

Sustaining Agriculture for Sudan's Food Security: Policy Brief Running Title: "Sudan's Food Security Policy Brief"

Mohammed Mahgoub Hassan^{1,*}, Magdoleen Gamareldeen Osman²,
Mohamed Ramadan A. Rezk³, Leonardo Piccinetti⁴, Hassan E. Hassan Alsayim⁵

¹National Center for Research, Ministry of Higher Education and Scientific Research

²Commission for biotechnology and Genetic Engineering, National Center for Research, Khartoum- Sudan

³Academy of Scientific Research and Technology (ASRT), 11516, Cairo, Egypt

⁴Sustainable Innovation Technology Services Ltd, Ducart Suite, Castletroy, Ireland

⁵Department of Agricultural Engineering, Faculty of Agriculture, Nile Valley University, Sudan

*Corresponding author: mohkadis@yahoo.com

Received April 18, 2025; Revised May 19, 2025; Accepted May 27, 2025

Abstract The important topic of food security in Sudan is discussed in this policy paper, which also suggests workable policy options to ensure food security for the populace by 2050. Climate change, violence, poor infrastructure, subpar agricultural practices, poverty, population expansion, and restricted market access are just a few of the difficulties Sudan faces. Promoting climate-smart agriculture, bolstering small-scale farming, advancing agricultural research and development, enhancing rural infrastructure and market access, putting social safety nets and nutrition programs into place, and placing a higher priority on conflict resolution and peacebuilding are just a few of the suggested policy alternatives. The report also stresses how critical it is to guarantee that everyone, especially those in disadvantaged situations, has access to wholesome food through targeted nutrition programs, food fortification, and social safety nets like cash transfers and food vouchers. The importance of observation and assessment to determine.

Keywords: Food security, Policy alternatives, Rural infrastructure, Market access, Conflict resolution, Monitoring and evaluation

Cite This Article: Mohammed Mahgoub Hassan, Magdoleen Gamareldeen Osman, Mohamed Ramadan A. Rezk, Leonardo Piccinetti and Hassan E. Hassan Alsayim, "Sustaining Agriculture for Sudan's Food Security: Policy Brief Running Title: "Sudan's Food Security Policy Brief"." *Journal of Food Security*, vol. 13, no. 2 (2025): 67-71. doi: 10.12691/jfs-13-2-2.

1. Introduction

Sudan, the third-largest nation on the continent with a population of about 43 million, is situated in northeastern Africa. The country is well known for its abundant natural riches, rich history, and unique culture. Sudan does, however, nevertheless have formidable obstacles, notably food security [1]. Sudan's semi-arid environment, which is marked by high temperatures and little rainfall, is a major barrier to the productivity of agriculture. The bulk of Sudan's population makes their living from agriculture, which is the backbone of the country's economy. Nevertheless, several issues, including conflict, climate change, and a lack of funding, have contributed to a decline in agricultural productivity [2].

Numerous negative outcomes have been brought about by Sudan's food security issue, including increased vulnerability to disease, widespread hunger, malnutrition, and the possibility of violence and migration [3,4].

Millions of Sudanese people are now food insecure due to the circumstances, as they do not have enough access to wholesome, culturally appropriate food. The situation regarding food security has also been made worse by the continuous hostilities in Sudan, especially in areas like South Kordofan and Darfur, which have resulted in limited access to vital resources, disruption of agricultural activity, and displacement [5]. Furthermore, agricultural productivity has been further stressed by the effects of climate change, such as irregular rainfall patterns and desertification, making it harder for farmers to support their livelihoods and contribute to food security [6,7,8,9].

With nearly 6 million people on the verge of starvation and 20.3 million experiencing severe food insecurity, the humanitarian situation in Sudan is catastrophic. An already serious food situation has been made worse by conflict, which has disrupted trade routes and supply systems. With nearly a million Sudanese escaping to neighboring countries, the World Food Programme (WFP) has reopened operations to assist refugees, internally displaced people, and host communities [10]. Several

issues, including rising food and fuel prices, economic hardship, displacement, and climate shocks, affect the nation's people, resulting in widespread food insecurity and malnutrition. After activating its highest level of emergency response, WFP hopes to help 6.7 million people by 2023 with emergency food aid, nutrition support, and the prevention and treatment of malnutrition.

Impact of Conflict on Sudan's food security and Economy:

The economy and food security of Sudan have been severely impacted by the conflict. There is a lack of food supplies, goods, and services as a result of the loss of vital infrastructure and interruptions in commerce and industrial activity. The Rapid Support Forces (RSF) and Sudanese Armed Forces (SAF) control over 85% of the economy, which has further complicated supply lines and created logistical obstacles, has made economic challenges worse. Famine, poverty, and hyperinflation have transformed the economic environment; warn that if the conflict continues, there may be a significant economic contraction, a dramatic decrease in household income, and an increase in poverty [11,12]. These problems impact both rural and urban communities. Escalating conflict since 2023 has further heightened Sudan's food security emergency, which the World Food Programme (WFP) calls a potential world largest. By early 2025, 24.6 million individuals were estimated to be experiencing acute hunger, and 10 locations had confirmed famine, carrying a high mortality risk without immediate humanitarian action [13,14].

SWOT analysis

Sudan's food security problem is intricate and multidimensional, with a variety of root causes and possible remedies (Figure 1). This essay seeks to examine viable solutions to this pressing issue by delving into the fundamental causes of food insecurity in Sudan [9]. To solve food insecurity in Sudan, it will also take into account the functions of international collaboration, government policies, and humanitarian relief.

2. Research Question

This policy paper aims to investigate the intricate problem of food security in Sudan and pinpoint the root reasons and obstacles impeding the nation's food supply. To solve these issues, the study suggests several sensible policy choices. To accomplish this goal, the study first explores the elements that support or undermine Sudan's ability to guarantee food security for its people by the year 2050. It then looks at the major roadblocks that the nation may run into on this trip. The study concludes by outlining substitute measures that could strengthen the nation's chances of achieving universal food security by 2050.

The challenge of food and nutrition security in Sudan is an urgent matter that is made worse by several reasons, including disease outbreaks, war, climate change, and rapid population increases. It is now more challenging than ever to guarantee food and nutrition security for every Sudanese person. The primary causes of the crisis are poverty and inequality, which have resulted in unequal

access to food, discrimination, decreased productivity, and an increased risk of poverty and social unrest. The conflict has also caused displacement and disruption in the agricultural sector. Climate change has caused irregular rainfall patterns and droughts. Lack of investment in agriculture has also contributed to the crisis. Another important aspect of agriculture is gender inequality. The Integrated Food Security Phase Classification (IPC) indicates that more than 20.3 percent, or over 42%, of Sudanese people. In addition to the Darfur region, other affected areas include Greater Kordofan, Khartoum State, and portions of eastern Sudan. The food and nutrition security crisis in Sudan will have negative effects on the country's economy, social instability, and higher rates of hunger and malnutrition if nothing is done. The severity of the issue: With millions of people already experiencing extreme hunger, the situation is serious. Future developments are likely to make the situation worse if they are not handled. Sudan's food and nutrition security crisis is a complicated issue with many underlying causes. To stop more pain and economic downturn, it needs to be addressed immediately.

Root causes and challenges

It is essential to address the underlying basic causes and problems of Sudan's food insecurity to effectively solve this issue. These include protracted hostilities and instability that cause evictions, loss of livelihoods, and disruptions to food supply networks. Sudan is very vulnerable to climate change, which is seen in the frequency of its floods and droughts, which have a substantial influence on food security and agricultural output. Poor infrastructure, which includes roads, warehouses, and irrigation systems, makes it difficult to move and store food, especially in isolated areas. Reduced yields and food insecurity are caused, in part, by many farmers' persistent use of antiquated and unsustainable farming techniques. Due to Sudan's pervasive poverty, many households lack access to enough food, which causes hunger and malnutrition. Sudan's fast population expansion puts a burden on the country's limited resources and exacerbates food insecurity, while farmers' access to markets is restricted, making it more difficult for them to sell their produce and make money.

Causal loop diagram for food security in Sudan

The complex network of interconnected variables influencing the stability and availability of food supplies in the area is depicted in the causal loop diagram for food security in Sudan (Figure 2). The diagram's main message is that climate change hurts agricultural output, which leads to food insecurity. It also shows how improved agricultural methods and productivity might potentially improve food security. It also identifies additional powerful loops that either enhance or diminish food security, including population growth, infrastructure, cultural practices, conflict, gender dynamics, access to education, and foreign aid. This comprehensive illustration emphasizes the complexity of the problems facing Sudan's food security and the necessity of comprehensive, long-term, and multidimensional solutions to successfully address these concerns.

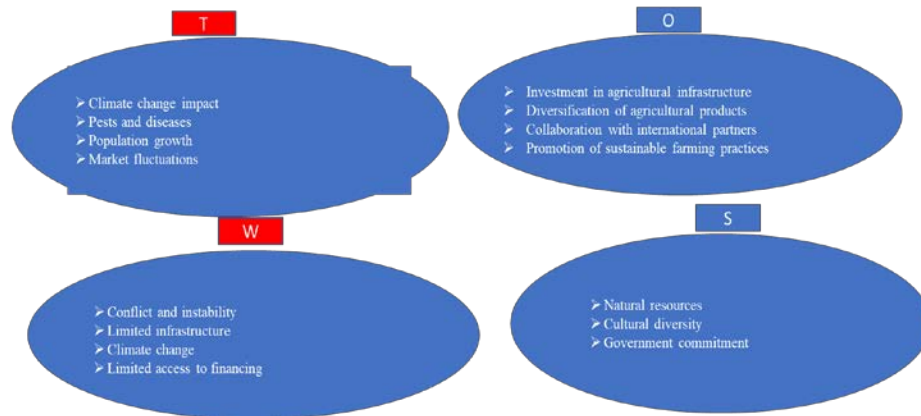


Figure 1. SWOT analysis on food security in Sudan

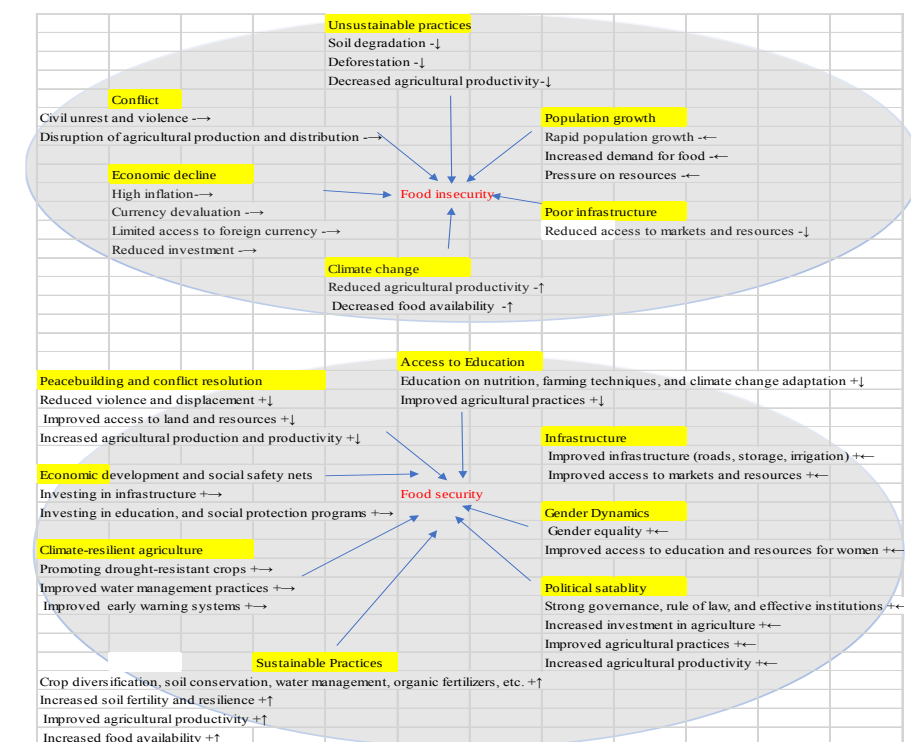


Figure 2. Causal loop diagram for food security in Sudan

Policy Options for Enhancing Food Security in Sudan: Alternatives Analysis

Sudan faces formidable obstacles in its fight for food security since variables including population expansion, climate change, and violence impact agricultural output and the availability of wholesome food. Consider the following policy alternatives to solve these issues:

Alternative 1: Promoting Climate Smart Agriculture

Productivity can be increased and climate change resistance can be strengthened by implementing climate-smart farming practices. This entails advancing conservation agriculture methods, agroforestry, and crop types resistant to drought. Water scarcity's negative effects on agricultural output can also be lessened by investing in

water management and irrigation infrastructure.

Alternative 2: Strengthening Small-Scale Farming

Particularly in rural areas, small-scale farmers are essential to the food production process. Enhancing these farmers' livelihoods and production can be achieved by providing them with improved technologies, training, and loan access. Enhancing farmer cooperatives and opening up markets can also increase their income and negotiating strength.

Alternative 3: Enhancing Agricultural Research and Development

Better farming practices, novel post-harvest management strategies, and enhanced crop types can all result from funding agricultural research and development.

This can boost agricultural output, cut down on food waste, and enhance crop nutrition.

Alternative 4: Improving Rural Infrastructure and Market Access

Building roads and storage facilities in rural areas can help farmers reach markets more easily and cut down on losses after harvest. Furthermore, bolstering value chains and providing access to markets for small-scale farmers can increase their revenue and encourage agricultural output.

Alternative 5: Social Safety Nets and Nutrition Programs

Social safety nets, such as food subsidies or cash transfer programs, can help needy communities have better access to food. In addition, malnutrition can be addressed and children's nutritional status can be improved by supporting school feeding programs and nutrition education.

Alternative 6: Conflict Resolution and Peacebuilding

Encouraging peacebuilding initiatives and addressing the root causes of violence can support long-term food security. This entails resolving land disputes, aiding in the resettlement of displaced people, and encouraging inclusive government and community involvement in decision-making. The agricultural sector in Sudan may become more resilient, increase food security, and increase agricultural output with the support of these policy choices. Combining these tactics can help the nation's agriculture grow in a way that is inclusive and sustainable. Putting policy options for food security into practice in Sudan could have several positive effects, such as increased agricultural productivity, decreased losses after harvest, better market accessibility, more food availability and access, better rural livelihoods, and increased climate change resilience. But there are also possible drawbacks and difficulties, like deteriorating environmental conditions, rising inequality, corruption, low capacity, a lack of funding, unstable political environments, the effects of climate change, and susceptibility to international food markets. Reducing food insecurity, poverty, and hunger while advancing sustainable farming methods and rural economic growth are the goals of these policy choices. To reduce unintended consequences and their harmful effects, thorough monitoring and evaluation are necessary. It's important to take into account and deal with any potential wild cards or unforeseen difficulties, such as the revival of conflicts, changes in the price of food globally, natural disasters, new pests and diseases, economic shocks, population expansion, and urbanization.

Alternative 7: Improve the legislative framework

Strengthening Sudan's food security legislation is one possible course of action to enhance and improve the current agricultural and food production laws and regulations. This means examining the current legal framework, searching for any gaps, and drafting new legislation that puts food security first and solves the challenges faced by farmers and other food producers. Laws about markets, farm inputs, land rights, and the availability of financing and financial assistance must all be included. It is also necessary to have efficient processes

for implementation, enforcement, oversight, and accountability. Improving the legal framework can protect farmers' rights and means of subsistence, promote agricultural growth, and support sustainability.

Monitoring and evaluation

It is vital to monitor and assess policy measures to ascertain whether they are beneficial in enhancing food security in Sudan. Metrics including income levels, agricultural output, availability of nutrient-dense food, and climate change resilience should be established to track progress. Establishing thorough methods for data collection and analysis that are segmented by relevant variables like age and gender is essential for identifying disparities and directing targeted interventions. Extensive impact evaluations that include control groups and randomized trials can be used to determine the causal relationship between policy and food security results. Including stakeholders is crucial to getting a variety of perspectives and enhancing accountability and ownership. Regular reporting and feedback should be used to enhance policies and programs. Extended observation guarantees flexibility and continuous advancement. Policymakers may effectively handle Sudan's food security concerns by making evidence-based decisions through the use of a thorough monitoring and evaluation system.

Conclusions and Suggestions

1. Emphasize the importance of peace and stability in achieving food security.
2. Establish inclusive policies and farm governance structures.
3. Increase your financial support for agricultural growth and research.
4. Make improvements to the facilities for better food distribution.
5. Make financial resources more accessible to small-scale farmers.
6. Make adapting agriculture to climate change a major focus.
7. Contribute to programs for agricultural education and training.
8. Encourage regional and international cooperation for information sharing.

References

- [1] Food and Agriculture Organization of the United Nations (FAO). "Sudan." Accessed 28 July 2021. <http://www.fao.org/sudan/en/>.
- [2] Hassan MM, Hussein MA, Osman MG, Alsayim MEH. Policy paper: Strengthening Food Security in Sudan: A Sustainable Approach. *Int. J. Res. Rev.* 11(11), 2023, 100-142.
- [3] United Nations (UN). The State of Food Security and Nutrition in the World. Retrieved from <https://www.un.org/en/chronicle/article/state-food-security-and-nutrition-world>. 2021.
- [4] World Food Programme (WFP). Sudan: Conflict and hunger. Retrieved from <https://www.wfp.org/countries/sudan#conflict>, 2020.
- [5] World Bank. <https://data.worldbank.org/country/sudan> 2021.
- [6] United Nations Development Programme (UNDP) Sudan. Green recovery in Sudan: Shaping a resilient and inclusive future. <https://www.sd.undp.org/content/sudan/en/home/library/sustainabl>

- e-development/green-recovery-in-sudan--shaping-a-resilient-and-inclusive-fut.html. 2020.
- [7] United Nations Development Programme (UNDP). Accessed 28 July [https:// www.sd.undp.org/ content/ sudan/ en/home/ countryinfo.html](https://www.sd.undp.org/content/sudan/en/home/countryinfo.html)2021.
 - [8] Food and Agriculture Organization (FAO). (2019). Sudan: Climate change and food security. Retrieved from [http:// www.fao.org/fileadmin/templates/clo/cmsdocs/1122390.pdf](http://www.fao.org/fileadmin/templates/clo/cmsdocs/1122390.pdf).
 - [9] Food Security Outlook (FSO)." Famine Early Warning Systems Network. Accessed 28 July 2021. <https://fews.net/east-africa/sudan/food-security-outlook/june-2021>.
 - [10] World Food Programme (WFP). [https:// www.wfp.org/ countries/sudan](https://www.wfp.org/countries/sudan) 2021.
 - [11] World Food Programme (WFP). CONFLICT IN SUDAN Food Security Analysis and Forecast. 2023.
 - [12] Siddig K; Raouf M; and Ahmed MO.M. (). The economy-wide impact of Sudan's ongoing conflict: Implications on economic activity, agrifood system, and poverty. Sudan SSP Working Paper 12. Khartoum, Sudan: International Food Policy Research Institute (IFPRI). 2023.
 - [13] World Bank. Agriculture in Sudan, [www.worldbank.org/ en/country/sudan/ overview/agriculture](http://www.worldbank.org/en/country/sudan/overview/agriculture) 2023.
 - [14] WFP. (n.d.). Famine in Sudan. World Food Programme. Retrieved May 27, 2025, from [https://www.wfp.org/ emergencies/sudan-emergency](https://www.wfp.org/emergencies/sudan-emergency) Report the summary paragraph and send it to the user.



© The Author(s) 2025. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).