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Policy paper: Strengthening Food Security in Sudan: A Sustainable Approach

By

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Executive Summary: The food security situation in Sudan is dire, with 15 million people facing food insecurity. The main drivers of food insecurity in Sudan are conflict, economic crisis, and climate change. Some of the policy implications of the food security crisis in Sudan are increasing investment in agriculture, providing social safety nets, improving the legislative framework, providing financial and the international community need also working with the Sudanese government to addressing the root causes of the food security crisis. The policy paper also discusses the importance of data-driven approaches to food security. Data can be used to track changes in cropland area and productivity, monitor the prices of food commodities, track the movements of people and goods, and predict droughts and floods. Moreover, AI has the potential to revolutionize agriculture in Sudan by increasing productivity, reducing costs, and improving sustainability. This information can then be used to make informed decisions about agricultural development, social safety nets, and other programs. The policy paper concludes by calling for urgent action to address the food security crisis in Sudan. Moreover, a combination of policies and interventions is needed to address the food security crisis in Sudan. Addressing food security in Sudan requires comprehensive and sustainable solutions. Efforts should focus on promoting peace and stability, investing in climate-resilient agriculture, expanding irrigation infrastructure, enhancing agricultural extension services, providing financial support to farmers, improving market access, and increasing investments in research and development. Additionally, social safety nets and poverty reduction programsmes should be implemented to address the immediate needs of vulnerable populations.

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RESEARCH QUESTION

The objective of this policy paper is to examine the complex issue of food security in Sudan and identify the underlying causes and challenges that hinder the country's ability to provide food for all its citizens. The paper proposes a set of effective policy alternatives to address these challenges. To achieve this objective, the paper first delves into the factors that contribute to or impede Sudan's capacity to ensure food security for its population by 2050. It then explores the significant obstacles that the country might encounter during this journey. Finally, the paper presents alternative policies that can improve the country's ability to achieve food security for all by 2050.

Problem Statement and Background

Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World

Food Summit, 1996, Global Food Security, 2020).). However, food insecurity is defined as a household-level economic and social condition of limited or uncertain access to adequate food (U.S., 2022a). In 2020, 13.8 million households were food insecure at some time during the year (U.S., 2022b). Food security is when everyone has enough safe and nutritious food to eat all the time. It depends on the availability of food, people's access to food, their ability to use food effectively, and the stability of the food system. Nutrition is essential for food security. (IICA 2009). Food insecurity does not necessarily cause hunger, but hunger is a possible outcome of food insecurity (Carlson et al., 1999). Sudan is a country located in northeastern Africa. It is a large country with a population of over 40 million people. Sudan is a semi-arid country, with a hot climate and low rainfall. Agriculture is the backbone of the Sudanese economy and provides a livelihood for the majority of the population. However, agricultural production has been declining in recent years due to a number of factors, including conflict, climate change, and a lack of investment. The five pillars of food security are: availability, access, utilization, stability and agency (FAO, 2020).

Food security in Sudan is a major challenge, affecting a large portion of the population. Over 20.3 million people, representing more than 42% of the population, are experiencing high levels of acute food insecurity in 2023. This issue is exacerbated by factors such as conflict and political instability, climate change and desertification, limited irrigation infrastructure, poverty and inequality, limited agricultural technology and practices, and post-harvest losses, and poor infrastructure. These factors contribute to food shortages and hinder agricultural productivity, particularly in rural areas. The magnitude of the food and nutrition security problem in Sudan is significant. According to the Integrated Food Security Phase Classification (IPC), over 20.3 million people in Sudan are currently experiencing high levels of acute food insecurity (IPC Phase 3 or above). This represents more than 42% of the population. Of these, 14 million people are facing crisis (IPC Phase 3) and nearly 6.3 million people are facing Emergency (IPC Phase 4) levels of acute hunger. The situation is particularly dire in the Darfur region, where over 60% of the population is food insecure. Other areas of concern include Greater Kordofan, Khartoum State, and parts of Eastern Sudan. The crisis is having a devastating impact on the population, particularly children. It is also having a negative impact on the economy. The food and nutrition security crisis in Sudan is a complex problem with multiple causes: conflict, climate change, lack of investment, poverty, inequality, and gender inequality are all contributing factors (FAO, 2022).

The food and nutrition security crisis in Sudan is urgent. Millions of people are already facing severe hunger, and the situation is only likely to worsen in the future if no action is taken. The consequences of not acting include: increased hunger and malnutrition, increased displacement, reduced economic productivity, further exacerbating the crisis and Increased social unrest.

SITUATIONAL OVERVIEW

1) Food security and population growth in Sudan

Food security refers to the availability and access to safe, nutritious, and sufficient food for individuals to lead an active and healthy life. Population growth, on the other hand, refers to the increase in the number of individuals in a given population over time. These two concepts are closely linked and have a significant impact on each other. Population growth affects food security in several ways. As the population increases, the demand for food also rises. This puts pressure on agricultural systems to produce more food to meet the growing demand. If the agricultural sector fails to keep pace with population growth, it can lead to food shortages, increasing food prices, and decreased availability of nutritious food. Additionally, population growth can result in the expansion of urban areas, which leads to the conversion of agricultural land into residential or industrial areas. This conversion reduces the amount of available agricultural land, making it more challenging to produce enough food to feed the growing population. Furthermore, population growth often occurs in developing countries where poverty levels are high. The lack of resources and infrastructure in these regions can hinder agricultural productivity, making it difficult to achieve food security (FAO. 2017; United Nations, 2021).

Conversely, food security can also influence population growth. Access to sufficient and nutritious food is essential for healthy growth and development, particularly in children. Adequate nutrition contributes to reduced mortality rates, improved health outcomes, and increased life expectancy. This, in turn, can lead to lower birth rates as families feel more confident in the survival and well-being of their children (McMichael, 2017).
Overall, managing population growth and ensuring food security are interdependent challenges that require sustainable and efficient agricultural practices, poverty reduction, education, and access to basic services. Strategies to address food security and population growth must adopt a holistic approach that considers economic, environmental, and social factors to achieve long-term sustainability (Cesaretti et al., 2019).

Sudan has been facing numerous challenges when it comes to food security, particularly in relation to its population growth. Population growth in Sudan has been rapid over the years. The country's population has been increasing at a significant rate, and this has placed immense pressure on agricultural production and food resources. With a growing population, the demand for food has also been increasing (FAO, 2017).

However, Sudan faces several obstacles to achieving food security. One of the main challenges is related to the agricultural sector. Sudan's agricultural practices are often traditional and prone to vulnerability due to various factors such as climate change, inadequate infrastructure, and limited access to modern

farming technologies. In conclusion, population growth in Sudan poses significant challenges to food security (McMichael, 2017; and FAO, 2017). The country needs to address these challenges by investing in agricultural development, promoting sustainable farming practices, and resolving conflicts. These efforts are vital to ensuring that Sudan can provide enough food for its growing population in the future.

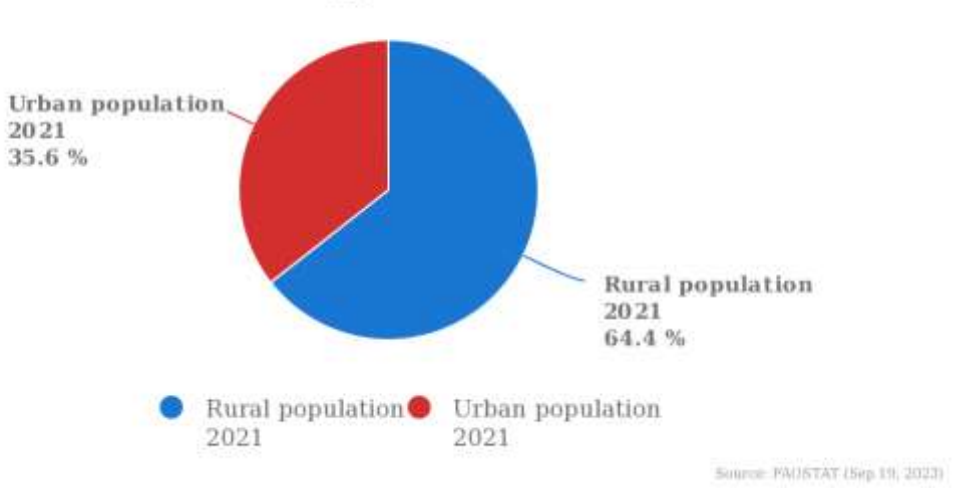

Fig.1 Sudan Urban and Rural population. Source https://www.fao.org/faostat/en/#country/276

2) Food insecure

The food security situation in Sudan is deteriorating rapidly, with the number of people experiencing high levels of acute food insecurity expected to increase by 2 million to 2.5 million in the next 3 to 6 months (World Food Programme, 2023; FAO, 2023; WFP, 2023a, 2023b; World Bank, 2023). This is due to a combination of factors, including the ongoing conflict between the Sudanese Armed Forces (SAF) and Rapid Support Forces (RSF), which has led to large-scale displacement, damage to infrastructure, and shortages of essential goods. As a result, around 15 million people are likely to face IPC Phase 3 or above conditions during the projection period of October 2023 to February 2024 (Table 1 and Fig. 2).

The agricultural sector is an important part of the Sudanese economy, but its contribution to GDP has been declining in recent years. This is due to a number of factors, including political instability, climate change, and a lack of investment. The decline in the sector's contribution to GDP has led to a decrease in the per capita share of GDP and agricultural output, which is indicative of the widespread prevalence of poverty

Table 1:. Food insecure and IDPs in Sudan

Items /years	2021	2022	2023	
			Present	Forecast
Food insecure	12.6 M	15.8 M	16.8 M	19.1 M
IDPs	3 M	3.7 M	3.7 M	4 M*

Source WFP, CONFLICT IN SUDAN Food Security Analysis and Forecast May 2023

Fig. 2 **Number of moderately and severely food insecure people (million) (3-year average).** Source: https://www.fao.org/faostat/en/#country/276

According to data from the Food and Agriculture Organisation (FAO), Sudan and Egypt are both important producers of sorghum and wheat in the Middle East and North Africa region (Figs. 3, 4 and 5). However, there are some significant differences in the yield and production of these crops in between the two countries. Egypt has a higher yield than Sudan for both sorghum and wheat. This is due to a number of factors, including climate, land, water, and technology. Wheat production in Sudan is relatively low compared to other crops, as the country relies heavily on imports to meet its domestic demand for wheat.

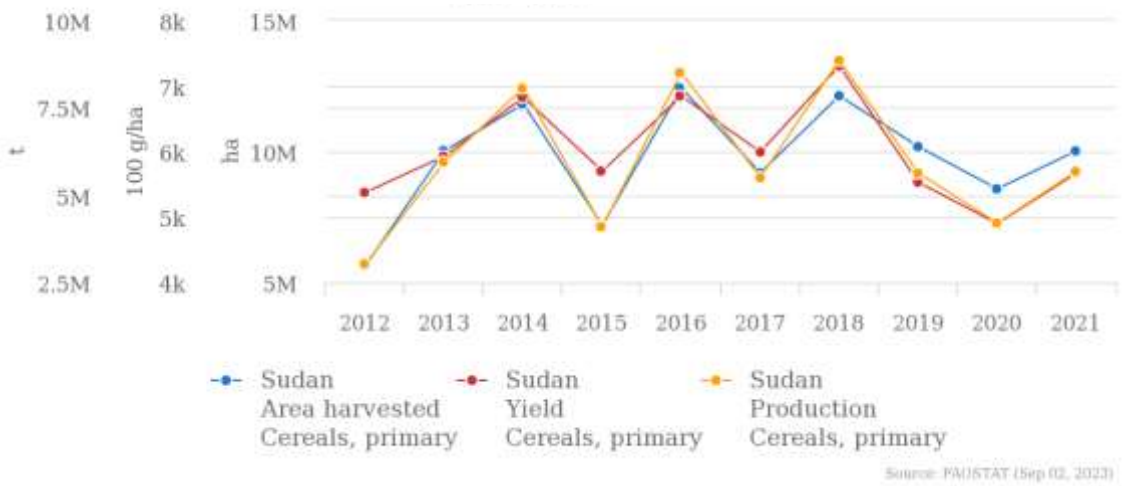

Fig.3 cereals, total production. Source https://www.fao.org/faostat/en/#country/276

3) Crop Production Trends: 2014-2019

According to the Food and Agriculture Organisation (FAO) and Central Bank of Sudan, the general trend of production for the most important crops, including sorghum, wheat, millet, and Sudan, for the years 2014-2019 can vary based on several factors such as weather conditions, land availability, market demand, and

government policies (Fig. 4). However, here is a general overview of the production trend for these crops during that period. Sorghum production has fluctuated over the years, but it has generally shown a slight increase. In 2014, global sorghum production was around 63.5 million metric tonnes (MMT), and it increased to 65 MMT in 2019. While wheat production has seen a relatively stable or slightly upward trend during the years 2014-2019. In 2014, global wheat production was around 715 MMT, and it increased to approximately 764 MMT in 2019. However, millet production in Sudan increased from 2.07 million metric tonnes in 2017 - 2018 to 2.49 million tonnes in 2018 - 2019. This represents an increase of 20.3%.

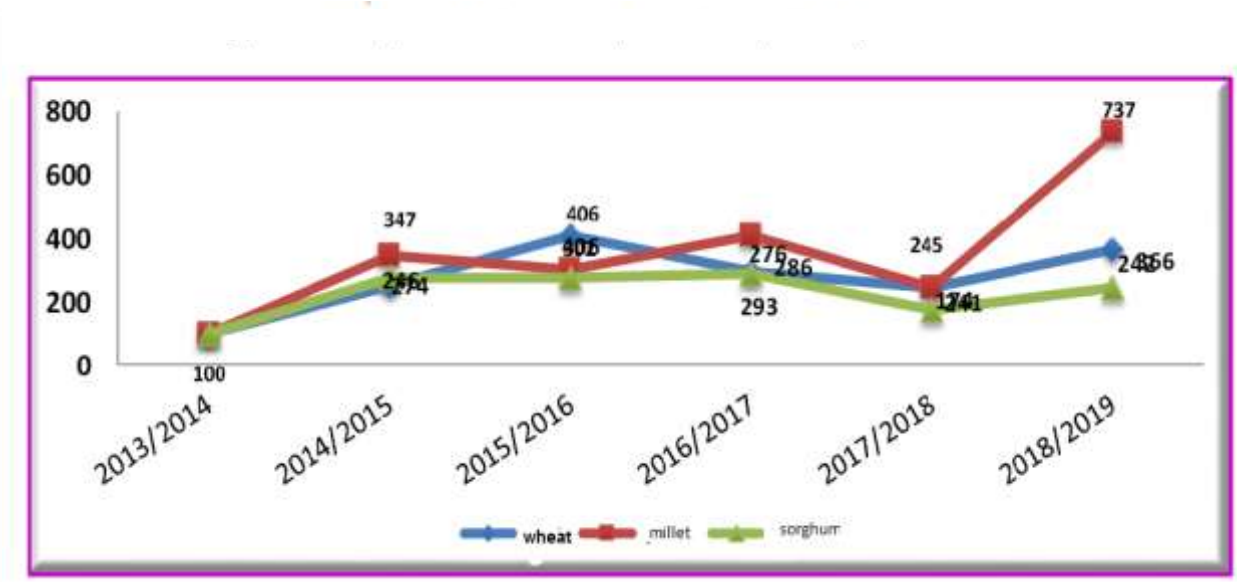

Fig.4. The general trend of production of the most important crops for the years 2014-2019.
Source: bank of Sudan annual report

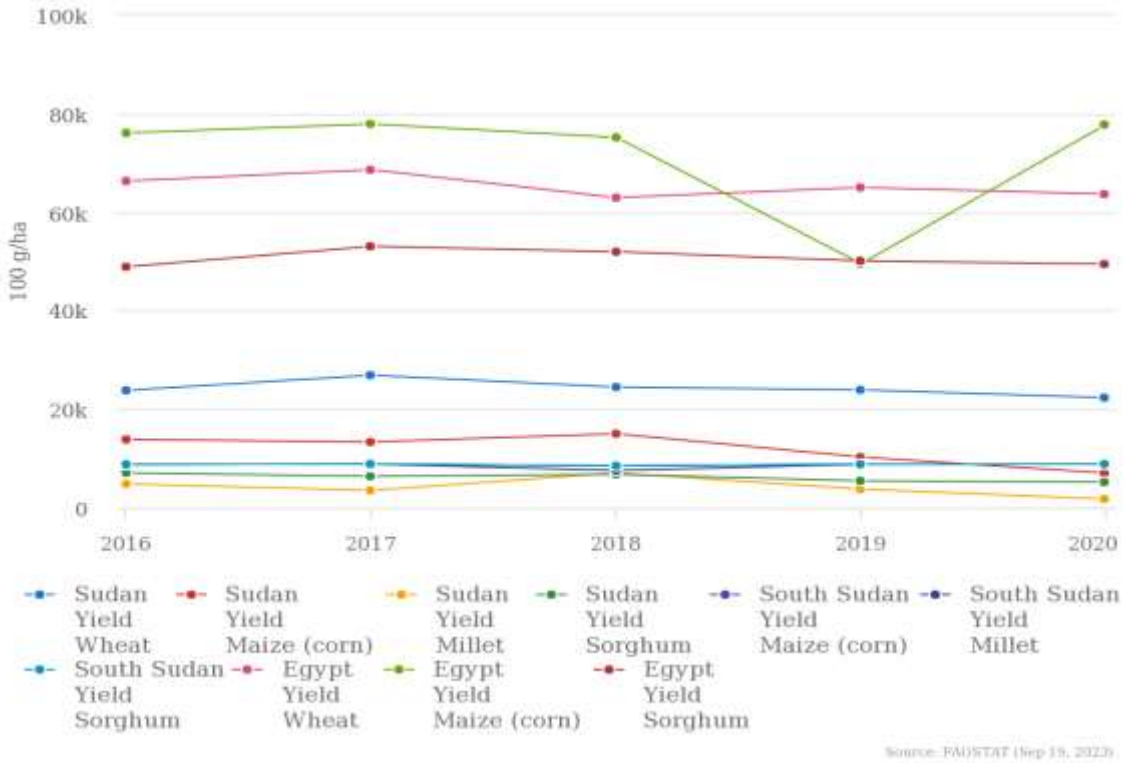

Fig. 5. comparison between Sudan, South Sudan and Egypt in crops yield.
Source https://www.fao.org/faostat/en/#country/276

The number of undernourished people in the world continued to rise in 2020. Between 720 and 811 million people in the world faced hunger in 2020 (FAO/FSTS, 2021). FAO estimates that over 20.3 million people in Sudan ~~will~~ be undernourished in 2023. This represents more than 42% of the population (Fig. 6). Undernutrition is a major challenge in Sudan, particularly in rural areas. It is caused by a number of factors, including poverty, conflict, and climate change.

The number of people who are moderately and severely food insecure in Sudan has increased significantly in recent years (Fig.7).

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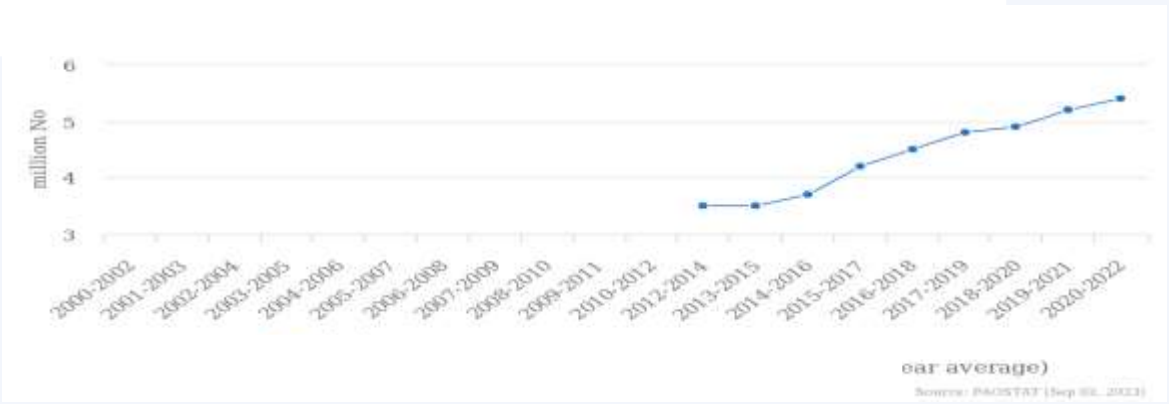

Fig.6. Number of people undernourished (million) (3 years average).
Source https://www.fao.org/faostat/en/#country/276

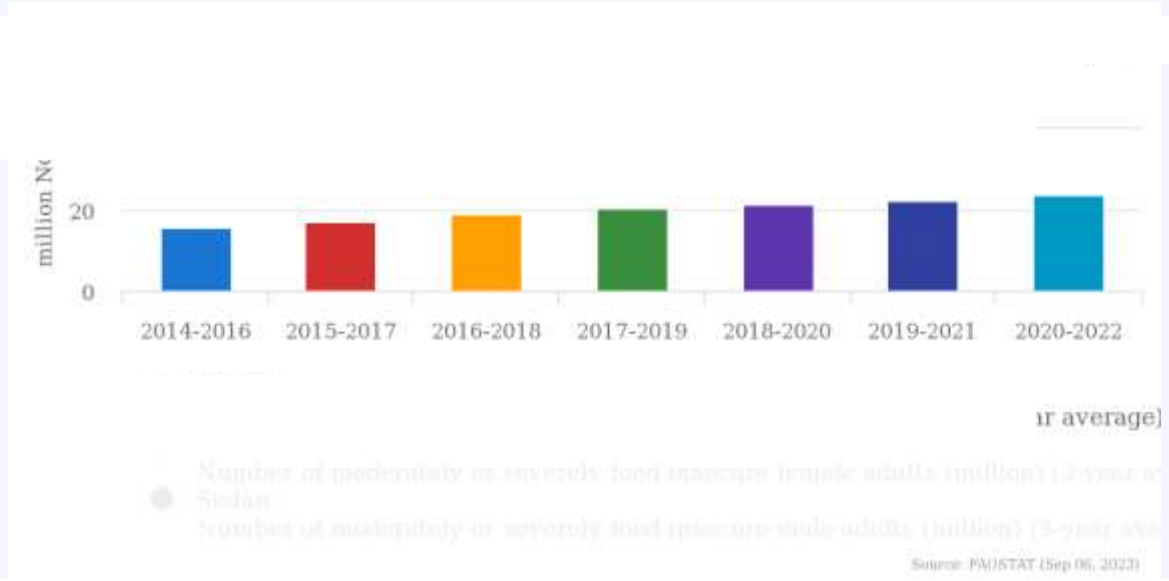

Fig. 7. Number of moderately and severely food insecure people (million).
Source https://www.fao.org/faostat/en/#country/276

4) Gender Roles in Agricultural Labor:

According to the latest data, female employment in the agricultural sector in Sudan is significant (World Bank, 2022). Women play a crucial role in the agricultural workforce, with around 68% of female participation in this sector (Fig. 8). This is partially due to the fact that Sudan's economy relies heavily on agriculture, and women have traditionally been involved in activities such as farming, animal husbandry, and food processing. Efforts are being made to address these gender disparities in Sudan's agricultural sector. Various organisations and initiatives

are working to increase women's access to productive resources, create supportive policies, and enhance their skills and knowledge through training programs. By empowering women in agriculture, Sudan has the potential to not only improve food security but also promote gender equality and overall economic development (World Bank, 2023a).

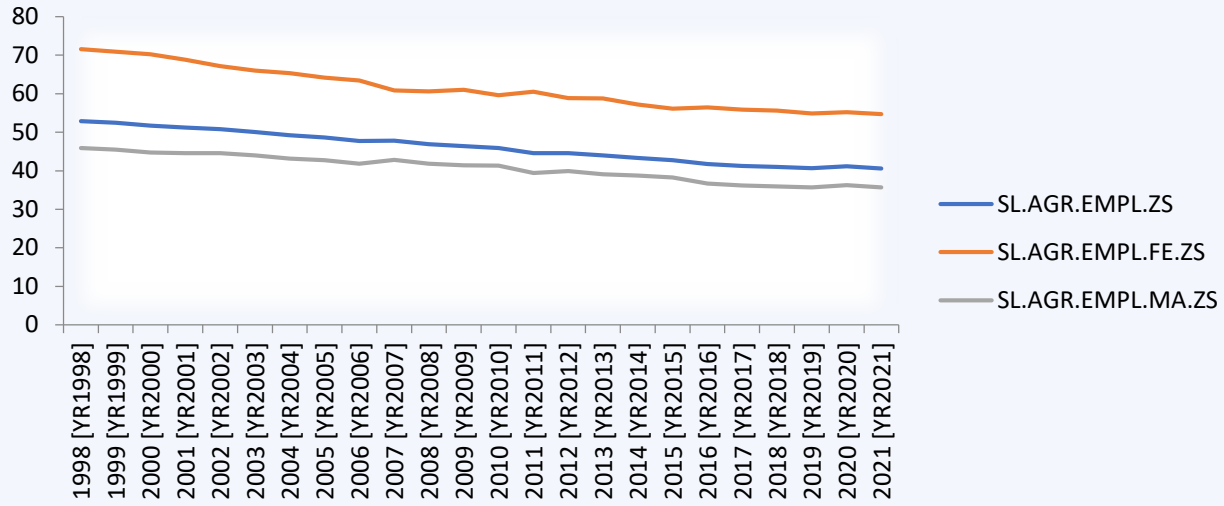

Fig 8. Employment in agriculture (male and female) in Sudan. Source: Data from database: World Development Indicators Last Updated: 07/25/2023

Climate change is already having a negative impact on food security in Sudan. The country is becoming increasingly dry, and this is making it difficult to grow crops. In addition, climate change is causing more frequent and severe droughts and floods, which can damage crops and infrastructure. Moreover, economic crises, natural disasters, disease and food safety can make it difficult for people to afford food. It can also lead to job losses and reduced incomes, which can make it more difficult for people to access food (FAO, 2020).

5) Sudan's Economic Challenges and Prospects

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Over the past few decades, Sudan has faced considerable instability in its economic landscape. Foreign Direct Investment (FDI) has shown drastic fluctuations, while the inflation rate has remained persistently high (Figs. 9 and 10). The secession of South Sudan in 2011 dealt a severe blow to the Sudanese economy, causing adverse effects. Additionally, the war with South Sudan and the ensuing occupation of oil-producing regions in Heglig worsened the already precarious situation, further compounding Sudan's economic challenges

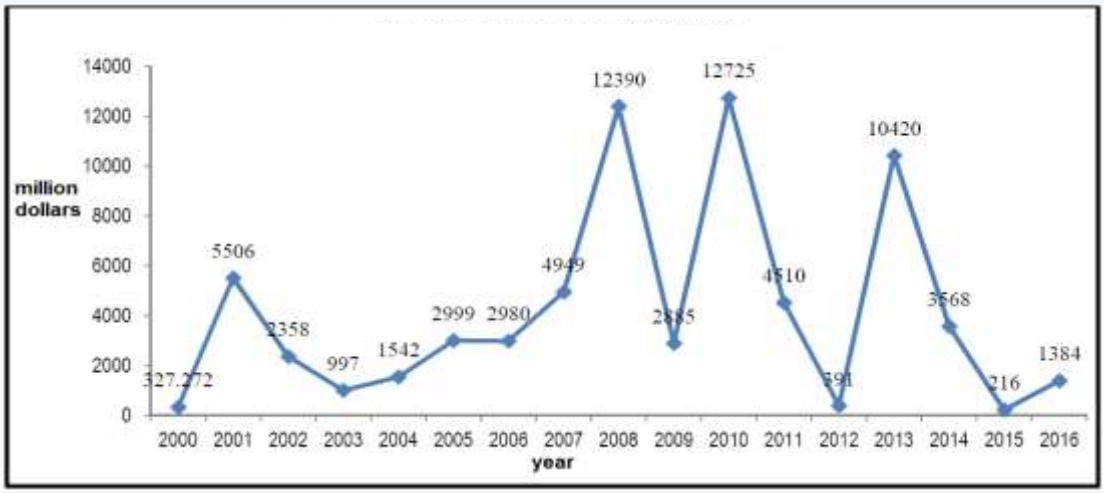

Fig. 9. Direct forging investment/ Source Ministry of investment

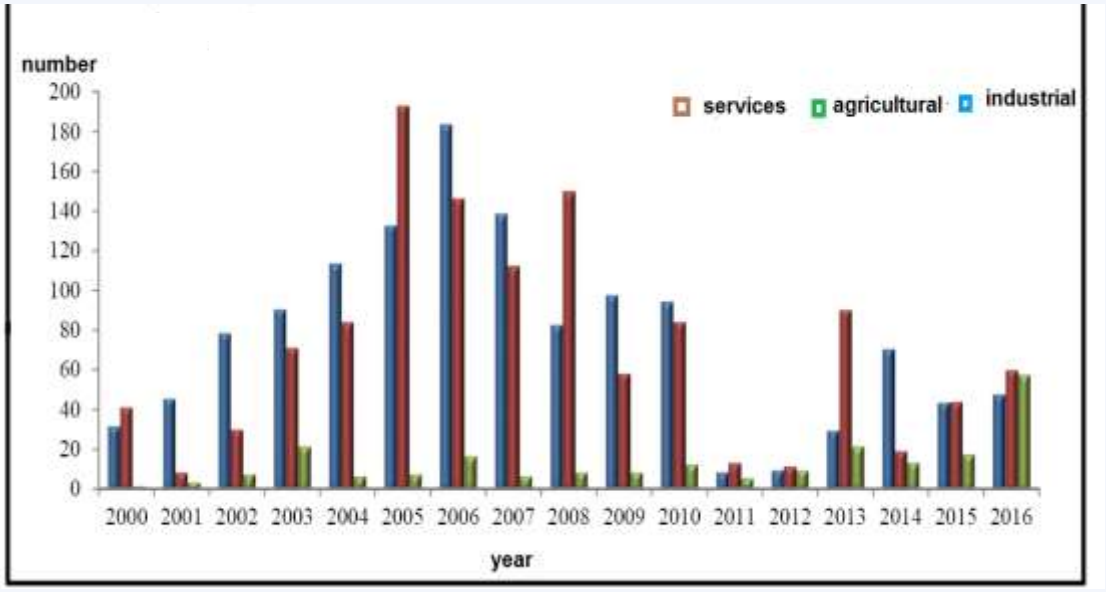

Fig. 10. Number of direct foreign investment according to the sectors (2000-2016).
Source Ministry of investment

6) Sudan food foreign trade balance (2012-2020)

The value of food imports in Sudan has increased in recent years, while the value of food exports has decreased (Table 2). This has led to a growing food trade deficit. Overall, the food trade situation in Sudan is challenging. The country imports a significant amount of food, while its food exports are relatively low. This has led to a growing food trade deficit. The main food imports are wheat and sugar, which together account for more than 75% of total food imports

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Table 2. Food foreign trade balance in Sudan (2012-2020) by million

Year	Food imports	Food exports	food foreign trade balance	Food coverage ratio
2012	2,049	-	-	-
2013	2,372	1699.43	-673	71.6
2014	2,248	1499.4	-749	66.7
2015	2,132.9	1314.2	-819	61.6
2016	1,775.4	1223.0	-552	68.9
2017	1,944.1	1885.3	-59	97.0
2018	1,969.1	1892.1	-77	96.1
2019	2,141.4	1785.2	-356	83.4
2020	2,685.7	1615.6	-1,070	60.2

Bank of Sudan reports Different years and Arab Organization for Agricultural Development; Agricultural Statistics Yearbook 2014, 2020

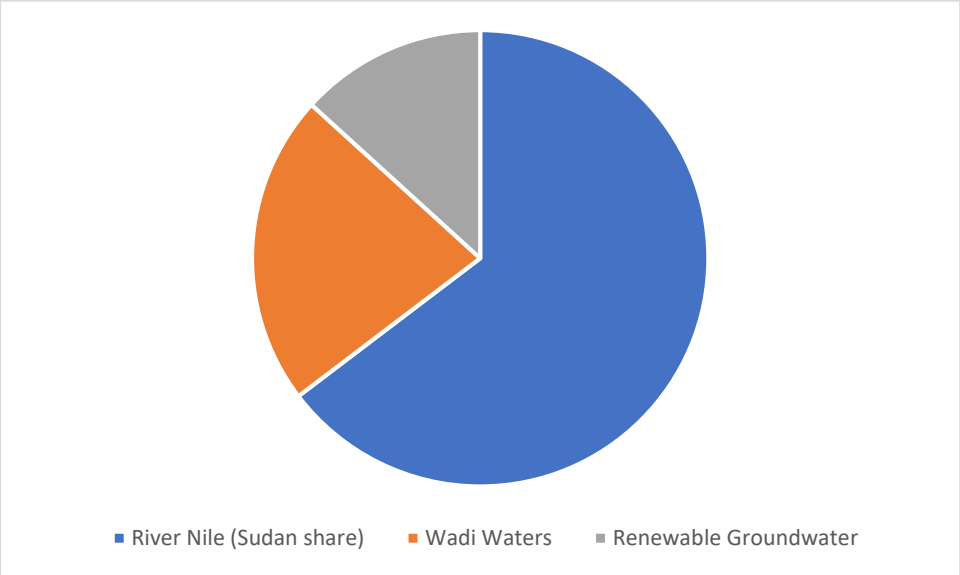

Fig. 12. Water supply in Sudan (Quantity in bcm)
(Source Abdalla, 2011)

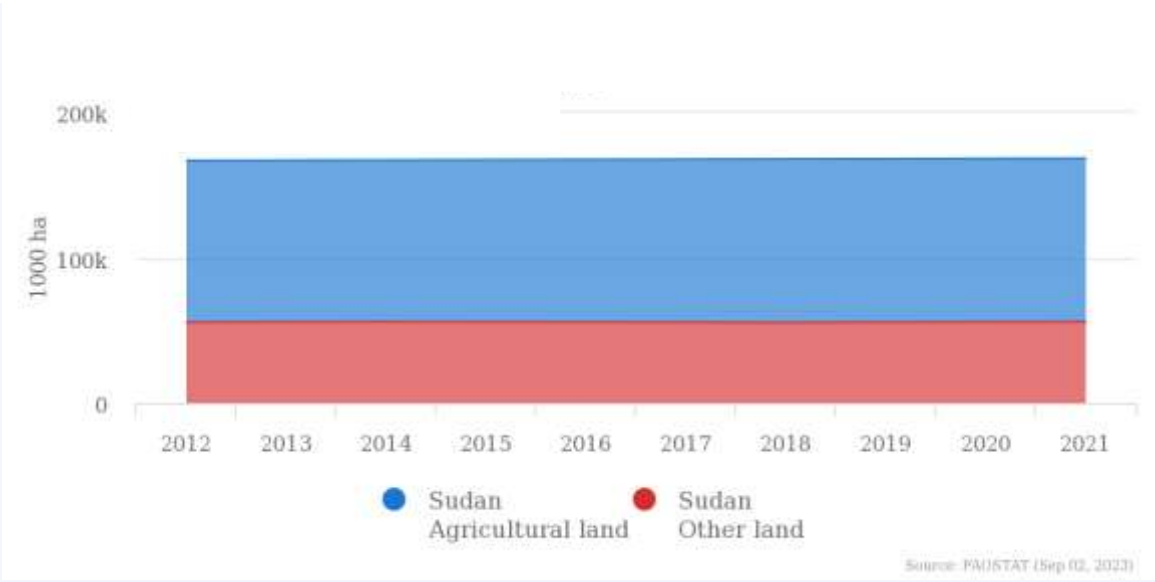

Fig. 13. land use in Sudan.
Source https://www.fao.org/faostat/en/#country/276

7) Uncertainties associated with addressing the food security crisis in Sudan

There are several uncertainties associated with addressing the food security crisis in Sudan:
1. Data accuracy: The accuracy and reliability of data on food security in Sudan can be a challenge. Incomplete or unreliable data makes it difficult to accurately assess the severity of the crisis and design targeted interventions. Efforts should be made to improve data collection methods, enhance monitoring systems, and ensure the transparency and accuracy of food security data.
2. Effectiveness of interventions: The complexity of the food security crisis means that there are no easy solutions. The effectiveness of interventions implemented to address the crisis is uncertain and may require

continuous monitoring and evaluation. Flexibility and adaptability in implementing interventions are essential to respond to changing circumstances and emerging challenges.

3. Availability of resources: Adequate resources are crucial for implementing effective interventions. However, the availability of resources, both from the government of Sudan and the international community, may be limited. It is important to prioritise and allocate resources efficiently and effectively to maximise their impact. Collaborative efforts with international partners, NGOs, and other stakeholders can help mobilise additional resources and support.

To address these uncertainties, Sudan should focus on improving data collection and analysis systems, investing in research and innovation, and fostering partnerships with international organisations and donors. Continuous monitoring and evaluation of interventions are essential to identify gaps and adjust strategies accordingly. Additionally, efforts should be made to enhance resource mobilisation and ensure the efficient use of available resources.

8) The Water-Energy-Food (WEF) Nexus Index – Sudan:

Water-Energy-Food (WEF) Nexus Index for Sudan is 44.6, ranking the country 147th among the countries assessed. Sudan has a score of 32 for the water pillar, 57.3 for the energy pillar, and no score available for the food pillar (Table 4 and fig. 15). This indicates that Sudan has a moderate level of WEF security, but there are significant challenges that need to be addressed to improve the country's WEF security.

Table 4. Food Indicators values in Sudan

Access	Values	Availability	Values
Prevalence of undernourishment (%).	82.8	Average protein supply (grams/capita/day).	41.4
Percentage of children under 5 years of age who are stunted (%).	42.4	Cereal yield (kg/hectare).	4.7
Prevalence of obesity in the adult population (18 years and older).	-	Average Dietary Energy Supply Adequacy (ADESA) (%).	43.8
Percentage of children under 5 years of age affected by wasting (%).	-	Average value of food production (I$/apita).	14.7

Source: https://wefnexusindex.org/SDN

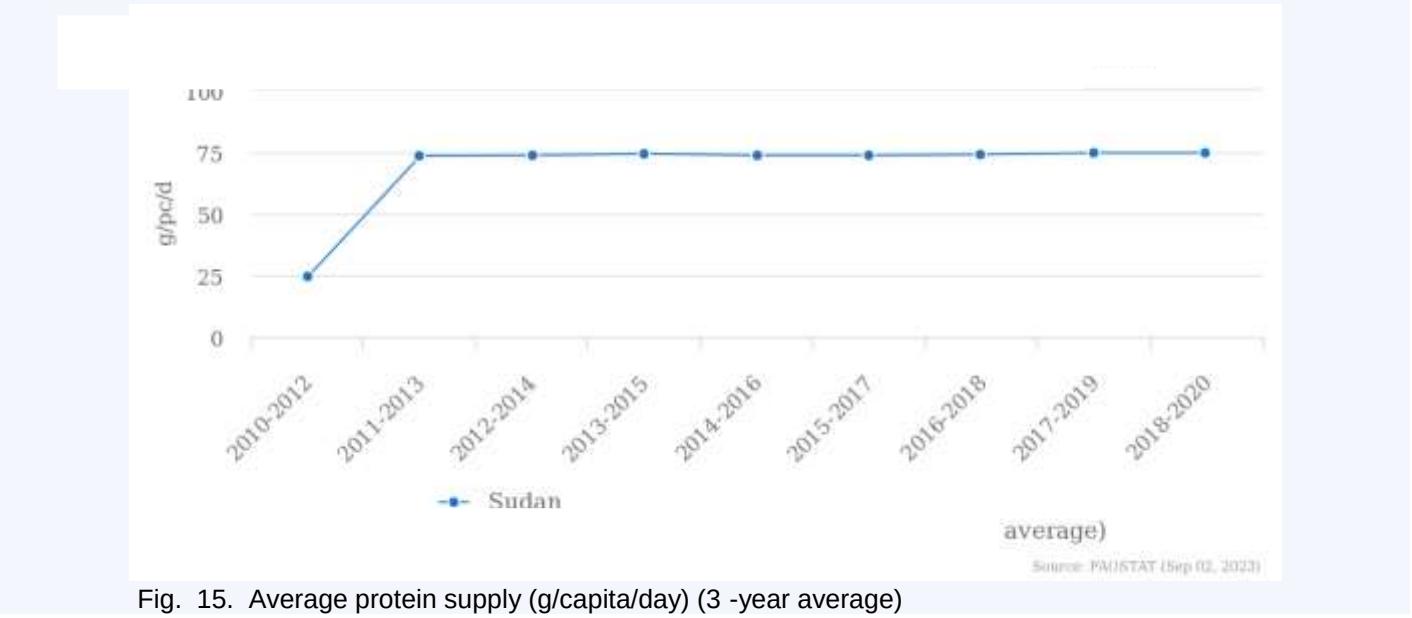

Fig. 15. Average protein supply (g/capita/day) (3 -year average)

Underlying challenges that hinder food security in Sudan:

SWOT analysis of food security in Sudan reveals several strengths, including abundant natural resources, cultural diversity, government commitment, and untapped agricultural potential. However, weaknesses such as conflict and instability, limited infrastructure, climate change vulnerability, and limited access to financing pose challenges. There are opportunities to invest in agricultural infrastructure, diversify agricultural products, collaborate with international partners, and promote sustainable farming practices. Threats include the impact of climate change, pests and diseases, population growth, and market fluctuations. Addressing these factors is crucial to improving food security in Sudan.

There are several underlying challenges that hinder food security in Sudan. These challenges include:

1. Conflict and Political Instability: Sudan has experienced prolonged periods of conflict and political instability, particularly in regions such as Darfur, South Kordofan, and the Blue Nile. These conflicts disrupt agricultural production, cause populations displacement, and hinder access to land and resources, leading to food insecurity.
2. Climate Change and Environmental Degradation: Sudan is highly vulnerable to climate change, with increasing temperatures, irregular rainfall patterns, and prolonged droughts. These climatic changes affect agricultural productivity, water availability, and livestock health, leading to reduced food production and increased vulnerability.
3. Limited Access to Land and Resources: Land tenure issues, unequal distribution of land, and inadequate access to productive resources such as water, seeds, and fertilisers pose significant challenges to smallholder farmers. Limited access to land and resources restricts their ability to increase agricultural production and improve food security.
4. Low Agricultural Productivity and Technology Adoption: Sudan's agricultural sector faces low productivity due to limited use of modern farming techniques, inadequate access to improved seeds and fertilisers, and outdated agricultural practices. The lack of technology adoption hampers the potential for increased food production.
5. Weak Agricultural Extension Services: Agricultural extension services, which provide technical advice, training, and information to farmers, are underdeveloped in Sudan. Limited extension services hinder farmers' ability to adopt improved practices, technologies, and sustainable farming methods.
6. Inadequate Infrastructure: Sudan's agricultural sector faces challenges related to inadequate infrastructure, including poor road networks, limited access to markets, and inadequate storage and processing facilities. These infrastructure gaps limit farmers' ability to transport and sell their produce, leading to post-harvest losses and reduced incomes.
7. Poverty and Limited Access to Markets: High levels of poverty and limited access to markets and financial services restrict farmers' ability to invest in agricultural inputs, technologies, and necessary infrastructure. Limited access to markets also results in reduced income opportunities for farmers.
8. Limited Value Addition and Processing: The lack of value addition and processing facilities in Sudan's agricultural sector limits the ability to add value to agricultural products, leading to lower market prices and reduced income for farmers.

Addressing these underlying challenges is essential to improving food security in Sudan. Effective policies and interventions are required to address issues related to conflict, climate change, land tenure, agricultural productivity, extension services, infrastructure, market access, and value addition.

A Historical Overview of Agricultural Policies

Agriculture has always played a significant role in Sudan's economy and history. The country has vast agricultural potential due to its fertile soil, abundant water resources, and favourable climate. Over the years, various agricultural policies have been implemented to promote and develop the sector. During the colonial period, Sudan was under British rule, and agriculture was primarily focused on the production of cash crops such as cotton, gum Arabic, and groundnuts. The British implemented policies that favoured large-scale commercial farming, often at the expense of small-scale farmers. This led to the concentration of land ownership in the hands of a few wealthy individuals and created a divide between the rural and urban populations. After Sudan gained independence in 1956, the government sought to address the inequalities in land ownership and promote agricultural development. The Agricultural Revolution of the 1970s was a major policy shift that aimed to increase agricultural productivity and reduce dependence on imported food. The government introduced mechanisation, irrigation, and improved seeds to boost crop yields. However, this approach mainly benefited large-scale farmers, and small-scale farmers continued to face challenges. In the 1980s, Sudan faced a severe economic crisis due to drought, civil war, and mismanagement. The government implemented structural adjustment programmes recommended by international financial institutions, which included reducing subsidies and liberalizing the agricultural sector. These policies led to the withdrawal of state support for agriculture and the privatization of agricultural services, resulting in a decline in productivity and increased rural poverty. In the 1990s, the government launched the National Agricultural Policy (NAP) to address the challenges facing the sector. The NAP aimed to promote sustainable agriculture, improve rural livelihoods, and enhance food security. It focused on diversifying agricultural production, promoting irrigation, and supporting small-scale farmers through credit schemes

and training programsmes(Hamid and El-Obeid, 2017; IMF, 2023).

In recent years, Sudan has faced numerous challenges in its agricultural sector, including conflicts, climate change, and economic instability (FAO,2020; IPC, 2021a,b). However, the government has continued to implement policies to support farmers and boost agricultural production. Efforts have been made to improve infrastructure, provide access to credit and inputs, and promote agricultural research and extension services. In conclusion, Sudan's agricultural policies have evolved over time, reflecting the country's changing socio-economic and political landscape. While efforts have been made to address the challenges facing the sector, there is still a need for further investment and support to ensure sustainable agricultural development in Sudan (World Bank, 2023b).

Stakeholder Analysis

Stakeholder analysis is a process that helps identify and understand the various individuals, groups, or organisations that are affected by or have an interest in a particular project, policy, or decision. It is an essential tool for effective decision-making and stakeholder engagement. In the context of agricultural policies in Sudan, the following stakeholders can be identified:

1. Farmers: Small-scale farmers, large-scale farmers, and agribusiness owners are key stakeholders in agricultural policies. They are directly affected by policies related to land ownership, access to credit and inputs, market regulations, and agricultural extension services.
2. Government: The government, including ministries of agriculture, finance, and planning, plays a crucial role in formulating and implementing agricultural policies. They are responsible for creating an enabling environment, providing infrastructure, and allocating resources for the sector.
3. Agricultural Associations and Cooperatives: These organisations represent the interests of farmers and advocate for their rights. They play a vital role in policy advocacy, capacity building, and providing services to farmers.
4. Research Institutions: Agricultural research institutions and universities contribute to policy formulation by providing scientific knowledge, conducting studies, and developing technologies to improve agricultural productivity and sustainability.
5. International Donors and Development Agencies: Organisations such as the World Bank, United Nations agencies, and non-governmental organisations (NGOs) provide financial and technical assistance to support agricultural development in Sudan. They often have a say in policy formulation and implementation.
6. Consumers: Consumers have a stake in agricultural policies as they are directly affected by food prices, quality, and availability. Policies related to food safety, food labeling, and import/export regulations impact consumers' choices and access to affordable and nutritious food.
7. Environmental and Conservation Groups: These organisations advocate for sustainable agricultural practices and the conservation of natural resources. They are concerned with policies related to land use, water management, and biodiversity conservation.
8. Traders and Processors: Traders, processors, and other actors in the agricultural value chain have a stake in policies related to market regulations, trade agreements, and infrastructure development. Their interests lie in ensuring a favorable business environment and access to markets.
9. Civil Society Organisations: Various civil society organisations, including community-based organisations and advocacy groups, work to promote the interests of marginalised groups, such as women, youth, and rural communities. They play a crucial role in ensuring that agricultural policies are inclusive and address social equity.
10. Financial Institutions: Banks and microfinance institutions have a stake in agricultural policies as they provide credit and financial services to farmers and agribusinesses. They are concerned with policies related to access to credit, loan terms, and risk management.

Understanding the interests, concerns, and power dynamics among these stakeholders is essential for effective policy formulation and implementation. Stakeholder analysis helps identify potential conflicts, build alliances, and ensure that policies are inclusive and address the diverse needs of the agricultural sector in Sudan.

The primary policy influencers in Sudan's agricultural sector are:

1. Ministry of Agriculture: The Ministry of Agriculture is responsible for formulating and implementing agricultural policies in Sudan. It plays a crucial role in creating an enabling environment for agricultural development, providing support and services to farmers, and ensuring food security.
2. International Financial Institutions: International financial institutions such as the World Bank, International Monetary Fund, and African Development Bank have a significant influence on Sudan's agricultural policies. They provide financial and technical assistance to support agricultural development and often require policy reforms as a condition for funding.
3. Donor Countries: Donor countries such as the United States, United Kingdom, and European Union provide aid and technical assistance to support agricultural development in Sudan. They often have a say in policy formulation and implementation.
4. Agricultural Research Institutions: Agricultural research institutions such as the Agricultural Research Corporation (ARC) and universities play a crucial role in policy formulation by providing scientific knowledge, conducting

studies, and developing technologies to improve agricultural productivity and sustainability.
5. Agricultural Associations and Cooperatives: Agricultural associations and cooperatives represent the interests of farmers and advocate for their rights. They play a vital role in policy advocacy, capacity building, and providing services to farmers.
6. Civil Society Organisations: Various civil society organisations, including community-based organisations and advocacy groups, work to promote the interests of marginalised groups, such as women, youth, and rural communities. They play a crucial role in ensuring that agricultural policies are inclusive and address social equity.
7. Private Sector: The private sector, including agribusinesses, traders, and processors, has a significant influence on agricultural policies. They are concerned with policies related to market regulations, trade agreements, and infrastructure development. Their interests lie in ensuring a favorable business environment and access to markets.
Understanding the interests, concerns, and power dynamics among these primary policy influencers is essential for effective policy formulation and implementation in Sudan's agricultural sector.

Secondary policy influencers in Sudan's agricultural sector can include:

1. International Trade Organisations: Organisations such as the World Trade Organization (WTO) and regional trade blocs (e.g., African Union, Common Market for Eastern and Southern Africa) influence agricultural policies through trade agreements, tariffs, and market access negotiations.
2. Research and Development Organisations: International research and development organisations, such as the International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Food Policy Research Institute (IFPRI), provide technical expertise and research-based recommendations to inform agricultural policies.
3. Non-Governmental Organisations (NGOs): NGOs working in the agricultural sector, both local and international, can influence policies through research, advocacy, and capacity-building initiatives. They often focus on issues such as sustainable agriculture, food security, and rural development.
4. Media and Communication Channels: The media plays a significant role in shaping public opinion and influencing policy discussions. News outlets, journalists, and social media platforms can highlight agricultural issues, raise awareness, and influence public and political discourse.
5. Regional and International Conventions: Sudan's agricultural policies can also be influenced by regional and international conventions and agreements related to agriculture, environment, and sustainable development. Examples include the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD).
6. Academia and Think Tanks: Researchers, academics, and think tanks contribute to policy discussions through their expertise, analysis, and recommendations. They often provide evidence-based insights and policy options to inform decision-making.
7. Professional Associations and Industry Groups: Associations representing specific sectors within agriculture, such as livestock, fisheries, or horticulture, can influence policies related to their specific industries. They advocate for the interests of their members and provide technical expertise.
8. International Agricultural and Food Safety Standards: International standards and certifications, such as those set by the Codex Alimentarius Commission and GlobalGAP, can influence agricultural policies by setting benchmarks for quality, safety, and sustainability.
9. Regional and Local Governments: Regional and local governments within Sudan can have an influence on agricultural policies at their respective levels. They may have specific priorities and initiatives that align with or diverge from national policies.
10. International Research and Development Projects: Projects funded by international organisations or developed through partnerships with foreign entities can introduce new technologies, practices, and approaches that influence agricultural policies.
Understanding the role and influence of these secondary policy influencers is crucial for a comprehensive understanding of the policy landscape and for effective decision-making in Sudan's agricultural sector.

Implementing partners

In Sudan's agricultural sector are organisations, institutions, or entities that work directly on the ground to implement agricultural policies, programs, and projects. These partners play a crucial role in translating policy objectives into action and achieving desired outcomes. Some examples of implementing partners in Sudan's agricultural sector include:
1. Agricultural Extension Services: Extension services, provided by government agencies or NGOs, work directly with farmers to disseminate information, provide training, and offer technical assistance on various agricultural practices and technologies.
2. Farmer-Based Organisations: Farmer-based organisations, such as cooperatives and producer associations, play a vital role in implementing agricultural policies by organizing farmers, facilitating collective action, and providing services and support to their members.
3. Non-Governmental Organisations (NGOs): NGOs working in the agricultural sector often collaborate with government agencies and other stakeholders to implement agricultural programsmesand projects. They provide technical expertise, training, and support to

farmers, and help in implementing specific interventions and initiatives.
4. Research and Development Institutions: Research and development institutions, such as agricultural research centers and universities, are involved in implementing agricultural policies through conducting research, developing new technologies and practices, and providing technical assistance to farmers.
5. Private Sector: The private sector, including agribusinesses, input suppliers, and processors, plays a crucial role in implementing agricultural policies through investment, technology transfer, and market linkages. They often collaborate with government agencies and other stakeholders to support farmers and promote agricultural development.
6. Community-Based Organisations: Community-based organisations, including local community groups and self-help organisations, are involved in implementing agricultural policies at the grassroots level. They often focus on issues such as sustainable agriculture, natural resource management, and rural development.
7. Financial Institutions: Financial institutions, such as banks and microfinance institutions, play a critical role in implementing agricultural policies by providing access to credit, financial services, and insurance products to farmers and agribusinesses.
8. International Organisations: International organisations, such as the United Nations agencies and international development organisations, often collaborate with the government of Sudan and other stakeholders to implement agricultural programsmesand projects. They provide technical expertise, funding, and support to achieve specific policy objectives.
These implementing partners work in collaboration with the primary policy influencers and other stakeholders to ensure the effective implementation of agricultural policies and programsmesin Sudan.

Legislations to address food security challenges

Sudan has implemented several key legislations to address food security challenges and ensure a sustainable and secure food supply for its population. These legislations include:

1. The National Food Security Policy (2011): This policy provides a comprehensive framework for addressing food insecurity in Sudan. It focuses on four key areas: increasing agricultural production and productivity, improving access to food, building resilience to shocks and stresses, and reducing malnutrition. The policy aims to enhance food security through strategic planning, coordination, and implementation of various programmes and initiatives.

2. The Agricultural Investment Act (2013): This act aims to attract investment in the agricultural sector and promote its development. It provides a number of incentives to investors, including tax exemptions, land concessions, and access to credit. By encouraging **private-sector** participation and investment in agriculture, the act aims to increase agricultural productivity and contribute to food security.

3. The Food Safety Act (2015): This act regulates the production, processing, and distribution of food in Sudan. It aims to protect consumers from foodborne diseases and ensure the safety of the food supply. The act establishes standards and guidelines for food safety, sets requirements for food labeling and packaging, and establishes a system for food inspection and certification.

4. The National Nutrition Policy (2016): This policy aims to improve the nutritional status of the Sudanese population. It focuses on promoting healthy diets, preventing malnutrition, and providing treatment for those who are malnourished. The policy emphasises the importance of nutrition education, micronutrient supplementation, and breastfeeding promotion to enhance food security and improve overall health outcomes.

In addition to these specific legislations, there are several other laws and policies that have an impact on food security in Sudan. The Land Act (2005) regulates land ownership and tenure, ensuring secure access to land for agricultural purposes. The Water Resources Act (2013) governs the management and allocation of water resources, which is crucial for agricultural production. The Social Safety Nets Program Act (2016) establishes social protection programsmes to assist vulnerable populations and improve their food security. The Sudanese government is also working on developing new legislations to further enhance food security, such as a National Food Security Law and a Law on the Regulation of Agricultural Inputs. These legislations aim to address emerging challenges, promote sustainable agricultural practices, and strengthen the overall food security framework in Sudan.
Despite the existence of these legislations, Sudan faces challenges in effectively implementing them due to limited institutional capacity, resource constraints, and ongoing conflict and insecurity in certain regions. However, the government's commitment to food security and ongoing efforts to improve the legislative framework provide hope for addressing these challenges and ensuring a more secure and sustainable food supply for the Sudanese population.

Causal loop diagram for food security –Sudan

The causal loop diagram can be used to inform policy decisions about food security in Sudan. For example, policymakers could focus on reducing the costs of food production and making food more affordable for consumers. They could also invest in climate change adaptation and conflict resolution measures to reduce the negative impacts of these factors on food security (Fig. 14).

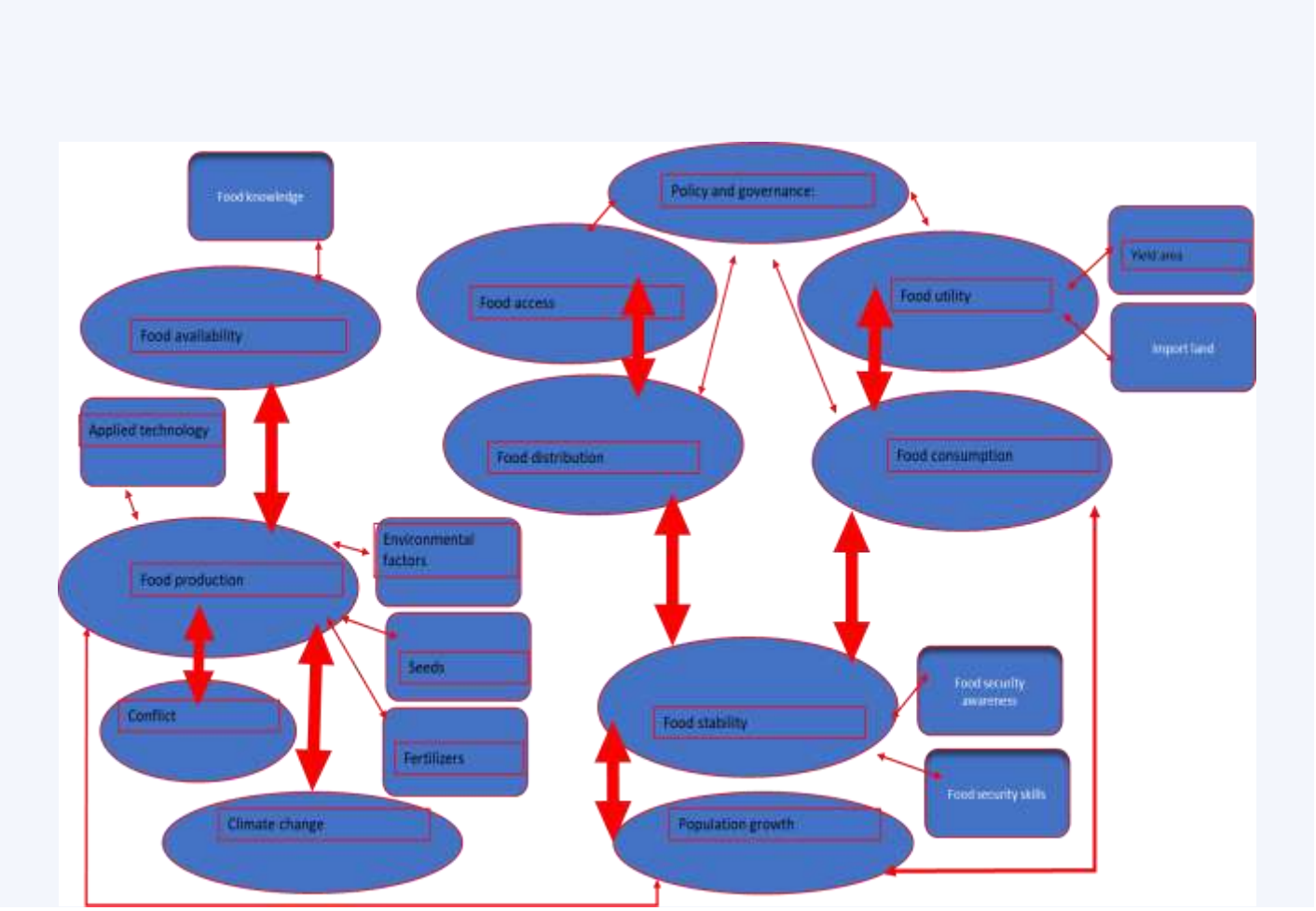

Fig. 14. Causal loop diagram for food security analysis in Sudan

Policy Options/ Alternatives Analysis

Alternative 1: Promoting Climate-Smart Practices and Adaptation Strategies to Enhance Agricultural Resilience in Sudan

To address the challenges posed by climate change, Sudan should prioritise the promotion of climate-smart agricultural practices and adaptation strategies. This alternative policy option aims to enhance the resilience of the agricultural sector and ensure sustainable food production. Firstly, promoting the adoption of climate-smart practices such as agroforestry, conservation agriculture, and precision farming is crucial. Agroforestry involves integrating trees into agricultural systems, which provides multiple benefits such as soil conservation, improved water management, and increased biodiversity. Conservation agriculture focuses on minimizing soil disturbance, maintaining soil cover, and diversifying crop rotations, leading to improved soil health and water retention. Precision farming utilizes technologies like remote sensing and GPS to optimize resource use, minimizing waste and maximizing productivity. Secondly, Sudan should develop and implement climate change adaptation strategies tailored to the specific challenges faced by its agricultural sector. This includes promoting the cultivation of drought-resistant crops and varieties, as well as supporting farmers in adopting sustainable farming practices. Providing resources and information to farmers, such as weather forecasts, early warning systems, and training on adaptive techniques, will help them cope with changing weather patterns and minimize crop losses. By combining these efforts, Sudan can enhance the resilience of its agricultural sector to climate change impacts. This will not only ensure food security but also contribute to natural resource conservation and sustainable development.

Alternative 2: Embracing Advanced Technological Tools for Agricultural Transformation in Sudan

To overcome the challenges faced by Sudan's agricultural sector, it is crucial to embrace advanced technological tools that can revolutionize farming practices and enhance productivity and sustainability. This alternative policy option focuses on the adoption and integration of cutting-edge technologies, such as artificial intelligence (AI), automation, and big data analytics, to transform the agricultural sector in Sudan. One key aspect of this alternative is the development of platforms that connect physical warehouses and logistical

infrastructure. By utilizing AI and automation, producers can streamline their operations, reduce costs, and improve the efficiency of storage, transportation, and distribution processes. This will ensure that agricultural products reach markets in a timely manner, reducing post-harvest losses and increasing profitability for farmers. Another important component of this alternative is the automation of irrigation systems. By utilizing AI and sensors, farmers can optimize water usage, reduce waste, and improve the efficiency of irrigation practices. This will not only conserve water resources but also enhance crop productivity and resilience to climate change. Furthermore, the integration of big data analytics can enable "smart farming" practices in Sudan. By collecting and analyzing site-specific data on weather patterns, soil conditions, and crop performance, farmers can make informed decisions regarding resource allocation, pest and disease management, and crop selection. This data-driven approach will enhance productivity, reduce input costs, and promote sustainable farming practices. To implement this alternative, Sudan should invest in the necessary infrastructure, such as internet connectivity and data collection systems, to support the adoption of advanced technological tools. Additionally, capacity-building programsmesand training initiatives should be provided to farmers and agricultural extension workers to ensure effective utilization of these technologies. Collaboration with international partners and private sector entities can also facilitate the transfer of knowledge and resources for technological advancements in the agricultural sector. By embracing advanced technological tools, Sudan can transform its agricultural sector, improve productivity, and ensure sustainable food production. This alternative will not only enhance food security but also contribute to economic growth, job creation, and environmental sustainability.

Alternative 3: Investment in Agricultural Infrastructure

One alternative policy option to improve food security in Sudan is to increase investment in agricultural infrastructure. This includes the development and improvement of irrigation systems, storage facilities, and transportation networks. Investing in irrigation systems will help farmers overcome the challenges posed by climate change, such as unpredictable rainfall patterns and droughts. By providing a reliable water supply, farmers can maintain consistent crop growth and increase productivity. This will also enable the cultivation of crops that require more water, diversifying agricultural production and reducing dependence on rain-fed agriculture. Improving storage facilities is crucial to reduce post-harvest losses, which can be significant in Sudan. By investing in modern storage facilities, farmers can store their produce safely and prevent spoilage, ensuring a steady supply of food throughout the year. This will also enable farmers to sell their produce at the most opportune time, maximizing their profits and reducing food waste. Investment in transportation networks is essential to improve market access for farmers. By developing and upgrading roads, railways, and other transportation infrastructure, farmers can transport their produce to markets more efficiently and at lower costs. This will not only increase their rofitability but also ensure that food reaches consumers in a timely manner, reducing food spoilage and improving food security. To implement this alternative, Sudan should prioritise funding for agricultural infrastructure projects and seek financial assistance from international donors and development partners. Additionally, capacity-building programsmes should be provided to farmers and agricultural extension workers to ensure effective utilization of these infrastructure investments. By investing in agricultural infrastructure, Sudan can improve productivity, reduce post-harvest losses, and enhance market access for farmers. This alternative will contribute to long-term food security, economic growth, and rural development in the country.

Alternative 4: Enhance Policy Coordination and Establish Partnerships for Affordable and Nutritious Meal Plans

To improve food security in Sudan, it is crucial to enhance policy coordination and establish partnerships that focus on creating affordable and nutritious meal plans. This alternative policy option emphasises the need for improved coordination among government ministries, agencies, and stakeholders involved in food security management. One key aspect of this alternative is the development and implementation of comprehensive policies, laws, and regulations that support sustainable agriculture, rural development, and food security. By aligning the efforts of different government entities and ensuring coherence in policy implementation, Sudan can create an enabling environment for agricultural growth and food security. Additionally, partnerships with national organisations like the National Nutrition Institute (NNI) can play a crucial role in addressing the nutritional aspect of food security. By collaborating with the NNI, Sudan can develop low-cost, high-value nutritional meal plans that cater to the specific needs of the population. These meal plans can focus on promoting locally available and culturally appropriate foods to ensure accessibility and acceptance. Engaging in partnerships with international organisations such as the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) can provide Sudan with access to technical expertise, resources, and best practices in food security and nutrition. These partnerships can support capacity-building initiatives, knowledge sharing, and the implementation of evidence-based interventions to improve food security in Sudan.

Furthermore, collaborating with the National Food Safety Authority can ensure that the meal plans developed are safe and meet the required quality standards. This will

help address concerns related to food safety and hygiene, ensuring that the population has access to nutritious and safe food. To implement this alternative, Sudan should prioritise policy coordination and establish mechanisms for regular communication and collaboration among relevant stakeholders. Additionally, partnerships with national and international organisations should be formalized through agreements and memorandums of understanding to ensure sustained support and collaboration. By enhancing policy coordination and establishing partnerships for affordable and nutritious meal plans, Sudan can address the multifaceted aspects of food security. This alternative will contribute to improved access to nutritious food, better health outcomes, and enhanced overall food security in the country.

Alternative 5: Investment in Agricultural Research, Education, and Capacity Building for Long-Term Food Security

To improve food security in Sudan, it is crucial to invest in agricultural research, education, and capacity building. This alternative policy option emphasises the importance of research and development (R&D) in enhancing agricultural productivity, developing climate-resilient crop varieties, and improving post-harvest processing techniques. Investing in R&D is essential to address the challenges faced by Sudanese farmers, such as climate change, pests, and diseases. By partnering with research institutions, universities, and international organisations, Sudan can access cutting-edge knowledge, expertise, and technologies. This will enable the development of innovative solutions and practices that can increase agricultural productivity, improve crop yields, and enhance resilience to climate-related risks. Furthermore, promoting education and capacity building is crucial to empower farmers and agricultural extension workers with the necessary knowledge and skills. Investing in agricultural education and vocational training programsmescan provide farmers with training on modern farming techniques, financial management, and entrepreneurship skills. This will enable them to adopt more efficient and sustainable agricultural practices, improve their productivity, and enhance their income-generating potential. Capacity building initiatives should also focus on strengthening the skills of agricultural extension workers who play a vital role in disseminating knowledge, providing technical support, and facilitating the adoption of best practices among farmers. By investing in their training and professional development, Sudan can ensure that extension workers have the necessary expertise to effectively support farmers and promote sustainable agriculture. To implement this alternative, Sudan should allocate resources for agricultural R&D and education programs, including funding for research projects, scholarships, and training programs. Collaboration with national and international research institutions, universities, and organisations should be fostered to leverage their expertise and resources. Additionally, partnerships with the private sector can be established to promote knowledge transfer, technology adoption, and innovation in the agricultural sector. By investing in agricultural research, education, and capacity building, Sudan can enhance agricultural productivity, resilience, and sustainability. This alternative will contribute to long-term food security, economic development, and the empowerment of farmers and agricultural stakeholders in the country.

Alternative 6: Building Resilience: A Comprehensive Approach to Food Security:

Sudan can achieve a sustainable and secure food supply by implementing a comprehensive national strategy that focuses on building resilience and mitigating the impacts of crises on food security. This alternative policy option emphasises the importance of addressing the underlying causes of food insecurity, such as climate change, water scarcity, and land degradation.

To achieve this, Sudan can adopt a five-pillar approach that includes:

1. Establishing a sustainable water use and irrigation system: Sudan can invest in the development of sustainable water management systems that improve water efficiency, reduce water losses, and promote the use of alternative water sources such as rainwater harvesting and groundwater recharge.
2. Adopting sustainable crop and soil management practices: Sudan can promote sustainable agriculture practices, such as conservation agriculture, agroforestry, and integrated pest management, which can improve soil health, reduce erosion, and enhance crop yields.
3. Implementing a sustainable livestock management system: Sudan can invest in the development of sustainable livestock management systems that promote animal health, reduce greenhouse gas emissions, and improve the productivity and profitability of the livestock sector.
4. Raising awareness among smallholder farmers and providing them with knowledge and access to financial services: Sudan can prioritise the education and empowerment of smallholder farmers by providing them with access to information, training, and financial services. This will enable them to adopt more sustainable and efficient farming practices, improve their productivity, and enhance their income-generating potential.
5. Supporting the livelihood diversification of vulnerable groups: Sudan can promote the diversification of livelihoods among vulnerable groups, such as women, youth, and marginalised communities. This can be done by providing them with access to alternative income-generating activities, such as small-scale businesses, non-farm activities, and value-added processing. To

implement this alternative, Sudan should prioritise policy coordination and establish mechanisms for regular communication and collaboration among relevant stakeholders. Additionally, partnerships with national and international organisations should be formalized through agreements and memorandums of understanding to ensure sustained support and collaboration.

By adopting a comprehensive approach to food security that focuses on building resilience and mitigating the impacts of crises, Sudan can achieve sustainable and secure food supply, improve livelihoods, and enhance overall food security in the country.

Alternative 7: Promoting Fair and Efficient Market Systems for Food Security

To achieve a sustainable and secure food supply, Sudan can implement market support mechanisms that stabilize and regulate food prices, promote fair trade, and foster efficient market systems. This alternative policy option focuses on three key strategies: strengthening agricultural cooperatives, establishing market information systems, and improving access to credit for small-scale farmers. 1. Strengthening agricultural cooperatives: Sudan can support the formation and capacity building of agricultural cooperatives. These cooperatives can play a crucial role in aggregating farmers' produce, negotiating fair prices, and accessing markets. By providing training and technical assistance, Sudan can empower cooperatives to effectively manage their operations, improve their bargaining power, and enhance their competitiveness in the market.

2. Establishing market information systems: Sudan can develop robust market information systems that provide real-time data on prices, supply, and demand. This information can be disseminated to farmers, traders, and policymakers, enabling them to make informed decisions regarding production, marketing, and pricing. Access to accurate and timely market information can help farmers identify market opportunities, plan their production accordingly, and negotiate fair prices for their produce.

3. Improving access to credit for small-scale farmers: Sudan can enhance access to credit for small-scale farmers, who often face challenges in accessing financial services. This can be achieved through the establishment of targeted credit programs, including microfinance initiatives, that offer affordable and flexible credit options to farmers. Access to credit can enable farmers to invest in inputs, equipment, and technologies, thereby improving their productivity, expanding their operations, and accessing new markets.

To implement this alternative, Sudan should collaborate with relevant stakeholders, including farmers' organisations, financial institutions, and market regulators. Policy coordination and cooperation among these stakeholders are essential to ensure the effective implementation of market support mechanisms. Additionally, investments in infrastructure, such as storage facilities and transportation networks, should be made to improve market access and reduce post-harvest losses. By promoting fair and efficient market systems through the strengthening of agricultural cooperatives, establishment of market information systems, and improvement of access to credit, Sudan can create an enabling environment for small-scale farmers. This will contribute to stable food prices, increased market opportunities, and enhanced food security in the country.

Alternative 8: Investing in Peace and Stability for Food Security

To ensure food security in Sudan, it is crucial to prioritise efforts to achieve sustainable peace and stability. Conflict and instability disrupt agricultural production, hinder the delivery of humanitarian assistance, and exacerbate food insecurity. This alternative policy option focuses on investing in peacebuilding and conflict resolution to create a conducive environment for agricultural development and food security.

1. Prioritise peace negotiations and conflict resolution: Sudan should prioritise peace negotiations and conflict resolution to address the underlying causes of conflict and create a stable environment for agricultural production. This can be achieved through diplomatic efforts, mediation, and dialogue among conflicting parties. Engaging all stakeholders, including community leaders, civil society organisations, and international partners, is essential to ensure inclusive and sustainable peace agreements.

2. Support post-conflict reconstruction and development: After the resolution of conflicts, Sudan should invest in post-conflict reconstruction and development to rebuild infrastructure, restore agricultural systems, and improve livelihoods. This can involve rehabilitating irrigation systems, providing agricultural inputs and equipment, and promoting the reintegration of displaced populations into agricultural activities. Additionally, investments in education, healthcare, and social services are crucial to support the overall well-being of communities affected by conflicts.

3. Strengthen institutions for conflict prevention and peacebuilding: Sudan should strengthen institutions responsible for conflict prevention and peacebuilding. This can involve capacity building for government agencies, civil society organisations, and local communities to effectively manage conflicts, promote social cohesion, and prevent the recurrence of violence. Investing in early warning systems, conflict resolution training, and community-based peacebuilding initiatives can help prevent conflicts and address their root causes.

4. Promote reconciliation and social cohesion: Sudan should prioritise efforts to promote reconciliation and social cohesion among communities affected by conflicts.

This can involve truth and reconciliation processes, community dialogues, and initiatives that foster trust and understanding among different ethnic and religious groups. By addressing historical grievances and promoting social cohesion, Sudan can create a peaceful environment that supports agricultural development and food security.

To implement this alternative, Sudan should collaborate with international partners, regional organisations, and civil society actors to leverage their expertise, resources, and support. Additionally, it is crucial to ensure the inclusion and participation of marginalised groups, including women and youth, in peacebuilding processes to promote sustainable and inclusive development.

By investing in peace and stability, Sudan can create an enabling environment for agricultural development, improve food security, and enhance the overall well-being of its population. Sustainable peace is a fundamental prerequisite for achieving long-term food security in the country.

Alternative 7: Improve the legislative framework

A policy option to improve the legislative framework for food security in Sudan is to strengthen and enhance existing laws and regulations related to agriculture and food production. This can involve conducting a comprehensive review of the current legislation to identify gaps and areas for improvement. The government can then work towards amending or enacting new laws that prioritise food security and address the specific challenges faced by farmers and food producers. This may include provisions for land rights, access to credit and financial support, agricultural inputs, and market regulations. Additionally, efforts should be made to ensure that these laws are effectively implemented and enforced, with appropriate monitoring and accountability mechanisms in place. By improving the legislative framework, Sudan can create a conducive environment for agricultural development and food security, promoting sustainable practices and protecting the rights and livelihoods of farmers.

Monitoring and evaluation:

Monitoring and evaluation of policy options for enhancing food security in Sudan are crucial to ensuring their effectiveness and identifying areas for improvement. Here are some key considerations for monitoring and evaluation:

1. Indicators and Targets: Define clear and measurable indicators to track progress towards food security goals. These indicators could include agricultural productivity, access to nutritious food, income levels of small-scale farmers, reductions in malnutrition rates, and the resilience of agricultural systems to climate change. Set specific targets for each indicator to assess the success of policy interventions.
2. Data Collection and Analysis: Establish robust data collection systems to gather relevant information on food security indicators. This can include surveys, assessments, and monitoring programsmes at national, regional, and local levels. Ensure data is disaggregated by gender, age, and other relevant factors to identify disparities and target interventions accordingly. Analyse the collected data to assess the impact of policy options and identify trends and patterns.
3. Impact Evaluation: Conduct rigorous impact evaluations to determine the causal relationship between policy interventions and observed changes in food security outcomes. This can involve using control groups, randomized controlled trials, or quasi-experimental designs. Assess the direct and indirect effects of policies on various dimensions of food security and identify any unintended consequences.
4. Stakeholder Engagement: Involve relevant stakeholders, including government agencies, civil society organisations, farmers' associations, and local communities, in the monitoring and evaluation process. Seek their input and feedback to ensure that the evaluation captures their perspectives and experiences. This can also enhance ownership and accountability for the outcomes of policy interventions.
5. Regular Reporting and Feedback: Regularly communicate the findings of monitoring and evaluation efforts to policymakers, implementers, and other stakeholders. Provide actionable recommendations based on the evaluation results to inform policy adjustments, programme improvements, and resource allocation decisions. Foster a culture of learning and continuous improvement by incorporating feedback from stakeholders into future policy interventions.
6. Long-term Monitoring: Recognize that food security is a complex and long-term challenge. Establish mechanisms for sustained monitoring and evaluation to track progress over time and adapt policies as needed. This can involve periodic reviews, mid-term assessments, and comprehensive evaluations at regular intervals.

By implementing a robust monitoring and evaluation framework, policymakers can ensure that policy options for enhancing food security in Sudan are evidence-based, adaptive, and effective in achieving their intended outcomes.

Conclusions

The food security crisis in Sudan is a serious problem. However, there are a number of solutions that can be implemented to address this problem. By investing in peace, agriculture, gender equality, education, and social safety nets, Sudan can improve food security and ensure that all its citizens have access to the food they need to live healthy and productive lives.

1. Achieving sustainable peace in Sudan is crucial for enhancing agricultural productivity, securing

livelihoods, and effectively delivering humanitarian assistance. It further suggests that peace will alleviate poverty and foster economic stability, ultimately contributing to improved food security for the population.

2. Regular monitoring and evaluation of food security initiatives are crucial for assessing their effectiveness and making necessary adjustments. This involves measuring progress towards food security targets, identifying gaps, and sharing best practices. Given the complexity of the issue of food security, a comprehensive approach is necessary, considering factors like poverty, climate change, and inadequate infrastructure. Governments and international organisations should prioritise policies and investments that focus on poverty reduction, sustainable agriculture practices, and climate change adaptation.

3. It is essential to adopt an integrated approach to food security that encompasses the entire food system, from production to consumption. This entails supporting small-scale farmers, improving market access, and promoting nutritious and sustainable diets.

4. Building resilience is vital to ensuring food security in the face of shocks and disasters. This can be achieved through investing in disaster risk reduction measures, developing climate-smart infrastructure, and implementing social protection programmes.

5. Capacity building is crucial for communities and institutions to address food security challenges effectively. This includes providing access to education, training, and resources for sustainable and climate-smart farming practices.

Recommendations

1. Emphasise the importance of peace and stability in promoting food security.
2. Develop inclusive policies and governance frameworks for agriculture.
3. Increase investment in agricultural research and development.
4. Improve infrastructure for efficient food distribution.
5. Enhance access to financial resources for small-scale farmers.
6. Prioritise climate change adaptation in the agricultural sector.
7. Invest in education and training programsmes for agriculture.
8. Strengthen regional and international cooperation for knowledge-sharing

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