Open Access Research Journal of
Biology and Pharmacy
Journals home page: https://oarjbp.com/
ISSN: 2782-9979 (Online)

(REVIEW ARTICLE)

Food security challenges: A comparative review of USA and African Policies

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Open Access Research Journal of Biology and Pharmacy, 2024, 11(02), 001–010

Publication history: Received on 31 May 2024; revised on 15 July 2024; accepted on 17 July 2024

Article DOI: https://doi.org/10.53022/oarjbp.2024.11.2.0028

Abstract

This review provides a comprehensive overview of the food security challenges faced by the United States (USA) and African nations, examining the distinct policy approaches implemented to address these critical issues. The analysis focuses on key factors influencing food security, such as agricultural practices, economic structures, and political considerations. The United States and African nations grapple with diverse challenges in ensuring food security for their populations. This study undertakes a comparative review of the policies adopted by these regions to tackle the multifaceted issues related to food production, distribution, and accessibility. In the USA, the emphasis lies on advanced agricultural technologies and industrial farming practices. The country's policies are geared towards maximizing efficiency, ensuring a stable food supply, and promoting exports. However, challenges arise from the environmental impact of intensive farming, unequal distribution of resources, and the vulnerability of large-scale monocultures. Contrastingly, African countries face unique hurdles stemming from a combination of socio-economic factors, including limited access to modern farming technologies, land tenure issues, and inadequate infrastructure. Additionally, political instability and climate change exacerbate the challenges, impacting food production and distribution systems. The comparative analysis sheds light on the importance of tailoring food security policies to the specific needs and contexts of each region. It explores the potential for knowledge exchange and collaboration between the USA and African nations to address global food crises collaboratively. Emphasizing sustainable agricultural practices, equitable resource distribution, and adaptive governance strategies emerge as key recommendations to fortify both regions against future food security challenges. This study contributes valuable insights to policymakers, researchers, and practitioners aiming to develop effective strategies for enhancing global food security in a rapidly changing world.

Keywords: Food Security; Agricultural Policies; USA; Africa; Comparative Analysis; Global Food Crisis; Economic Factors; Political Considerations; Sustainable Agriculture

1. Introduction

Food security is a critical issue that affects both developed and developing countries, with the challenge of feeding a growing global population becoming increasingly complex (Godfray et al., 2010). The importance of food security cannot be overstated, as it is intricately linked to economic stability, social well-being, and national security. In light of this, a comparative review of food security policies in the USA and African countries is essential to understand the different approaches and challenges faced by these regions.

The global food security landscape is characterized by a myriad of challenges, including overexploitation of resources, rising food prices, malnutrition, and displacement of vulnerable communities (Godfray et al., 2010). In the USA, policies and programs are designed to address issues such as food access, diet quality, and agricultural sustainability.

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Conversely, African countries face unique challenges, including environmental degradation, biodiversity loss, and governance deficiencies (Toit et al., 2023; Clapp & Moseley, 2020). The impact of climate change further exacerbates food security challenges in regions like South Africa and West Africa (Masipa, 2017; Merem et al., 2019).

Food security is of paramount importance due to its far-reaching implications on public health, social stability, and economic development. In the USA, ensuring food security is crucial for maintaining social welfare and preventing displacement of vulnerable communities (Godfray et al., 2010). In African countries, food security is closely tied to environmental sustainability, poverty alleviation, and social stability (Fawole & Özkan, 2017; Grzelak & Sapa, 2018). The impact of food security on national development plans and economic growth is evident in the policies and programs implemented in these regions (Hendriks, 2013).

The primary objective of the comparative review is to analyze and compare the food security policies and programs in the USA and African countries. By doing so, the review aims to identify the unique challenges faced by each region and assess the effectiveness of existing strategies in addressing food security issues. Additionally, the review seeks to highlight the importance of context-specific approaches to food security and the need for sustainable and inclusive policies that consider social, economic, and environmental factors (Dibal et al., 2022; Hendriks, 2013).

2. Food Security and its challenges

Food security is a multifaceted issue encompassing various dimensions, including food availability, access, utilization, and stability (Lawlis et al., 2017). This challenge is evident across different populations and regions, with specific groups such as refugees, low-income households, and individuals with disabilities facing heightened risks of food insecurity (Loopstra et al., 2019). Long-term assessments of food security and a comprehensive understanding of its causes present significant research challenges (Peng et al., 2021). Addressing food security requires a multidisciplinary approach, as it cannot be restricted to a single variable (Wahbeh et al., 2022). The implications of external factors such as the COVID-19 pandemic on household food security highlight the importance of resilience capacity in dealing with food security challenges (Abdullah et al., 2021).

Climate change and its impact on agriculture, particularly under drought stress, pose significant challenges to food security (Bashir et al., 2022). The interrelationship between food security and economic, social, and environmental factors necessitates a holistic view of the issue (Grzelak & Sapa, 2018). The literature also emphasizes the need to consider the dynamic and interconnected nature of food security risks, rather than assuming a direct causal relationship between risks and outcomes (Lovendal & Knowles, 2007). The feasibility of interventions such as biostimulants in addressing food security challenges underlines the importance of innovative approaches to sustainability (Bashir et al., 2022).

The complexities of food security extend to the food industry, where factors such as product substitutability and asymmetric competition can influence firms' performance and, consequently, food security outcomes (Yang & Nie, 2016). Additionally, the relationship between food and nutrition security, diets, and food systems underscores the intricate nature of sustainable development issues related to food security (El-Bilali et al., 2016). It is also essential to consider the intersectionality of food security with other critical issues such as healthcare, housing, and education (Kumar & Selvaraj, 2013).

In conclusion, addressing the challenges of food security requires a comprehensive understanding of its multidimensional nature, the dynamic interplay of various factors, and the development of innovative and sustainable interventions to ensure access to safe and nutritious food for all individuals.

2.1. Food Security in the United States

The United States has a complex agricultural system that plays a crucial role in ensuring food security. The country's agriculture is characterized by industrial farming practices, which have been shaped by technological advancements and intensive agricultural methods (Altieri et al., 2017). These practices have significantly increased productivity but have also raised concerns about their environmental impact and the vulnerabilities associated with monoculture (Altieri et al., 2017; Adeleke et al., 2019). The government has implemented various initiatives, including agricultural insurance programs, to support sustainable agricultural development and compensate for crop failure (Yudiarini et al., 2022). However, challenges such as resource inequality persist, impacting household food security (Moseley, 2016).

The policy framework in the United States is influenced by government initiatives and export policies, which have implications for both domestic and international food security (Ilugbusi et al., 2020; Skogstad, 1998). The government's

financial support for agriculture is crucial for the stable development of the sector and is linked to the national economy (Chen & Wang, 2022). Moreover, the country's agricultural policies have found echoes in the European Union, indicating the global significance of US agricultural practices (Lowe et al., 2010).

The challenges facing US agriculture include its environmental impact, as political economy and climate change dynamics synergistically impact household food security (Vincent et al., 2021; Moseley, 2016). Resource inequality is another significant challenge, as it affects the distribution of agricultural benefits and impacts food security at the household level (Moseley, 2016). Additionally, monoculture vulnerabilities pose a threat to the resilience of the agricultural system, highlighting the need for diversified and sustainable farming practices (Altieri et al., 2017).

In conclusion, the United States' agricultural system is a critical component of food security, but it faces challenges related to environmental impact, resource inequality, and monoculture vulnerabilities. The government's policy framework and initiatives, including agricultural insurance programs, play a vital role in addressing these challenges and ensuring sustainable agricultural development.

2.2. Food Security in African Nations

Food security in African nations is influenced by a myriad of socio-economic, agricultural, political, and environmental factors. Access to technology and land tenure issues are critical socio-economic factors affecting food security (Mohamed et al., 2021). Improving and diversifying agricultural productivity through the use of technology is essential for enhancing food security in Africa (Mohamed et al., 2021). Additionally, addressing land tenure issues is crucial as it directly impacts access to arable land for agricultural production (Mohamed et al., 2021).

Traditional farming and the role of smallholder farmers are significant agricultural practices that affect food security in African nations (Ndhleve et al., 2021). Traditional farming methods, while often sustainable, may not be sufficient to meet the growing food demands of the population. Therefore, supporting smallholder farmers and integrating modern agricultural practices can enhance food production and security (Ndhleve et al., 2021).

Political instability and climate change impacts are major challenges affecting food security in African nations (Adaga et al., 2024; Gregory et al., 2005). Political instability can disrupt agricultural activities and food distribution systems, leading to food shortages. On the other hand, climate change impacts, such as extreme weather events and changing precipitation patterns, pose significant threats to agricultural productivity and food availability (Gregory et al., 2005).

Furthermore, socio-economic factors such as geographical location, household size, and infrastructure, as well as environmental factors like climate variability and extreme weather events, are common determinants of food security in African nations (Amare & Simane, 2017). These factors highlight the complex interplay between socio-economic and environmental elements in shaping food security outcomes.

In conclusion, addressing food security in African nations requires a multifaceted approach that considers socio-economic, agricultural, political, and environmental dimensions. Enhancing agricultural productivity through technology, addressing land tenure issues, supporting smallholder farmers, and addressing political instability and climate change impacts are crucial steps towards achieving food security in African nations.

2.3. Comparative Analysis

Economic Structures: The economic structure of a country significantly influences food security. It has been observed that economic factors such as inflation and purchasing power can threaten the sustainability of the food supply (Erokhin, 2017). Additionally, self-sufficiency in food production has been identified as a critical factor in ensuring food security, especially in South Asian countries (Abrahams et al., 2023; Bishwajit et al., 2013).

Political Considerations: Political decisions and policies play a crucial role in shaping food security. For instance, agricultural policies in some regions may inadvertently encourage households to sell high-quality nutritious food for more voluminous amounts of nutritionally substandard goods, thus impacting dietary diversity and food security (Weatherspoon et al., 2019).

Environmental Impact: The environmental impact is another critical factor influencing food security. Wetland resources have been found to contribute significantly to household food security in Uganda, highlighting the importance of environmental resources in ensuring food security (Turyahabwe et al., 2013). Furthermore, the role of import substitution in providing food security has been explored, emphasizing the environmental and production aspects of food security (Popova et al., 2016).

Lessons Learned from the USA: The Supplemental Nutrition Assistance Program–Education (SNAP-Ed) in the USA has shown to increase long-term food security among households with children, indicating a successful intervention in addressing food security challenges (Rivera et al., 2016). Moreover, the association of urban or rural county status and environmental, nutrition- and lifestyle-related resources with the efficacy of SNAP-Ed to improve food security has been explored, providing valuable insights into the impact of such programs (Rivera et al., 2017).

Potential Strategies for Africa: In African countries, the impact of COVID-19 on food security has been studied, highlighting the vulnerability of households during the pandemic and the need for targeted interventions to address food insecurity (Khasanah et al., 2022). Additionally, local wisdom has been identified as a potential strategy to support food security in coastal agroecosystems, emphasizing the importance of indigenous knowledge in ensuring food security (Rosada et al., 2021).

In conclusion, economic structures, political considerations, and environmental impact are critical factors influencing food security. The USA has demonstrated successes through programs like SNAP-Ed, while potential strategies for Africa include addressing the impact of COVID-19 and leveraging local wisdom to support food security.

2.4. Global Food Crisis and Collaborative Solutions

The global food crisis requires collaborative solutions that encompass international cooperation, knowledge exchange opportunities, sustainable agricultural practices, and equitable resource distribution. International cooperation is crucial in addressing food insecurity, as it allows for the pooling of resources, knowledge, and expertise to tackle complex agricultural challenges (Exime et al., 2021). Collaborative efforts between International Agricultural Research Centers and National Agricultural Research Systems have been instrumental in promoting the adoption and adaptation of crops in developing countries (Maya & Maphosa, 2020). Furthermore, international cooperation, such as Brazil's collaboration with Haiti in agriculture, has been pivotal in introducing new agricultural models to combat hunger and poverty (Exime et al., 2021).

Knowledge exchange opportunities play a vital role in enhancing agricultural practices. Social ties have been identified as important facilitators of effective and sustainable farming practices, particularly in developing-country agriculture (Cadger et al., 2016). The flow of agricultural knowledge among stakeholders has the potential to drive collaborative research on priority thematic issues, as identified by the majority of stakeholders (Mtega & Ngoepe, 2018). Additionally, web-based knowledge exchange platforms have been highlighted as effective tools to increase farm productivity and contribute to food and energy security (Bruce, 2016).

Sustainable agricultural practices are essential for addressing the global food crisis. Agricultural cooperatives not only provide economic benefits but also serve social objectives, including enhancing knowledge exchange, empowering farmers, and increasing food security (Bijman & Hanisch, 2020). Furthermore, the role of farmers' experiments and innovations in agricultural innovation systems has been recognized, emphasizing the importance of knowledge exchange encounters and strategies to institutionalize these innovations (Leitgeb et al., 2011). Equitable resource distribution is critical for addressing food insecurity. Agricultural cooperatives have been identified as important avenues for farmers to improve their economic status, highlighting the role of cooperative systems in promoting equitable resource distribution (Liu & Li, 2020). Additionally, the development of sustainable network systems for common data exchange in the agricultural sector has been proposed to address problems related to resource distribution (Teye et al., 2012).

In conclusion, addressing the global food crisis requires a multifaceted approach that encompasses international cooperation, knowledge exchange opportunities, sustainable agricultural practices, and equitable resource distribution. Collaborative efforts, knowledge sharing, and sustainable practices are essential for ensuring food security and combating hunger on a global scale.

2.5. Future Outlook

Food security is a critical concern, particularly in regions like sub-Saharan Africa, where the impact of climate change on agricultural productivity is a significant challenge (Thornton et al., 2011; Kumar & Upadhyay, 2019). The debate on food security and sustainability has evolved, emphasizing the need to reformulate the approach to address emerging trends (Lang & Barling, 2012). Bibliometric analyses have highlighted the expanding research focus on food security, indicating a growing interest in evaluating and improving food security systems (Li & Song, 2022; Xie et al., 2021). Additionally, the potential effects of different world development paths on food security have garnered attention, emphasizing the need for comprehensive analysis and policy implications (Meijl et al., 2020). In the context of South

Africa, the existing legislative framework and production patterns have raised questions about future household food security (Hendriks & Olivier, 2015; Hendriks, 2014).

These studies collectively underscore the importance of understanding emerging trends and future outlooks for food security, especially in regions facing significant challenges such as sub-Saharan Africa. The impact of climate change, evolving research focus, and the need for comprehensive analysis and policy implications are critical aspects that need to be considered to address food security challenges effectively.

2.6. Emerging Technology for Food Security

Emerging technologies play a crucial role in addressing food security challenges. Genome-editing technologies, such as CRISPR, have the potential to revolutionize agriculture and enhance food security (Sedeek et al., 2019). Aquaponics, an integrated closed-loop multi-trophic food production system, has shown promising growth performance, outperforming hydroponics, and offers a sustainable approach to food production (Delaide et al., 2016). Additionally, the use of hyperbaric storage for food preservation has been identified as a cost-effective, energy-saving, and environmentally friendly technique, with potential for reducing energy consumption during storage (Rahman et al., 2022). Furthermore, the application of unmanned aerial vehicles (UAVs) and satellite multiscale data fusion in precision agriculture has expanded to address global food security challenges (Sagan et al., 2019).

In the context of energy for preservation and storage, the use of solar drying has been studied, highlighting its significance at the intersection of food, energy, and water, thus offering potential for food storage and preservation (Prajapati & Sheorey, 2022; Ukoba et al., 2018). Moreover, the impact of climate change on agricultural productivity and food security has been analyzed, emphasizing the need for sustainable approaches to ensure food security in the face of changing climatic conditions (Kumar & Upadhyay, 2019).

Aquaponics has been recognized as an innovative and sustainable approach to food production, with studies indicating its potential for water quality improvement and its adaptability to various plant species with low to medium nutritional requirements (Hasan et al., 2017). Furthermore, aquaponics has been identified as an emerging practice worldwide, with specific models being developed to suit regional conditions, such as in South Africa (Mchunu et al., 2019).

In the realm of food preservation, osmotic dehydration has been highlighted as a viable technique that maintains nutrient levels and reduces energy costs, thus offering a potential method for food preservation (Martínez-Sánchez et al., 2022). Additionally, the development of a zero-energy, zero-emission nonelectricity method for low-temperature food preservation has been emphasized as an urgent need (Zhang et al., 2023).

In conclusion, emerging technologies such as genome editing, aquaponics, precision agriculture, and sustainable food preservation techniques hold significant promise for addressing food security challenges. These technologies offer innovative and sustainable approaches to enhance agricultural productivity, improve food preservation, and mitigate the impact of climate change on food security.

2.7. Recommendations for Enhancing Food Security

Undertake detailed studies to understand the unique challenges and opportunities in each region regarding food production, distribution, and consumption. Develop and implement policies that are tailored to the specific needs and characteristics of each region, considering factors such as climate, soil types, and local agricultural practices. Design policies with a level of flexibility that allows for adaptation to changing conditions and emerging challenges within each region. Create governance frameworks that can quickly adapt to changing circumstances, ensuring a timely response to food security threats. Implement robust monitoring systems to regularly assess the effectiveness of food security policies and make necessary adjustments based on real-time data and feedback. Foster collaboration and engagement among various stakeholders, including government bodies, local communities, NGOs, and the private sector, to collectively address food security challenges.

Support research initiatives focused on developing sustainable agricultural practices, resilient crop varieties, and efficient water and land use. Encourage farmers to adopt agroecological practices that promote biodiversity, reduce environmental impact, and enhance the overall resilience of agricultural systems. Develop policies and programs that offer incentives to farmers adopting sustainable agricultural methods, such as organic farming, agroforestry, and integrated pest management.

Foster partnerships between agriculture, health, education, and environmental sectors to address food security comprehensively. Collaborate with neighboring countries and international organizations to share knowledge,

technology, and resources, fostering a global approach to food security. Encourage collaborations between governments and the private sector to leverage innovation, investment, and expertise for the development of sustainable food systems. By incorporating these recommendations, policymakers can create a more resilient and adaptable food security framework that addresses the unique challenges faced by different regions while promoting sustainability and collaboration across sectors.

3. Conclusion

In our comparative review of food security policies between the USA and African nations, several key findings have emerged. While the USA exhibits a higher level of technological advancement, infrastructure, and overall food production capacity, African nations face unique challenges related to climate variability, resource constraints, and diverse socio-economic contexts. Both regions, however, share common concerns such as the need for sustainable agricultural practices, adaptive governance, and collaborative efforts to ensure food security for their populations.

The comparative analysis underscores the importance of tailoring policies to regional contexts. In the USA, the emphasis should be on maintaining and enhancing technological advancements, while African nations need policies that address specific challenges related to climate resilience, resource management, and inclusive agricultural development. Adaptive governance strategies, continuous monitoring, and stakeholder engagement are crucial for both regions to navigate the dynamic nature of food security challenges.

Promoting sustainable agriculture emerges as a common imperative. The USA should invest in sustainable practices to mitigate environmental impact, while African nations can benefit from increased support for agroecological approaches that enhance resilience and biodiversity. Incentivizing sustainable practices and fostering international collaborations should be integral to future policy development in both contexts.

The findings from this comparative review underscore the interconnectedness of global food security. As we confront challenges on both sides, there is a pressing need for a collective effort to ensure food security on a global scale. Governments, international organizations, and the private sector must collaborate to share knowledge, technology, and resources. A call to action is needed to establish a global framework that addresses not only regional disparities but also promotes sustainable and equitable food systems worldwide.

The urgency of the situation demands a commitment to investing in research and development, implementing innovative policies, and fostering international cooperation. Only through a united and coordinated effort can we hope to create a world where every individual has access to sufficient, safe, and nutritious food. The call to action extends beyond borders, emphasizing the shared responsibility of the global community in building a resilient and sustainable future for food security

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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