focussing on agricultural productivity, climate change, gender equality, and global trade dynamics. These themes underscore that attaining food security necessitates a holistic strategy that incorporates sustainable farming practices, gender-responsive policies, climate adaptation methods, and international collaboration to address the multifaceted issues related to SDG 2. This literature review emphasises theoretical frameworks and empirical evidence that will guide the study's research design and analysis.

CONSEQUENCES OF THE RESEARCH

This project will substantially enhance both scholarly understanding and practical implementations in the domains of food security, sustainable agriculture, and nutrition. The findings will enhance comprehension of the interconnected difficulties related to food security in developing nations and present policy suggestions to guide future initiatives and strategies aimed at achieving SDG 2 (Zero Hunger). The ramifications of this study can be categorised into several principal domains:

One: Formulation of Policies and Proposals

This study will produce evidence-based insights into the primary factors contributing to food insecurity and malnutrition in at-risk communities, especially in sub-Saharan Africa and South Asia. The study will provide significant recommendations for policymakers by analysing the impacts of sustainable agriculture, gender inequality, climate change, and global trade policies. This guidance will concentrate on:

- Adopting climate-smart agriculture techniques to improve resilience.
- Enhancing the empowerment of women farmers through improved access to land, credit, and education.
- Enhancing local food systems to increase access to healthful food and diminish reliance on global markets.
- Combating malnutrition with comprehensive strategies that connect food security with health, education, and economic advancement.
- Influence on Policy: Policymakers may utilise these findings to design policies that bolster small-scale farmers, enhance nutrition-sensitive agriculture, and augment the resilience of food systems to climatic fluctuations.

Furthermore, the results may push international organisations, such as the FAO, and regional entities to implement more inclusive and sustainable agricultural development policies.

Two: Progressing Scholarly Literature

This research will enhance the current understanding of food security and sustainable agriculture, especially concerning the Global South. The project will offer a thorough knowledge of food security by synthesising contemporary research with established theoretical frameworks, considering the influences of climate change, gender, and economic inequities. This will address deficiencies in the literature about the nexus of food security, malnutrition, and agricultural practices. This study's theoretical and empirical findings will facilitate new research opportunities, especially in climate adaptation, food sovereignty, and gender-inclusive agricultural policies.

The influence on academia: Academics and researchers in agriculture, public health, and development studies will gain a refined comprehension of the connections among food security, gender roles, and climate resilience, facilitating more focused and interdisciplinary research.

Three: Pragmatic Consequences for Communities

This study's practical consequences are especially important for smallholder farmers, at-risk households, and rural communities facing food shortages and malnutrition. This study will examine the efficacy of sustainable farming practices and gender empowerment in enhancing food security, thereby contributing to the formulation of community-level interventions to improve food availability, access, and utilisation. The study's findings may guide NGOs, development organisations, and local governments in formulating sustainable and inclusive community-driven solutions to food insecurity.

The insights acquired could empower local populations by enhancing access to sustainable agricultural practices, nutritional

education, and community-oriented food systems. This will mitigate poverty, boost nutritional outcomes, and strengthen community resilience to climate-related disturbances.

Four: Advancing Global Food Security Objectives

The findings clearly correlates with SDG 2 (Zero Hunger) and will aid in the worldwide push to eliminate hunger and malnutrition by 2030. The study will identify practical strategies and obstacles to achieving food security, thereby supporting global initiatives to enhance agricultural productivity, promote sustainable practices, and ensure that all populations, especially those in vulnerable circumstances, have year-round access to nutritious and adequate food.

The study's findings can guide international organisations, including the United Nations, World Bank, and FAO, in formulating worldwide strategies to attain food security, especially in low-income nations. It will facilitate the establishment of global frameworks for sustainable agricultural development, climate adaption, and gender equity in food systems.

Five: Adaptation to Climate Change and the Development of Resilience

The report emphasises the nexus between climate change and food security, highlighting the necessity of creating climate-resilient agricultural systems. The research will demonstrate how the adoption of sustainable agricultural methods can alleviate the impacts of climate change, enhance food production systems, and safeguard biodiversity. These findings are essential for fostering resilience in agricultural sectors significantly affected by climatic catastrophes such as droughts, floods, and temperature extremes.

This study can enhance global climate change adaptation initiatives by providing realistic recommendations for agriculture-based measures that bolster food security. It will also influence global climate policies by showcasing the capacity of sustainable agriculture to mitigate food insecurity and climate vulnerability.

This study's influence encompasses policy formulation, scholarly research, community empowerment, and international initiatives aimed at enhancing food security and nutrition. This research will significantly contribute to the overarching objective of eradicating hunger and establishing sustainable food systems by 2030 by tackling the interrelated issues of sustainable agriculture, gender inequality, climate change, and global trade policy. The results will offer practical insights for policymakers, scholars, practitioners, and community leaders striving to enhance global food security and nutrition.

KEY TAKEAWAYS

Multi-Dimensional Nature of Food Security:

Food security is not just about food availability, but also about access, utilization, and stability. Addressing these dimensions requires a comprehensive approach that includes enhancing agricultural productivity, improving access to nutritious food, and ensuring resilience to climate shocks.

Sustainable Agriculture as a Solution:

Sustainable agricultural practices, such as agroecology, agroforestry, and climate-smart agriculture, are essential for achieving long-term food security. These practices help smallholder farmers improve productivity, maintain ecosystem health, and adapt to climate change.

Gender and Food Security:

Empowering women, particularly in rural areas, is critical to improving food security. Women play a central role in food production and household nutrition, and addressing gender disparities in access to land, resources, and education can significantly enhance food security outcomes.

Climate Change Threatens Food Systems:

Climate change is a major threat to global food security, especially in vulnerable regions. The negative effects of climate variability—such as droughts, floods, and temperature extremes—are already impacting food production. Adapting to these changes through sustainable practices is crucial to maintaining food security in the face of environmental challenges.

Global Trade Policies Impact Food Security:

Trade policies, particularly subsidies and export restrictions, can distort food markets and undermine food security in developing countries. Addressing these trade distortions and ensuring fair and equitable access to international food markets is key to improving food security globally.

Malnutrition as Both a Cause and Consequence of Food Insecurity:

Malnutrition, including undernutrition and micronutrient deficiencies, is both a cause and a consequence of food insecurity. Addressing malnutrition requires not just increasing food availability but ensuring that food is nutritious and accessible to all, particularly vulnerable populations such as children and pregnant women.

Policy and Practice Integration:

The study emphasizes the need for integrated policy solutions that combine agricultural development, climate change adaptation, gender equality, and nutrition-focused interventions. Policymakers need to adopt **multi-sectoral approaches** to address the root causes of food insecurity.

Impact on SDG 2 (Zero Hunger):

This study contributes directly to achieving **SDG 2** by offering practical recommendations that align with the broader global goal of eradicating hunger and improving food security by 2030. The findings will support efforts to develop **inclusive**, **sustainable**, and **resilient food systems** worldwide.

Community-Level Interventions Are Essential:

Local communities, particularly smallholder farmers, play a crucial role in food production. Empowering these communities with access to resources, knowledge, and climate-resilient practices can enhance food security and reduce poverty at the grassroots level.

Global Cooperation Is Critical:

Achieving food security in developing countries requires global cooperation, particularly in areas such as agricultural research, trade reform, and climate adaptation. Collaborative efforts between governments, NGOs, and international organizations are essential to scaling solutions that can address food insecurity at both the local and global levels.

These takeaways underscore the complexity of food security and the necessity for a **holistic approach** to solving the

challenges that hinder the achievement of **SDG 2**. They provide actionable insights for policymakers, practitioners, and researchers working towards a **more sustainable and inclusive** global food system.

IMPACT OF THE ARTICLE FOR AFRICA AND THE DIASPORA

The findings of this article will have significant implications for **Africa** and the **African diaspora**, particularly in addressing food insecurity, malnutrition, and the role of **sustainable agriculture** in enhancing **food systems resilience**. The insights can inform policies, initiatives, and strategies that aim to tackle food security challenges in Africa, while also influencing the diaspora's role in supporting development initiatives. Below are key areas of impact:

Improving Food Security in Africa

The article's findings will contribute to enhancing **food security** in Africa, a continent where **hunger**, **malnutrition**, and **climate change** are critical challenges. By focusing on **sustainable agriculture**, **climate-resilient practices**, and improving **small-scale farming**, the study will provide actionable recommendations to enhance the capacity of African nations to feed their growing populations. The integration of **climate-smart agricultural techniques**, such as agroecology and drought-resistant crops, will be pivotal in reducing dependency on global food imports and increasing **local food production**.

Impact on Africa: This will help reduce reliance on food aid, strengthen **local food systems**, and improve the **sustainability** of agricultural practices, promoting food sovereignty in African nations. **Smallholder farmers**, who form the backbone of agriculture in Africa, will benefit from better access to knowledge, resources, and technology, increasing productivity and livelihoods.

Addressing Gender Inequality and Empowering African Women

Women in Africa are disproportionately affected by food insecurity and are central to food production, processing, and family nutrition. The article highlights the importance of empowering women farmers, ensuring **equal access to land**, **financial resources**, and **education**. By focusing on gender-sensitive agricultural policies, the article advocates for the removal of barriers that limit women's participation in food systems, thus improving **food security** and **nutritional outcomes**.

Impact on African Women: Empowering women in agriculture will improve food availability at the household level, enhance **economic independence**, and contribute to the **overall development** of African communities. **Gender equity** in agriculture can also enhance resilience to climate change and improve **nutritional security** for families.

Climate Change Adaptation and Resilience in African Agriculture

Africa is one of the most vulnerable regions to the impacts of **climate change**, which threatens food security by disrupting agricultural productivity. The article emphasizes the need for **sustainable agricultural practices** and the development of **climate-resilient food systems**. These practices, such as the adoption of drought-resistant crops and sustainable water management techniques, are crucial for mitigating the effects of **climate-related shocks** such as **droughts**, **floods**, and **changing rainfall patterns**.

Impact on Africa: Promoting **climate adaptation strategies** in agriculture will help African countries build resilience to the increasing frequency and intensity of climate-related disasters. By **investing in local climate solutions**, African nations can enhance **food security**, reduce vulnerability, and improve the livelihoods of rural populations who depend on agriculture for their sustenance.

Promoting African Diaspora Engagement in Agricultural Development

The African diaspora has the potential to play a crucial role in supporting **agricultural development** on the continent. The article underscores the importance of **remittances**, **knowledge transfer**, and **investment** from the diaspora in strengthening African food systems. The diaspora community can contribute to sustainable development through:

Investment in agriculture-related projects

Transfer of skills and knowledge in sustainable farming, agricultural technologies, and value chain development.

Advocacy for food security on global platforms, pushing for policies that benefit African nations.

Impact on the Diaspora: The findings will empower the diaspora to become more actively involved in supporting agricultural development in Africa, not only through financial remittances but also by leveraging their networks, skills, and expertise. This engagement will help **bridge the gap** between Africa's development needs and global agricultural advancements.

Enhancing Regional Food Trade and Economic Integration

The article's insights into the impact of **global trade policies** on food security will be highly relevant for **Africa's regional integration** efforts. By addressing trade distortions and promoting **fair trade policies**, the study will advocate for more **regional collaboration** in food production and distribution. The **African Continental Free Trade Area (AfCFTA)** can be an important tool in reducing barriers to intra-African trade in agricultural products, ensuring that African countries can share resources, knowledge, and food in times of crisis.

Impact on Africa: Facilitating regional trade will strengthen Africa's ability to achieve **food self-sufficiency**, reduce food price volatility, and improve **economic resilience**. It will also foster **economic integration**, which is critical for enhancing the continent's global competitiveness and food security.

Impact on Global Advocacy for African Food Systems

The article will contribute to the global discourse on **food security** by emphasizing the unique challenges faced by Africa and the solutions needed to address them. It will highlight the importance of supporting African agricultural development through international cooperation, development aid, and policy support. It will also advocate for policies that consider **Africa's specific needs**, such as improving access to **technology**, **research**, and **education**.

Impact on Global Advocacy: The article will give African food security issues more visibility on international platforms, urging international organizations, donors, and governments to

invest in African solutions for food security, climate adaptation, and sustainable agriculture.

Contributing to Food Sovereignty in Africa

Finally, the article underscores the importance of **food sovereignty**—the right of African nations to control their own food systems and prioritize local production over external dependence. It advocates for African countries to make choices based on their own **cultural**, **environmental**, and **economic contexts** rather than being shaped by global trade pressures and foreign interventions.

Impact on Africa: This focus on **food sovereignty** will promote **self-sufficiency**, **autonomy**, and the **sustainability** of food systems in African countries, thus reducing dependence on foreign aid and food imports.

The impact of this article for Africa and its diaspora will be far-reaching, particularly in the areas of **food security**, **sustainable agriculture**, **gender empowerment**, **climate resilience**, and **regional integration**. It will help **inform policy** and **practical solutions** to food security challenges, while also encouraging the African diaspora to play a more active role in supporting sustainable development in Africa. By focusing on **holistic, inclusive, and sustainable** approaches, the study will contribute significantly to advancing **food sovereignty** and **self-sufficiency** in Africa, enhancing the continent's resilience to future challenges in food production and distribution.

FURTHER STUDY

The study of food security and sustainable agriculture in the context of **Africa** and its **diaspora** provides important insights but also opens avenues for further research in several key areas. The following outlines potential areas for **future studies** that could build on the findings of this research:

Impact of Climate Change on Agricultural Productivity

While this study examines the intersection of **climate change** and **food security**, more focused research is needed to assess specific climate impacts on **different agricultural systems** across regions in Africa. Future studies could explore the **regional variations** in climate change impacts, such as how different crops, farming systems, and agricultural practices respond to changing climatic conditions.

SUGGESTED AREAS OF RESEARCH:

The **effect of climate change** on crop yield in specific African regions. **Adaptation strategies** for smallholder farmers in **drought-prone areas** of sub-Saharan Africa. **Mapping vulnerabilities** of different agricultural regions to **climate extremes** (e.g., droughts, floods, heatwaves).

Gendered Impacts of Agricultural Policies and Practices

This study highlights the centrality of **gender equality** in achieving food security, but further research is needed to explore the **gendered impacts** of specific agricultural policies, practices, and interventions. More focused studies could examine the barriers and opportunities for **women farmers** in accessing **land**, **capital**, and **market opportunities**.

Suggested Areas of Research:

Women's access to agricultural credit, land tenure systems, and farming technologies. The role of **social norms and gender roles** in food production and household nutrition. **Gender-sensitive policies** that improve **food security** and **economic outcomes** for women farmers.

Exploring Urban Food Systems and Food Security

As African cities grow rapidly, urbanization is placing increased pressure on food systems. While this study focuses on rural agriculture, further research is needed on **urban food security**, particularly in **slums** and **peri-urban areas** where food insecurity is pervasive.

Suggested Areas of Research:

The role of **urban agriculture** and **local food systems** in promoting food security in **African cities**. The impact of **urban migration** on food access and nutrition in **informal settlements**. **Sustainable food systems** in **urban areas**, including **food distribution networks** and **food waste management**.

Technology and Innovation in African Agriculture

The study touches on **technological advancements**, but further investigation is needed into the specific technologies that have the potential to revolutionize food production in Africa. Future studies could focus on how innovations in **agricultural technology**, such as **smart farming**, **drones**, and **genetic modification**, can be scaled to improve food security in the region.

Suggested Areas of Research:

The role of **agricultural technology** in improving productivity and resilience to climate change. **Impact of precision farming** tools (e.g., sensors, drones, AI) on smallholder farming in Africa. **Barriers to technology adoption** in African agriculture and solutions for **wider adoption**.

Food Sovereignty and Local Food Systems

This study advocates for the importance of **food sovereignty**, but there is a need for more research into how African countries can assert control over their food systems. Future research could explore **community-led models** for **food sovereignty**, and how to ensure that **local food production** and **market systems** are prioritized over global trade dynamics.

Suggested Areas of Research:

Case studies on successful **local food systems** and **food sovereignty models** in Africa. Research into the role of **local food banks** and **community-supported agriculture** in improving food security. **Policy frameworks** for strengthening **food sovereignty** and local food economies in Africa.

Economic Models for Sustainable Food Security

The role of **economic models** in promoting **sustainable food systems** in Africa remains underexplored. Future research could investigate economic frameworks that support smallholder farmers, **social enterprises**, and **agricultural cooperatives** in driving sustainable food production.

Suggested Areas of Research:

The **economic viability** of small-scale farming versus large-scale industrial agriculture in Africa. **Social enterprises** and **cooperatives** as models for ensuring equitable food access. **Public-private partnerships** that foster **investment** in sustainable food systems.

Linking Agricultural Policies with Health and Nutrition

The article discusses the importance of **nutrition-sensitive agriculture**, but more research is needed to explore how **agricultural policies** can be better aligned with **health and nutrition** goals. Future research should examine the direct link between **agriculture**, **health**, and **nutrition**, particularly for **vulnerable groups** such as **children**, **pregnant women**, and the **elderly**.

Suggested Areas of Research:

The impact of **agriculture-based interventions** on improving **maternal and child nutrition**. **Food-based strategies** to combat **micronutrient deficiencies** in African populations. **Nutrition-sensitive agricultural policies** that enhance both food security and health outcomes.

Regional Food Trade and Integration

Further research is needed on the **economic integration** of African nations through improved **regional food trade**. The **African Continental Free Trade Area (AfCFTA)** provides a framework for greater cooperation, but studies are needed on the practical challenges and opportunities to improve **food trade** across African borders.

Suggested Areas of Research:

The effectiveness of **AfCFTA** in improving **food trade** and **economic integration** within Africa. **Trade barriers** to food products within African regions and solutions to mitigate them. The role of **regional food reserves** in addressing food crises.

Diaspora Involvement in Agricultural Development

The African diaspora can play an important role in supporting agricultural development in Africa, but further studies are needed to understand how diaspora communities can best contribute to sustainable agricultural practices, both financially and through knowledge transfer.

Suggested Areas of Research:

The role of the **diaspora in remittances** and investment in **agricultural development**. Knowledge transfer from the **diaspora** on **innovative agricultural practices**. **Cultural barriers** and opportunities for involving the diaspora in agricultural projects.

The areas for further study outlined above offer significant opportunities to deepen our understanding of the complex issues surrounding food security, sustainable agriculture, and nutrition, especially in the context of Africa and its diaspora. By addressing these research gaps, future studies will contribute to the development of more effective, **equitable**, and **sustainable solutions** to food security challenges, while empowering African communities and the diaspora to take a more active role in the continent's agricultural and food systems.

PRACTICAL RECOMMENDATIONS

Based on the findings of this study, the following practical recommendations are proposed to improve **food security**, promote **sustainable agriculture**, and enhance **resilience** in Africa. These recommendations target various stakeholders, including **governments**, **development organizations**, **smallholder farmers**, **research institutions**, and the **diaspora**.

Promote Climate-Smart Agriculture and Sustainable Farming Practices

Governments and **development organizations** should invest in and promote **climate-smart agricultural practices** that increase productivity while preserving environmental resources. This includes promoting practices like **agroecology**, **agroforestry**, **conservation agriculture**, and the use of **drought-resistant crops**. These methods enhance **soil health**, reduce the environmental impact of farming, and make food systems more resilient to climate change.

Recommendation:

Governments should support farmers in adopting **sustainable farming techniques** through subsidies, training programs, and access to resources like water management technologies, **resilient seeds**, and **organic fertilizers**. **Extension services** should be strengthened to provide **on-the-ground support** to farmers in adopting climate-resilient practices.

Strengthen Gender Equality in Agriculture

Empowering women farmers is essential for enhancing food security. Governments and agricultural programs should focus on removing barriers to **land ownership**, **credit access**, and **technology adoption** for women. Gender-sensitive agricultural policies must be prioritized, ensuring that women have the same access to resources, training, and markets as their male counterparts.

Recommendation:

Implement **gender-responsive policies** that ensure women have access to **land tenure**, **financial resources**, and **education** in agriculture. Encourage **women's participation** in decision-making processes related to agricultural development, and provide financial **incentives for women-led agricultural enterprises**. Establish **gender-focused agricultural cooperatives** to increase women's access to collective resources, skills, and market opportunities.

Enhance Regional Trade and Food Systems Integration

Regional integration in Africa, particularly through initiatives like the **African Continental Free Trade Area (AfCFTA)**, can significantly improve food security by facilitating intra-regional food trade. Governments should work to remove trade barriers, harmonize regulations, and improve infrastructure that connects **regional markets**.

Recommendation:

Promote the **development of regional food hubs**, where food can be processed, stored, and distributed efficiently across borders. Establish **cross-border collaborations** to improve trade routes and reduce tariffs that hinder agricultural trade. Improve **logistical infrastructure** (e.g., roads, warehouses, transportation) to facilitate smoother **food supply chains** within Africa.

Support Smallholder Farmers with Access to Financial Resources

Access to finance is one of the biggest barriers to increasing agricultural productivity. Financial institutions and development organizations should work to provide **affordable credit**, **insurance products**, and **microfinance** to smallholder farmers, especially in rural areas.

Recommendation:

Create **financial products** tailored to smallholder farmers, such as **agriculture-specific loans** and **insurance** schemes that protect against weather shocks and market volatility. Establish **public-private partnerships** to provide **funding for agricultural innovation**, including sustainable farming technologies, and **market access**. Promote **digital financial inclusion** by integrating farmers into digital platforms that offer loans, insurance, and market linkages.

Invest in Agricultural Research and Technology

Agricultural research and technological innovation are critical to improving **productivity** and **resilience**. **Governments** should invest in **agricultural research** institutions, focusing on developing **locally adapted** technologies and solutions for smallholder farmers. The integration of **ICT** and **data-driven technologies** can also significantly enhance agricultural productivity.

Recommendation:

Increase investment in **agricultural research** that focuses on developing crops and farming techniques suited to Africa's **climate and ecological conditions**. Support the adoption of **digital tools**, such as **precision farming**, **mobile apps**, and **data analytics** that can help farmers improve their decision-making and productivity. Foster **collaborations** between **local research institutions**, **international organizations**, and **private companies** to accelerate the adoption of **innovative agricultural technologies**.

Strengthen Food Systems in Urban Areas

Urbanization in Africa is increasing rapidly, and with it, the demand for food in cities. Governments and urban planners should integrate **urban food systems** into broader urban development plans. This includes promoting **urban agriculture**, establishing **food banks**, and improving the resilience of **food supply chains**.

Recommendation:

Support **urban agriculture** initiatives, including rooftop gardening, vertical farming, and community gardens, to ensure cities can produce part of their own food supply. Strengthen the role of **local food markets** to ensure **fresh, nutritious food** is accessible and affordable for urban populations. **Develop urban food security programs** that include food reserves and local procurement strategies to reduce **dependency on external food imports**.

Promote Education and Awareness on Nutrition-Sensitive Agriculture

Improving **nutrition** is integral to food security. Governments and NGOs should focus on **nutrition-sensitive agricultural practices** that aim to produce food with higher **nutritional value**. Public education campaigns should emphasize the importance of **diverse diets**, especially for **vulnerable groups** like children, women, and the elderly.

Recommendation:

Integrate **nutrition education** into agricultural extension services, emphasizing the importance of growing a variety of **nutrient-dense crops** (e.g., **vegetables**, **legumes**, and **fortified grains**). Implement **school-based programs** that teach children about healthy eating habits and encourage the consumption of **locally produced, nutritious foods**. Promote the production of **biofortified crops** that are rich in essential vitamins and minerals to combat **hidden hunger** and micronutrient deficiencies.

Enhance the Role of the African Diaspora

The African diaspora has an important role to play in supporting agricultural development. **Remittances**, **knowledge exchange**, and **investment** in agricultural projects can significantly improve food security in Africa.

Recommendation:

Encourage the diaspora to **invest** in **agriculture-based businesses**, including food processing, farming technology, and sustainable agricultural projects in Africa. **Facilitate partnerships** between the diaspora and local agricultural initiatives to transfer knowledge, best practices, and technical expertise. Leverage diaspora networks to **advocate for policy reforms** that promote **food security** and **sustainable agriculture** in Africa.

Improve Governance and Policy Frameworks for Food Security

Strong **governance** and **policy frameworks** are necessary to support sustainable agriculture and food security. Governments should prioritize food security in national development plans, focusing on **inclusive policies** that address the needs of smallholder farmers and marginalized communities.

Recommendation:

Governments should align national agricultural policies with **global sustainable development goals** (SDGs) to ensure that food security is integrated into broader development agendas. **Improve governance** by creating transparent, accountable systems that support farmers and food producers at every level. **Establish food security monitoring systems** to track progress and adjust policies to respond to emerging challenges such as climate change, population growth, and global market fluctuations.

The recommendations provided above offer a **comprehensive approach** to improving food security and promoting sustainable agriculture in Africa. By focusing on **climate resilience**, **gender equality**, **financial inclusion**, **technological innovation**, and **regional cooperation**, Africa can build stronger, more sustainable food systems that not only feed its growing population but also help protect the environment for future generations. The involvement of the **diaspora** and the strengthening of **governance systems** will be key to scaling up these initiatives. Implementing these practical recommendations will create a **more equitable** and **resilient** food system in Africa, contributing to the achievement of **SDG 2**: **Zero Hunger**.

CONCLUSION

This study highlights the vital significance of sustainable agriculture and food security in Africa, a continent where fast population expansion, climate change, and socio-economic difficulties exert substantial pressure on current food systems. Africa is at a critical juncture in determining the future of its agricultural sector as the globe confronts the pressing necessity of fulfilling the United Nations Sustainable Development Goal 2 (Zero Hunger). The results and suggestions presented herein underscore the interrelation between climate resilience, gender equality, financial inclusion, regional integration, and technological adoption in the transformation of Africa's food

systems. In a region where smallholder farmers provide the foundation of food production, equipping them with appropriate equipment, knowledge, and resource access is essential for establishing resilient food systems. Furthermore, the significance of women's involvement in agriculture must be emphasised, guaranteeing their equitable access to land, capital, and decision-making authority, hence improving food security for all communities.

Simultaneously, advancing regional commerce via efforts such as the African Continental Free commerce Area (AfCFTA) is crucial for enhancing food accessibility and mitigating susceptibility to external disruptions. The swift progression of urbanisation necessitates immediate focus on urban food systems and local food production, which can markedly diminish dependence on imports and foster healthier, more sustainable diets in metropolitan areas. Investing in agricultural innovation, bolstered by research institutes and public-private partnerships, is a potent mechanism to augment productivity while preserving the sustainability of agricultural practices. Africa's adoption of technical innovations like precision farming, smart agriculture, and digital technologies can facilitate agricultural modernisation and mitigate inefficiencies in food systems.

The diaspora possesses a distinctive and significant function, contributing not only through remittances but also by disseminating information, investing in agricultural projects, and promoting policy reforms. Through the promotion of collaboration among governments, international organisations, the business sector, and the diaspora, Africa can establish a food system that is both more secure and sustainable, while also resilient to future problems.

The proposals presented herein serve not just as remedies to current difficulties but also as frameworks for a more fair and resilient future for Africa. By synchronising national policies with global objectives, engaging local communities, and adopting innovative technologies, Africa can emerge as a paradigm for food security and sustainable agricultural advancement. Realising Zero Hunger in Africa is not an unattainable objective—it is a feasible aspiration, and through collaborative endeavour and dedication, it can be actualised.

REFERENCES

1. **Agarwal, B.** (1994). *A Field of One's Own: Gender and Land Rights in South Asia*. Cambridge University Press.
2. **Altieri, M. A.** (2002). *Agroecology: The Science of Sustainable Agriculture*. CRC Press.
3. **Baldwin, R.** (2019). *The Great Convergence: Information Technology and the New Globalization*. Harvard University Press.
4. Berkes, F., & Folke, C. (1998). *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge University Press.
5. Devereux, S., & Maxwell, S. (2001). *Food Security in Sub-Saharan Africa*. ITDG Publishing.
6. **Doss, C.** (2018). *Women and Agricultural Productivity: Reframing the Issues*. Development Policy Review, 36(1), 35-50.
7. **FAO** (2008). *The State of Food Insecurity in the World*. Food and Agriculture Organization of the United Nations.
8. **FAO** (2021). *The State of Food Security and Nutrition in the World 2021*. FAO.
9. FAO. (2020). *The Future of Food Security in Africa*. Food and Agriculture Organization.
10. FAO. (2024). *State of Food Security and Nutrition in the World 2024*. Food and Agriculture Organization.
11. Galtung, J. (2018). *Theory and Practice of Social Change: Dependency Theory Revisited*. Journal of Political Economy.
12. Gichuki, F. N., et al. (2020). *Smallholder Farmers' Livelihood Strategies and Food Security: A Case Study in Rural Kenya*. Journal of Agriculture and Rural Development.
13. **Gundersen, C., et al.** (2017). *Food Insecurity in the United States: Magnitude and Health Consequences*. *American Journal of Public Health*, 107(7), 1022-1030.
14. **Lal, R.** (2015). *Climate-Smart Agriculture for Food Security and Resilience to Climate Change*. Springer.
15. **Lobell, D. B., et al.** (2011). *Climate Change and Food Security: Adapting Agriculture to a Warmer World*. *Food Security*, 3, 201-213.
16. **Maxwell, D., & Smith, M.** (1992). *Household Food Security: A Conceptual Review*. *Food Policy*, 17(2), 1-20.
17. Patel, R. (2009). *The Value of Nothing: How to Reshape Market Society and Redefine Democracy*. Picador.
18. **Pretty, J., et al.** (2018). *Sustainable Intensification: Increasing Food Production without Increasing Land Area*. *Frontiers in Environmental Science*, 6, 18.
19. **Quisumbing, A. R., et al.** (2020). *Gender and Agriculture: A Critical Review of the Literature*. *World Bank Group*.
20. Scoones, I. (1998). *Sustainable Rural Livelihoods: A Framework for Analysis*. IDS Working Paper 72. Institute of Development Studies.
21. Stats SA. (2017). *Agricultural Census 2017*. Statistics South Africa.
22. **Timmer, C. P.** (2010). *Food Security and Economic Growth: The Role of Trade Policy*. *Food Policy*, 35(5), 377-386.
23. UNFCCC. (2022). *Climate Change and Agriculture in Africa*. United Nations Framework Convention on Climate Change.
24. UNICEF. (2019). *The State of the World's Children 2019*. United Nations Children's Fund.
25. UNICEF. (2023). *Global Hunger Crisis Report*. United Nations Children's Fund.
26. **Vermeulen, S. J., et al.** (2012). *Climate Change and Food Security: Adaptation and Mitigation in the*

Agricultural Sector. *Environmental Science & Policy*, 15(1), 39-49.

27. WHO. (2020). *Global Nutrition Report 2020*. World Health Organization.
28. World Bank. (2021). *Agricultural Investment Strategy 2021-2030*. World Bank Group.
29. World Bank. (2021). *World Bank Annual Report on Food Security and Agriculture*. World Bank.