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Understanding Food Insecurity Dynamics in Conflict Settings - Stability indicator: Sudan

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Abstract

Sudan, with its vast agricultural potential, faces significant challenges in ensuring food security for its growing population. The country's food production systems are highly dependent on traditional farming methods, rainfall variability, and limited infrastructure, making them vulnerable to climate change and economic instability. Despite possessing fertile lands and substantial water resources, inefficient agricultural practices, political instability, and conflicts have led to food shortages and malnutrition. This paper explores the understanding of food insecurity dynamics in term of conflict, displacement, high food prices and economic decline. It also examines potential strategies to enhance food production systems through sustainable practices, improved irrigation techniques, and policy reforms. Strengthening Sudan's agricultural sector is crucial to achieving long-term food security and economic stability in the region.

Keywords: *food security, agricultural production, sustainable farming in Sudan*

1. Introduction

FAO stated that 'Food security' exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious foods to meet their dietary needs and food preferences for an active and healthy life (Clay E. 2003).This definition reveals the four dimensions of food security, including the physical availability of food, economic and physical access, utilization, and stability of the previous three dimensions over time. Food security remains a major humanitarian concern in multiple contexts. The second Sustainable Development Goal is to end hunger, achieve food security, improve nutrition and promote sustainable agriculture. This requires improving the productivity of small-scale farmers and increasing investments through international collaboration to increase the productive capacity of agriculture in developing countries (UN, 2017). The agricultural sector acts as an engine of growth for the Sudanese economy. It supplies food for the people, avails employment opportunities and provides the industrial sector with raw materials. Sudan is considered as one of the three countries in the world that can contribute in the international food security (Mohamed I. A. W). The economy of the country is highly dependent on the agricultural sector, as

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nearly 65 percent of its population is engaged in agriculture, which is the main supplier of raw material to industries. The agricultural sector, including forestry, livestock and fishery, accounted for 16 percent of the GDP in 2021. About 175 million feddans, equivalent to 73.5 million hectares, are suitable for agriculture. The average annual area shown is approximately 26 million hectares. The country's crop portfolio is quite diversified, including cereals (sorghum, millet, wheat, rice and maize), oil and commercial crops (sesame, groundnuts and sunflowers), commercial crops (cotton, seed melon and sugarcane), fodder crops (alfalfa, fodder sorghum, Sudan-grass and Rhodes grass), pulses (broad beans and pigeon peas) and horticultural crops (okra, onions, potato, carrots, eggplant, tomatoes, citrus, mango, etc.). Moreover, the country land is suitable for animal husbandry, with an estimated total livestock population in 2022 slightly above 111 million heads of cattle, sheep, goats, camels and others, mainly depending on natural grazing areas for feed and from hafirs,2 rivers, seasonal streams and bore wells for water (FAO, 2023).

Crop production Systems

In Sudan crop production system is practiced according to the following patterns:

Irrigated agricultural system:

The water supply for irrigation is from rivers and their tributaries, seasonal revers, bore wells and underground water. According to the water sources the irrigation systems ranged from Gravity irrigation, through pump irrigation, to Center-pivots systems AS follow:

1. Gravity irrigation schemes are Gezira and Managil, Suki, New-Halfa, and Rahad.
    - Gezira, and Suki are irrigated from the Blue Nile, water for Gezira is stored in Roseries and in Sennar dams. From Sennar dam water is conveyed to Gezira via two main carrier canals, while Suki water is lifted by pumps.
    - Rahad is mainly irrigated from the Blue Nile where water is lifted by pumps and conveyed through 80 km carrier canal to Au-Rakham dam where it joins the seasonal river Rahad.
    - The Water source for New-Halfa scheme is supplied by Sateit and Atbara revers, as they are seasonal revers the water is stored in Khasm-Algirba dam and conveyed to the scheme land via currier canal.
2. The sugar industries are Kenana, Sennar, White Nile, Al-Gunaid and Halfa. Kenana and White Nile are irrigated from the White Nile, Sennar and Al-Gunaid from the Blue Nile, while Halfa from Girba dam. Except Halfa, all water for other sugre cane farms is lifted by pumps to attain a positive head command.
3. Flood irrigation systems: mainly Gash and Tokar schemes, using seasonal floodwater from Gash and Tokar Creeks. That, beside small, scattered farms along the banks of the River Nile and its tributaries.
4. Center-pivot irrigation system: they are in west Omdurman, River Nile and North states. Water source is from subterranean wells or the River-Nile.

Main crops grown under the different irrigation systems include cotton, sugarcane, sorghum, ground nuts, wheat, legumes, fruits, vegetables, and forage crops. The sector

contributes 100 % of wheat sugar cane, and forages, 52 % of ground nuts, and 25 % of sorghum. On average, the irrigation sector accounts for about 64 % of the total crop contribution to GDP (Abdalla & Abdel Nur, 2001).
Irrigated agriculture plays a significant role in adoption of agricultural mechanization and production, especially under sugar cane farming and for crops under center pivot irrigation. The consistent practiced mechanized operations under sugarcane and center pivot farming are land preparation, planting, spraying, and fertilizer application and harvesting. For the other systems mechanization is restricted to land preparation and wheat harvesting while others are still somehow carried out manually (Awadalla et al., 2019)

Mechanized rain-fed agricultural system

Mechanized rain-fed farming depends completely on rainfall. It's practiced over a broad belt of about eight million ha, running mainly through the states of Gadaref, Blue Nile, Sennar, White Nile, and South Kordofan, and receives annual rainfall ranges between 350 to more than 600 mm. Mechanized farming accounts for about 65 % of sorghum, 53 % of sesame, 5 % of millet, and almost 100 % of sunflower. On average, mechanized rainfed agriculture accounts for about 18 % of crops' contribution to GDP. The level of mechanization in this farming system, depends on the use of the Wide Level Disk soil preparation, seeding for almost all crops. Seeding with precision planters is common in big farms as well as inter-row cultivation, chemical weed control using self-propelled, tractor-trailed, tractor-mounted, knap-sack sprayers and hand weeding. With considerable decline trend on manual weeding. Level of harvesting for sorghum and millet ranges from direct combine harvesting of sunflower, partial for sorghum and millet, as sorghum and millet are normally cut and collected manually and stationary thrashed. Sesame is cut by a cutter-binder or reaper and threshed by hand. Until the early 2000th Sorghum was a commonly grown crop, accounting for about 80 percent of the total area. By now, sorghum area is declining in favor of rain fed cotton, seed-melon and sesame.
Farms in the mechanized rain fed system under Gedarif state are either 420 ha (1000 feddans), or 630 ha (1500 feddans). per farm. (Table to more than.
Crop yield in this sector depends on the onset, amount, intercity, frequency, distribution and span of the rain period or duration of the growing season (Abdalla & Abdel Nur, 2001; FAO, 2022).

Traditional rain-fed farming system

Traditional rain-fed farming covers about 9 million ha and employs most farmers. The sector is characterized by small family units farming 2 to 50 ha for both income and self-consumption. The agricultural practices are conducted manually or by animals' power. Only larger units are mechanized for land preparation, but the other farm work is conducted manually. Traditional rain-fed farming is prevalent mainly in the western parts of the country, the Greater Darfur region, and most of the Greater Kordofan region, where the main crop.

Problem statement

Since the outbreak of the fighting in Sudan in April 2023, the center, south, and west of the country have seen widespread conflict, violence against civilians, and mass displacement. The international efforts to secure a ceasefire have failed and active fighting is ongoing in Al Jazirah, Darfur, Khartoum, North Kordofan, South Kordofan and Sennar, driving significant displacement and pushing more people into food insecurity. Individuals and families are forced to move to other states in search of safety and resources, thereby contributing to an overall increase in food-insecure populations

across the country. The most affected groups are the newly displaced and the protracted IDPs and refugees, host communities and people stranded in areas affected by direct fighting. The large presence of IDPs also exacerbates civil unrest due to the limited resources available for an increasing demand for essential goods and services. During the lean season, most households rely on markets for accessing food. Physical access has been significantly hampered by conflict. A recent proliferation of community checkpoints across many areas of Sudan has been reported and significant administrative obstacles to the movement humanitarian goods and personnel continue. In addition, markets have been directly targeted by bombing and shelling. The ongoing conflict is expected to further constrain food supply chains, while the purchasing power of IDPs is projected to decline further. In areas forecasted to experience Famine conditions, the healthcare system has largely collapsed an access to sanitation and hygiene services is critically undermined.

Research Objectives:

The main objective of this research is to explore understanding food insecurity dynamics in conflict settings -stability indicator: Sudan. Specific objectives are;

1. Analyzing the trends of cereal crops production (thousand tons) and productivity (kg/feddan) over time (2012–2023).
2. Assess the cereal production, yield and area dynamics
3. Review and summarize the scientific research published outcomes of food security situation during the conflict (2023-2025).
4. Develop evidence-based policy recommendations for food security interventions.

Materials and Methods

This study depends mainly on secondary data that were collected from the FAO Statistics Data Base during the period from 2012-2023. The information considered for this study included the production (ton), area harvested (ha), and yield (kg/ha). Descriptive statistics such as percentages, cumulative annual growth rates and trends were used and reviewing existing literature from different formal or informal institutions and national, international institutions during the conflict to achieve the study objectives.

The study will use the following formula.

Indicators were further examined in the following sections.

Cereal Import Dependency Ratio

The CIDR displays the percentage contribution of domestic production and the quantity of imports to the overall available food supply of cereals in the country (FAO, 2022a). The Cereals Dependency Ratio (CIDR) is determined using the following formula:

2.1 $$\text{CIDR} = \frac{\text{Cereal Imports} - \text{Cereal Exports}}{\text{Cereal production} + \text{Cereal Imports} - \text{Cereal Exports}} \times 100 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

2. 2) Total Δ Production:

$$\text{Total } \Delta \text{ Production} = \frac{\text{final production} - \text{initial production}}{\text{initial production}} \times 10 \ldots (2)$$

2. 3) Avg Annual Growth Rate:

$$\text{Avg Anual growth rate} = \left[\left(\left(\frac{\text{final production}}{\text{initial production}}\right)^{\frac{1}{n}} - 1\right) \times 100\right] \ldots\ldots\ldots\ldots (3)$$

where n=number of years

2.4) % Contribution from Yield vs. Area Decomposition Formulas

$$\%\text{Yield contribution} = \left[\frac{(\Delta\text{Yield} \times \text{Avg Area})}{\Delta \text{ Production}}\right] \times 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

2.5) $$\%\text{Area contribution} = \left[\frac{(\Delta\text{Area} \times \text{Avg Yield})}{\Delta \text{ Production}}\right] \times 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Results and discussion

The cereal imports dependency ratio

The cereal imports dependency ratio, which is a three-year indicator and shows how dependent a country is on cereal imports, is one of the indicators of FAO stability indicators of food security (Babych M, Kovalenko A. (2018)). Cereals, which play both a quantitative and important role in the human food basket and a qualitatively key role in the general health of society, must be guaranteed access to people at all times and places. With these interpretations, the need to import cereals from abroad has a positive role in maintaining the stability of food security of countries, and in contrast, dependence on grain imports from abroad challenges the stability of food security of countries. Fig 3.1 Indicate that in 2013, the cereal import dependency ratio of Sudan was 42.4%, which has decreased to 28.2% in 2022.The trend of cereal imports in Sudan will continue in the coming years because the conflict has severely curtailed agricultural production and inflicted damage on crucial infrastructure and livelihoods. The 2024 Crop and Food Supply Assessment Report on Sudan highlights significant declines in cereal production, particularly in the greater Kordofan and Darfur regions, where

conflict is most intense. Cereal output in these areas has plummeted to as much as 80% below average, with West Darfur state experiencing a complete failure of the crop season because widespread insecurity has prevented farmers from accessing their fields (FAO, 20/03/2024). The emergence of plant pests and diseases, including a desert locust outbreak in northern Sudan, poses a significant threat. The conflict has restricted farmland access, hindered livestock movement, and destroyed critical infrastructure, disrupting the production of staple grains such as sorghum and millet. Frequent violent clashes in Sudan's economic center, Khartoum, have brought the majority of the country's Agri-processing operations to a standstill, as these activities (agri-food processing and food manufacturing) are concentrated in this area (IFPRI 15/12/2023).

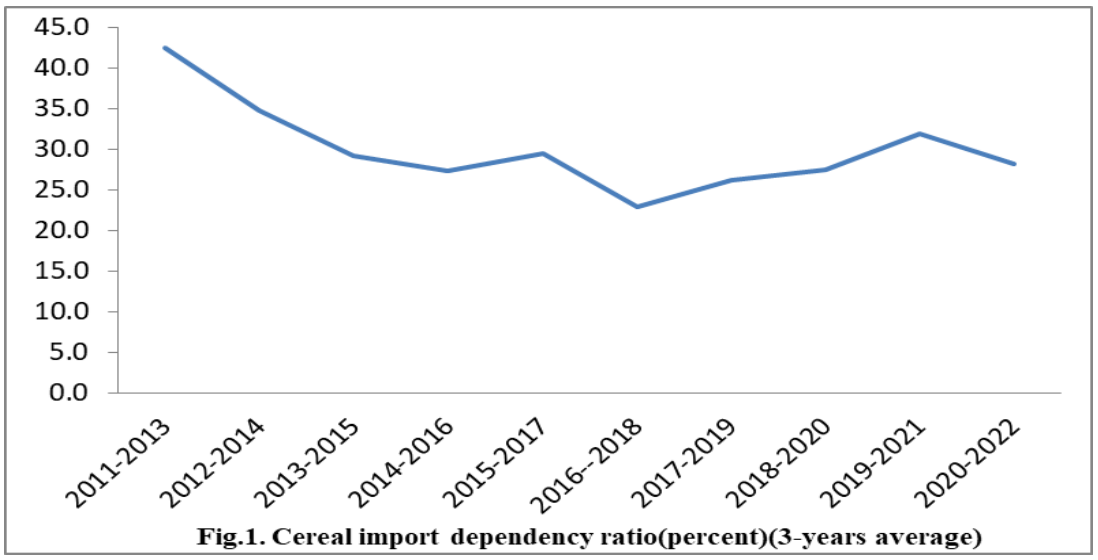

Fig.1. Cereal import dependency ratio(percent)(3-years average)

Data Source: FAOSTAT

Comprehensive analysis of cereal crops in Sudan (2012-2023)

This analysis examines trends in cultivated area, yield, and production for Sudan's key cereals: millet, sorghum, wheat, rice, and maize, revealing critical insights into the country's agricultural strengths and vulnerabilities. Sorghum dominates as Sudan's staple crop, with an average annual cultivation area of 6.77 million hectares (triple that of millet) and production averaging 4.2 million tons, peaking at 6.47 million tons in 2016 due to expansive planting (9.16 million ha) and improved yields. However, sorghum yields declined sharply to 0.51 ton/ha by 2021, likely impacted by drought or pest pressures Fig, 3.1 and table 3.1

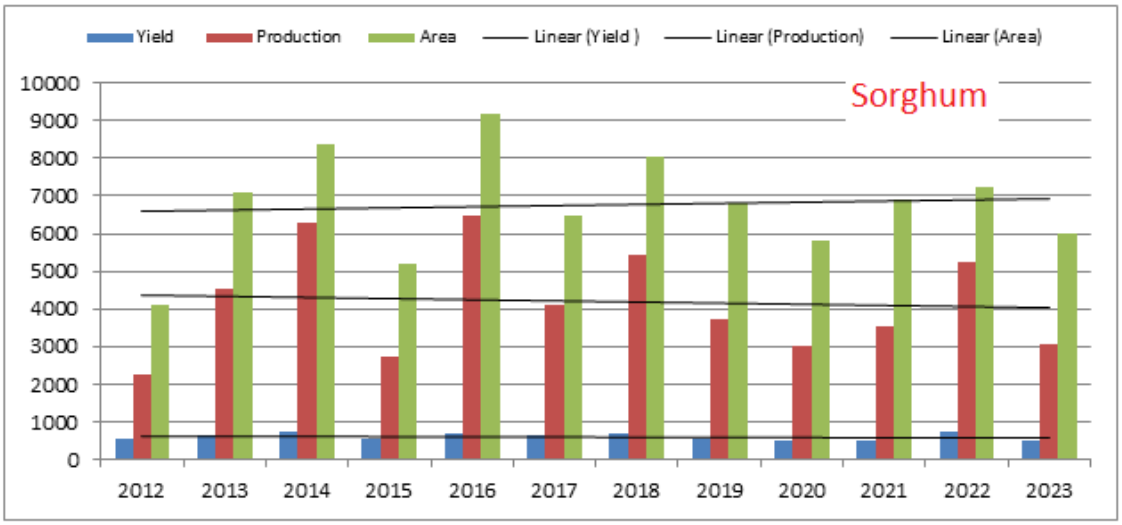

Fig.3.3 Sorghum production (000tons), yield (kg/ fed) and area (thousand hectare) trends (2012–2023)

Millet, while secondary in scale, exhibits extreme volatility, with cultivated area swinging between 1.3 and 3.77 million hectares and yields plummeting to a record low of 0.23 ton/ha in 2023, which may be attributed partially to armed conflict, causing production to collapse to 684,000 tons despite earlier peaks like 2.65 million tons in 2018.

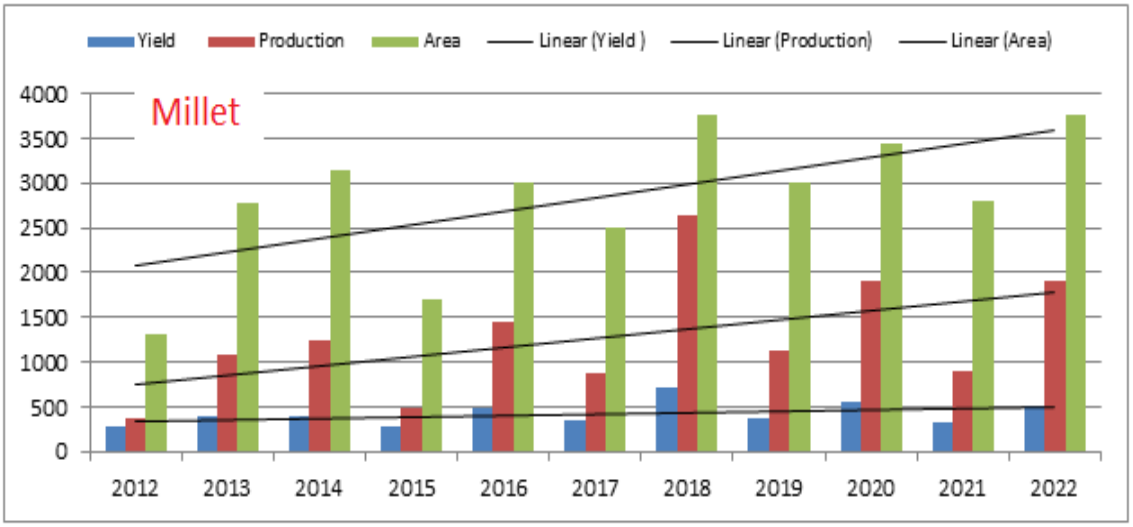

Fig.3.3 Millet production (000tons), yield (kg/ fed) and area (thousand hectare) trends (2012–2023)

Wheat stands out for its high average yield (2.23 ton/ha, the highest among cereals), though limited cultivation (~241,000 ha) restricts its output, despite a notable yield spike in 2015 (3.44 ton/ha) from improved practices fig 3.2 and table 3.1. Fig.3.3 Millet production (000tons), yield (kg/ fed) and area (thousand hectare) trends (2012–2023)

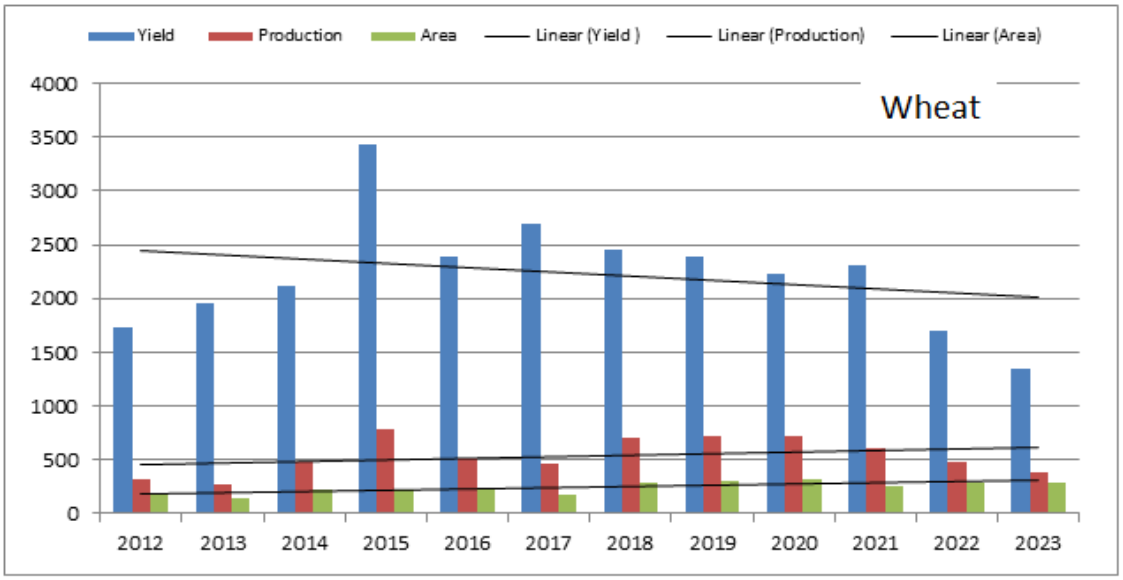

Fig.3.3 Sorghum production (000tons), yield (kg/ fed) and area (thousand hectare) trends (2012–2023)

Rice, though positioned with a tiny average area (~9,260 ha), achieves remarkable yields (4.44 tons/ha), signaling untapped potential for food security if irrigation infrastructure expands.

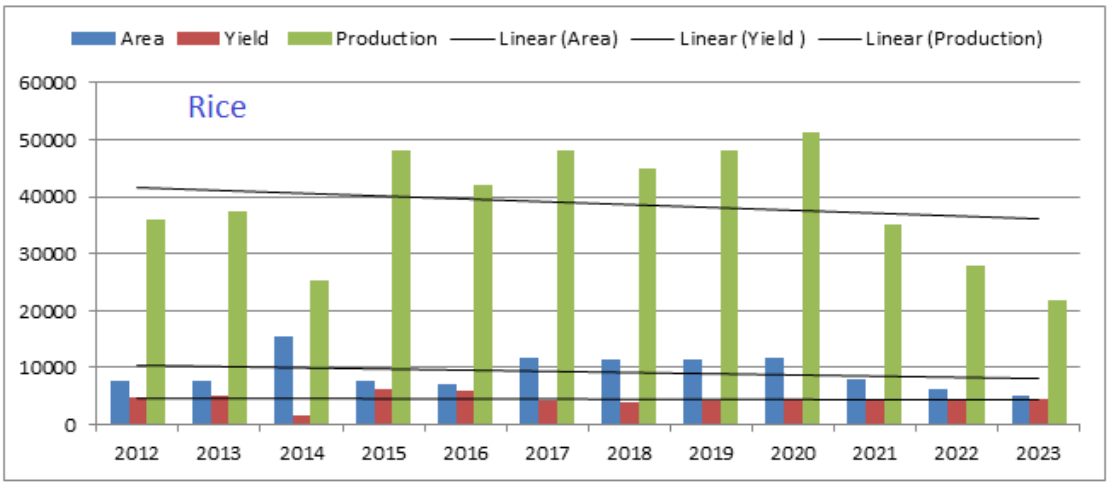

Fig.3.4 Rice production (ton) trends, yield (kg/ha) vs. area (thousand ha) Contributions (2012–2023)

Maize, however, faces severe challenges, including a catastrophic yield drop to 0.07 ton/ha in 2020. Collectively, Sudan's cereal sector remains heavily reliant on rain-fed sorghum and millet, leaving it vulnerable to climate shocks, while underutilized opportunities in wheat and rice, coupled with systemic issues in maize, highlight urgent needs for resilience-building and investment.

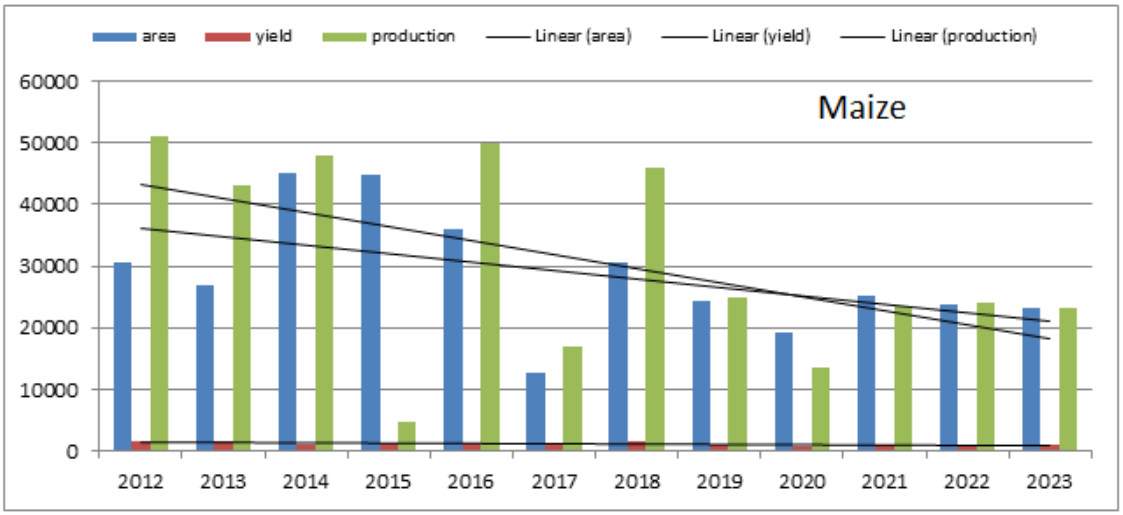

Fig.3.3 Sorghum production (000tons), yield (kg/ fed) and area (thousand hectare) trends (2012–2023)

Table 3.1 Cereals Crops: Comparative Insights

Crop	Avg. Area (ha)	Avg. Yield (ton/ha)	Avg. Production (ton)
Sorghum	6,767,186	0.607	4,197,219
Millet	2,852,237	0.407	1,226,083
Wheat	241,097	2.229	535,098
Rice	9,260	4.444	38,823
Maize	28,598	1.152	30,771

Analysis of Cereal Production Trends in Sudan (2012–2023)

Wheat experienced a modest 16.7% increase in total production, driven overwhelmingly by area expansion (+382.6% contribution), which offset severe yield losses (-169.5%). Despite an annual growth rate of +1.3%, this reliance on cultivating more land rather than improving productivity highlights unsustainable practices, as yield declines likely reflect climate stress or outdated farming techniques.

Sorghum, Sudan's staple crop, saw a 35.8% rise in production, with area expansion (+142%) compensating for yield declines (-31.7%). Its +2.6% annual growth underscores its resilience, though persistent yield stagnation threatens long-term food

security, pointing to inefficiencies in pest management, soil health, or water access and scarcity.

Millet recorded the sharpest production surge (+81.0%), fueled by aggressive area expansion (+222.1%), which masked alarming yield collapses (-55.9%). The +5.1% annual growth rate reveals a paradox: while farmers expanded cultivation, productivity per hectare deteriorated drastically, likely due to climate volatility (e.g., droughts) degrading marginal lands. Rice suffered a 39.2% production collapse, driven by area reduction (-81.1%) and yield declines (-24.3%). Annual production fell by -4.1%, reflecting systemic challenges such as shrinking irrigation access, soil salinity, or shifting priorities toward less water-intensive crops. Maize faced the most severe decline (-54.4%), with yield losses (-68.4%) as the primary culprit, exacerbated by area contraction (-30.7%). The -6.3% annual drop signals catastrophic issues, including pest outbreaks, disease, or data inconsistencies, undermining its viability as a reliable crop.

Key Implications

Sudan's heavy reliance on expanding cultivated land for wheat, sorghum, and millet is unsustainable in the face of escalating climate change and land degradation, compounding long-term risks to food security. Persistent stagnation or decline across nearly all crops underscores an urgent need for investments in climate-resilient seeds, modern irrigation systems, and farmer capacity-building programs to enhance productivity. The severe production crises in rice and maize, driven by water mismanagement and pest vulnerabilities, demand targeted solutions to address these systemic weaknesses. Without shifting focus from land extensification to sustainable yield improvements, Sudan's agricultural growth model threatens to collapse, jeopardizing both economic stability and food sovereignty.

Table 3.2 Summary of Wheat, Sorghum, Millet, Maize and Rice Production Trends, Yield vs. Area Contributions (2012–2023).

Crop	Δ Total Production	Avg. Annual Growth Rate	% Contribution from Yield	% Contribution from Area	Key Driver
Wheat	+16.7%	+1.3%	-169.5%	+382.6%	Yield loss +Area gains
Sorghum	+35.8%	+2.6%	-31.7%	+142%	Yield loss +Area gains
Millet	+81.0%	+5.1%	-55.9%	+222.1%	Yield loss +Area gains
Rice	-39.2%	-4.1%	-24.3%	-81.1%	Yield loss + Area collapse
Maize	-54.37	-6.3	-68.4	-30.72	Yield loss+ Area collapse

Cereal supply/demand balance (January–December 2024)

Table 3.3 indicates that the national cereal availability production in 2024 is estimated at 4.43 million tons, 43 percent lower than the total cereal utilization which is estimated at 7.8 million tons. The estimated cereal import requirements are 3.38 million tons, which represent 43 percent of the total cereal utilization.

Table 3.3 The Sudan – National cereal supply/demand balance, January–December 2024 (‘000 **tones)**

	Sorghum	**Millet**	**Maize**	**Wheat**	**Rice**	**Total**
Availability	3 329.14	683.54	6.00	387.90	22.15	**4 428.73**
Production	**3 054.79**	683.54	6.00	377.90	22.15	4 144.38
Opening stocks (SRCo)	48.35	0.00	0.00	10.00	0.00	58.35
Opening stocks (private)	226.00	0.00	0.00	0.00	0.00	226.00
Total utilization	3 990.78	835.90	49.43	2 830.84	97.82	**7 804.78**
Food use	3 614.30	771.05	48.19	2 795.06	96.38	7 324.99
Feed use	152.74	13.67	0.00	0.00	0.00	166.41
Seed requirements	71.00	17.00	1.00	32.00	1.00	122.00
Post-harvest losses and other uses	152.74	34.18	0.24	3.78	0.44	191.38
Estimated import requirements	661.64	152.36	43.43	2 442.94	75.67	**3 376.04**

Source: Authors’ own elaboration based on the data collected during the 2023 FAO Crop and Food Supply Assessment Mission (CFSAM) to the Republic of the Sudan, 2024

Food Insecurity

Before the conflict (2022): In 2022, a considerable portion of Sudanese households were relatively food secure—more than 70 percent of rural households in West Darfur were food secure, while the estimate from the 2022 SLMPS was that all rural households in River Nile were food secure. Even in more vulnerable states, many households were food secure in 2022—in Blue Nile, over one-third of rural households were food secure. Urban households showed somewhat higher levels of food security than did rural households—54 percent were food secure in 2022, compared to 46 percent of rural households. However, even before the start of the conflict, some states faced substantial challenges—severe food insecurity affected over 70 percent of rural households in West Kordofan and 59 percent in Gedaref in 2020 (Oliver, *et al*.,2024).During the conflict (2023 through late 2024): Following the conflict's outbreak, there was a significant adverse shift in food security dynamics.It has been estimated by the Integrated Food Security Phase Classification Technical Working Group (IPC TWG) currently about twenty five million of the Sudan population are expected to undergo heights of severe food insecurity until May 2025. As shown in Figure 2, about eight million people will be subjected to a Crisis stage (IPC Phase 4) and about six hundred thousand to a Tragedy stage (IPC Phase 5).

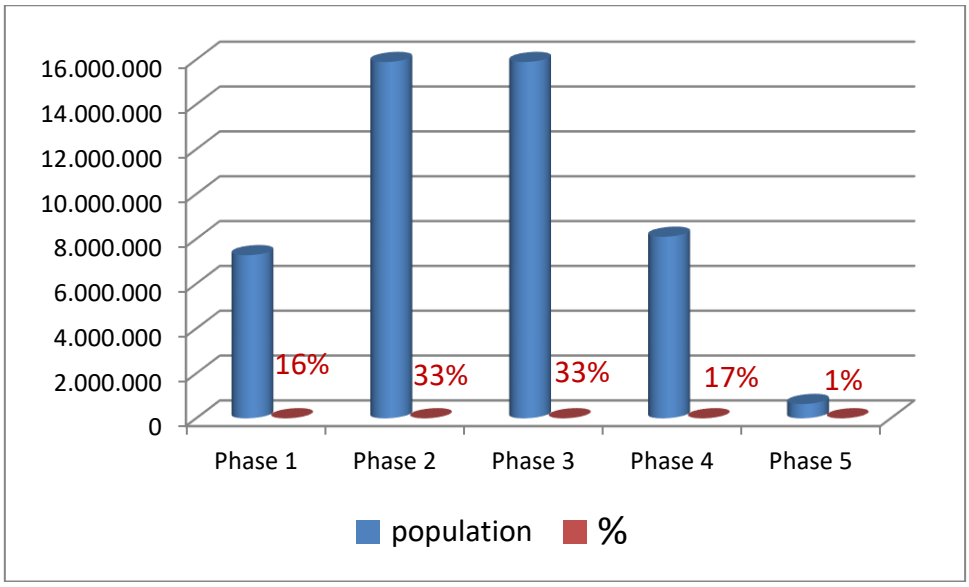

Fig 2. Projected Food Insecurity of Sudan (December 2024-May2025)

Source: Author compilation based on IPC 2024.Sudan: Acute Food Insecurity Snapshot-Oct.24-Feb.'25)

High Hunger Regions

Table 2 provides a detailed breakdown of affected populations across 15 out of 18 states: East Darfur, North Darfur, West Darfur, Central Darfur, South Darfur, North Kordofan, West Kordofan, South Kordofan, Khartoum, Al Jazira, Kassala, Sennar, Northern, River Nile and Red Sea state. This selection was based on the severity of the impacts of the ongoing conflict and the likelihood of a deviation from the assumptions made in the previous IPC analysis.

Food Insecurity Intensity

The intensity levels of the food insecurity in the Sudan eighteen states varies from one state to another due to the ongoing conflict as shown in Table 2. The indirect-affected states such as Northern, Red Sea, River Nile and Gedarif states, have the lowest percent of hunger stages (above the IPC phase 3) respectively as 8, 4, 2 and 2. On the hand, the North Dar Fur, Al-Gezira and Khartoum the direct-affected states have the highest percent of hunger stages as indicated respectively in Table 2 by 37, 30 and 28.

Table 2: Food Insecurity Intensity for Sudan war-affected and non-affected States from October 2024 to February 2025

State	Population	Mild stage (IPC Phase 3) %	Crisis stage (IPC Phase 4) %	Tragedy stage (IPC Phase 5) %	Hunger Stages (>IPC Phase 3) %
Al-Gezira	5,439,140	38	29	1	30
Blue Nile	1,470,448	35	11	0	11
Central Dar Fur	1,998,753	33	21	0	21
East Dar Fur	1,772,902	38	10	0	10
Kasala	3,035,321	32	12	0	12
Khartoum	5,190,110	34	26	2	28
North Dar Fur	2,770,811	33	29	8	37
North Kordfan	2,300,592	26	15	0	15
Sennar	2,676,891	44	19	0	19
South Darfur	3,661,757	35	22	1	23
South Kordofan	2,098,395	36	16	3	19
West Darfur	1,301,489	33	23	2	25
West Kordofan	1,823,319	33	16	3	19
White Nile	3,233,255	34	11	0	11
Northern	1,430,815	24	8	0	8
Red Sea	1,809,643	23	4	0	4
River Nile	2,368,732	23	2	0	2
Gedarif	3,146,052	27	2	0	2
Total	47,528,425	32.3	15.3	1.1	16.4

Source: Author compilation based on IPC 2024.Sudan: Acute Food Insecurity Snapshot-Oct. 2024-Feb. 2025)

Economic Problems

Sudan's economy, public revenues and its national currency are severely affected by the ongoing conflict since April 2023. Most of the country valuable exports such as gold, meat, Arabic gum, onions, sesame and other agricultural products are stopped (Reuters 12/05/2023). In 2023, gold export declined by 80% compared to the year 2022 resulted in diminishing the foreign exchange supply along with the international reserves of the Central bank. Consequently, the demands for the essential goods (food, medicine and fuel) ceased. Moreover, destruction of the main infrastructure of the country aggravated the strain situation by halting the goods movement via the major air and sea cargo (UNICEF 15/12/2023). Due to displacement of farmers and poor harvest, principal grains prices are anticipated to increase by 200% compared to the date before of the conflict resume (WFP accessed 02/07/2024; Siddig et al. 28/08/2023; WFP

15/04/2024). Sudan's inflation surged up to 145.5% in April 2024 as designated by the IMF data, leading into an annual percentage change of 114.6% (IMF accessed 30/07/2024). Prices of the main commodities in the country substantially hiked by 130-296% in Al Fasher, Al_Gezira and Khartoum compared to five-year average in May 2025 (IPC 27/06/2024). These prices remain extremely high due to security risks and high cost of transportation (FEWS NET 13/06/2024). The Sudan Chamber of Commerce and Industry indicates about 24 million of the Sudan's population are unemployed; moreover, due to war that more than 1.8 million workers and employees exiled from their jobs (The EastAfrican 08/03/2024; Radio Tamazuj 22/05/2024).

Food Availability

It was designated food availability in Sudan is highly possible to be severely troubled by the influences of the ongoing war (IFPRI 01/07/2024). Food production and trade in the country are anticipated to continue being disturbed by the economic repercussions and the conflict related disturbances. Darfur, Kordofan and Khartoum considered as the main trade centers of the country will endure facing markets collapses, augmented inflation and reduced food production. Consequently in these zones, food shortage will aggravate and commodity prices drive up. Lack controlling of pest and plant diseases during the rainy season (July to September), negatively will impact agricultural productivity (IPC 27/06/2024). Moreover, flooding during the rainy season affect the transport and its infrastructure, which then may deteriorate food availability concerns in the conflict zones.

Malnutrition

Deterioration of food availability in the conflict zones directly impact the nutrition and health of the children. The UNICIF stated that in 2024 nearly four million of the Sudanese children were harshly malnourished and about 730000 experienced undernourishment (UNICEF 22/05/2024). Furthermore, during the rainy season, occurrence of waterborne diseases such malaria and cholera intricate the significance of malnutrition issues in country (KII 29/07/2024). Malnutrition in the war affected zones such as Central Darfur has 15.6% acute severely malnourished children and this percentage is expected to increase with ongoing conflict (WHO 30/05/2024; IPC 27/06/2024). Malnutrition of a region is critical when 15.6%-29.9% of its children are severely malnourished (IPC accessed 29/07/2024). Malnutrition has negative impacts on children, such as slowing growth, education disturbances and high mortality (WVI 27/06/2024).

Food shortage

Reducing meal portions and limiting number of daily meals are anticipated to undergo in most of the conflict zones in Sudan as stated by IFPRI/WFP 20/06/2024. Moreover, many displaced Sudanese are predicted in facing problems in planting crops or safeguarding food. This situation is leading to additional food insecurity and dependence on aids (Nutrition Cluster 06/05/2024). Lack of services such as water and electricity in the rural regions are expected to continue; therefore, this leading to high levels of food insecurity (IFPRI 12/04/2024).

Conclusions and Recommendations

The ongoing conflict in Sudan has driven food insecurity to unprecedented levels, with rural households and vulnerable populations, currently about twenty five million of the Sudan population are expected to undergo heights of severe food insecurity until May 2025, about eight million people will be subjected to a Crisis stage (IPC Phase 4) and about six hundred thousand to a Tragedy stage (IPC Phase 5)

The intensity levels of the food insecurity in the Sudan eighteen states vary from one state to another due to the ongoing conflict. The indirect-affected states such as Northern, Red Sea, River Nile and Gedarif states, have the lowest percent of hunger stages (above the IPC phase 3). On the hand, the North Dar Fur, Al-Gezira and Khartoum the direct-affected states have the highest percent of hunger stages.

Based on the analysis, the following policy recommendations are proposed:

• Emergency food assistance and strengthening coordination of humanitarian assistance: Humanitarian actors must scale up emergency food assistance, focusing on conflict-affected regions, including Darfur and Kordofan regions and Blue Nile, Khartoum, Aj Jazirah, and Sennar states, all areas where food insecurity is most acute.

Ensuring food access for displaced populations and those in hard-to-reach areas should be a top priority. To tackle the food security crisis at the appropriate scale, greater coordination among international donors, local governments, and humanitarian organizations is needed. Securing adequate funding to meet the requirements of the humanitarian response plan that has been developed for Sudan is particularly urgent, as it remains significantly underfunded despite escalating needs.

•Support for agricultural production: The disruption of agricultural activities due to the conflict calls for urgent support for farmers. Providing inputs such as seeds, fertilizers, and tools is critical. Where possible, secure access agricultural corridors should be established to enable farmers to cultivate their land and resume production safely.

• Improving market access: Restoring supply chains and enhancing market access will be essential to stabilizing food availability. Investing in infrastructure, such as roads and storage facilities, will strengthen food syste s' resilience and facilitate food distribution in areas where the conflict has disrupted access.

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