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# Food Security and Social Assistance in Sudan During Armed Conflict

## Evidence from the first round of the Sudan Rural Household Survey (November 2023–January 2024)

A joint report by the International Food Policy Research Institute (IFPRI) and the World Food Programme (WFP)

# EXECUTIVE SUMMARY

The conflict in Sudan has severely impacted the food security landscape in rural areas, with profound implications for household diets, coping strategies, and overall food insecurity levels. Data from a national rural household phone survey conducted between October 2023 and January 2024 highlights the dire food consumption patterns, the prevalence of food insecurity, and the reliance on reduced coping strategies among the rural population of Sudan.[1]

As of the end of 2023, nearly 40 percent of rural households were consuming inadequate diets, with West Kordofan, South Kordofan, North Darfur, East Darfur, and Sennar states experiencing the highest prevalence of poor food consumption (34, 33, 29 and 24 percent, respectively). The primary components of diets were cereals and oils, with nutrient-rich foods, such as meats and fruits, consumed less frequently, highlighting a critical gap in nutritional adequacy.

The situation has resulted in households across Sudan resorting to a range of coping strategies to try to meet their food needs, such as buying less preferred or less expensive food (on average 4 days out of 7), limiting portion sizes, or reducing the number of daily meals. The five coping mechanisms that were examined in the analysis were found to be implemented with approximately similar frequencies across rural Sudan. However, the situation was particularly dire in West Darfur, South Kordofan, and Khartoum, the states recording the highest prevalence of consumption of inadequate diets and the highest reduced Coping Strategy Index (rCSI) scores.

Fifty-six percent of rural households in Sudan were severely food insecure at the time of the survey, based on the Household Food Insecurity Experience Scale. The highest incidences of food insecure households were reported in West Kordofan, South Kordofan, and Blue Nile. Most households reported that they only had sufficient resources (savings and stocks) to meet their immediate food needs for less than one week. The highest prevalences of households with limited savings and stocks to meet their food needs were recorded in states in Darfur, followed by Blue Nile and South Kordofan.

Food emerges as the primary concern for approximately 60 percent of households across rural Sudan. Households in the states in the Darfur and Kordofan regions were the most likely to highlight food as their primary concern. The second most reported need was security. This need was commonly reported by households in Khartoum, North Darfur, and West Kordofan, all areas affected significantly by active conflict. There was also a widespread concern about access to healthcare—11 percent of households reported it as their most important need.

Even before the conflict, many Sudanese were acutely food insecure, and the World Food Programme (WFP) was a significant part of the humanitarian assistance they received. However, the ongoing conflict is significantly affecting WFP's ability to deliver humanitarian assistance, impacting those households who rely on it. Of those who were receiving WFP assistance before the conflict, most reported that assistance had since been disrupted. Notably, 95 percent of households in North Darfur reported a drop in the assistance they are

[1] The survey was only conducted among rural households, while the conflict in Sudan has affected urban areas most severely. In addition, the survey was conducted at the end of 2023 following the main harvest. Food insecurity has deteriorated further since the data was collected.

receiving. Insecurity and conflict prevented WFP from reaching beneficiary households in North Darfur at the time of the survey.

Both parties to the conflict in Sudan must allow for access to humanitarian assistance across all areas of Sudan to ensure that the already severe food insecurity affecting rural households does not deteriorate further. The Integrated Food Security Phase Classification (IPC) assessment for Sudan of March 2024 warned that catastrophic outcomes are possible in areas particularly affected by the conflict where there is no or little humanitarian access.

WFP and other organizations play a pivotal role in helping rural households across Sudan meet their food needs through humanitarian assistance. However, the findings from the survey clearly show that a more comprehensive approach to addressing both the immediate and underlying factors contributing to food insecurity in Sudan is required. The situation necessitates enhanced collaborative efforts to not only meet immediate food needs but also to tackle the broader challenges posed by the conflict, aiming to improve the resilience and overall well-being of the affected communities.

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# 1) INTRODUCTION

The conflict in Sudan, primarily between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF), has escalated into a significant crisis, impacting the nation's stability and security and worsening humanitarian conditions. The conflict has severely impacted the food security landscape, with profound implications for household diets, coping strategies, and overall food insecurity levels.

Prior to the escalation of the current conflict, Sudan's food security situation was already precarious, influenced by a combination of factors, including deteriorating macroeconomic conditions, economic sanctions, fluctuating agricultural production, and climate-related challenges, such as droughts and floods (Alhelo, Siddig and Kirui 2023, Salih 2016, Abdalla 2018). Despite part of the country having abundant arable land and water resources, Sudan struggled with underinvestment in agriculture, inadequate infrastructure, and a reliance on food imports. These conditions, coupled with high inflation rates and a devaluating currency, made food access increasingly difficult for a significant portion of the population. However, localized conflicts in the Darfur and Kordofan regions and Blue Nile state had already laid the groundwork for food insecurity by affecting agricultural activities and displacing communities, thereby exacerbating the vulnerability of certain regions to food insecurity.

The food security situation in Sudan is the result of a complex interplay of factors that the ongoing conflict has exacerbated. The conflict between SAF and RSF has led to mass displacement, creating large populations of internally displaced persons (IDPs)—6.6 million people are estimated to have been displaced internally since the start of the conflict through April 2024. Sudan's agricultural sector, the backbone of the economy, has suffered significantly due to the conflict. Insecurity and displacement have prevented farmers from accessing their fields in certain areas, while military operations have led to the destruction of crucial agricultural infrastructure. This is expected to lead to decreased agricultural output and diminished food availability (FAO 2023).

This paper seeks to contribute to the broader discourse on conflict and food security in rural areas through an analysis of Sudan's food security amid the ongoing conflict. It specifically evaluates the food security status utilizing four key indicators—the Food Consumption Score (FCS), the Food Insecurity Experience Scale (FIES), the Reduced Coping Strategy Index (rCSI), and the Household Hunger Scale (HHS). These measures are used to provide a holistic view of the challenges and potential strategies for mitigating food insecurity in Sudan.

The rest of the paper is organized as follows: Section 2 provides the methodology that includes the survey approach and measurements and indicators of food security. Section 3 provides the results of the empirical analysis, describing the food security situation in rural Sudan based on the different indicators and assessing the drivers of food insecurity. Section 4 concludes and provides policy implications and recommendations for addressing food insecurity in conflict-affected areas.

# 2) SURVEY APPROACH AND MEASUREMENT OF FOOD SECURITY

The first round of the Sudan Rural Household Survey in 2023 was conducted against the backdrop of a significant national conflict. The survey aimed to understand the impact of the conflict on the food security of rural households across Sudan. The first round of the panel survey aimed to establish a comprehensive baseline on rural life, economic activities, and food security in Sudan. The choice of a Computer-Assisted Telephone Interview (CATI) methodology for the administration of the survey questionnaire to sample households underscored the adaptability of research methods in crisis conditions, ensuring the collection of data despite the safety challenges posed by the ongoing conflict.

## 2.1 Survey approach and data

The survey's methodological framework was characterized by a rigorous approach to sample size determination and selection, opting for a longitudinal panel study design to trace the evolution of rural households over time. A sample totaling 4,504 households was deemed sufficient for robust analysis of key household variables of interest at both the national and state levels. This sampling strategy was crafted to account for the unpredictability associated with telephone surveys, including factors like inactive numbers in the telephone number databases used for selecting the sample and interruptions to network connectivity. The methodology paper that introduces the Sudan rural household survey provides the logical basis for sample allocation across states, emphasizing the goal of achieving accurate and reliable inferences despite the inherent challenges of data collection in a conflict setting (Kirui, et al. 2024).

A robustly designed questionnaire served as the cornerstone of the survey, covering in its modules an expansive range of themes from demographic information and income sources to food security, market access, and exposure to shocks. The development of the questionnaire was a collaborative effort involving careful translation to reflect local dialects and cultural nuances. The CATI methodology facilitated data collection under constrained conditions, ensuring the survey's success in capturing the multifaceted dimensions of rural livelihoods in Sudan.

The execution of the survey began with comprehensive training for enumerators that focused on the principles of interviewing, ethical standards, and a detailed review of the survey instrument. The training ensured that enumerators were well-prepared to navigate the complexities of data collection, maintaining the integrity and validity of the data. Quality assurance mechanisms were rigorously applied, encompassing both automated checks and manual reviews to uphold the highest standards of data quality.

Conducting research in a conflict-affected setting presented numerous challenges, from logistical hurdles and network instability to ethical dilemmas and translation accuracy. The survey navigated these challenges through innovative solutions and adaptive strategies while committing to ethical research practices, ensuring the protection of respondent privacy and data security. However, phone-based surveys are inherently biased toward better-off households. Thus, while the survey provides insights into the food security situation of rural households at the time of data collection, definitive conclusions cannot be made.

## 2.2 Measures and indicators of food security

The **Food Consumption Score (FCS)** is a composite score reflecting the dietary diversity, food frequency, and nutritional value of food groups consumed by a household over a reference period of seven days. FCS is a widely used indicator to assess food security (WFP 2009). The FCS is calculated based on the frequency of consumption of various food groups, each weighted according to its nutritional value. The food groups typically include cereals and tubers; vegetables; fruits; meat and fish; legumes; milk products; and oils and fats. This method helps in evaluating the adequacy of food consumption in terms of both frequency and quality at the household level. The total score is categorized into thresholds indicating poor, borderline, or acceptable food consumption (Maxwell, Vaitla and Coates 2014, WFP 2009).

The **Food Insecurity Experience Scale (FIES)** is a globally applicable measure developed by the FAO to assess the access dimension of food insecurity. It is an experience-based measure of household or individual food security (ability to obtain food). The FIES survey module consists of eight questions that are designed to capture various degrees of severity in food insecurity based on people's access to adequate food. It collects information on individuals' direct experiences of food insecurity, such as worrying about obtaining food, compromising the quality and quantity of food consumed, and experiencing hunger over the previous 30 days or 12 months. The responses are used to estimate the prevalence of moderate or severe food insecurity in the population. The scale is designed for use at the global, regional, and national levels (Cafiero, Viviani and Nord 2018).

The **reduced Coping Strategy Index (rCSI)** is a consumption-based indicator used to measure the severity and frequency of coping strategies adopted by households facing food shortages over a seven-day recall period. The rCSI involves a set of five questions that ask respondents how often they have resorted to specific coping strategies in the past seven days, such as relying on less preferred or cheaper food, borrowing food, relying on help from friends or relatives, consuming stored food, eating fewer meals in a day, or going to bed hungry. The frequency of each behavior is scored, and the scores are summed to create the index, with higher scores indicating greater food insecurity (Maxwell and Caldwell 2008).

The **Household Hunger Scale (HHS)** is a tool used to measure household food deprivation based on experiences of hunger. The scale is a simplified version of the Food Insecurity and Access Scale (FIAS), focusing specifically on the physical sensation of hunger and its frequency within a household. The HHS consists of three questions that assess the frequency of "no food to eat," "going to bed hungry," and "going a whole day and night without eating" because there is no food. Responses are scored and aggregated to produce a scale ranging from 0 to 6, where higher scores indicate greater hunger levels within the household (Ballard, Kepple and Cafiero 2013).

# 3) LIMITATIONS OF THE SURVEY

This assessment of food insecurity in Sudan is likely to underestimate the current severity of the food crisis. Since the data was collected, the situation in Sudan has continued to deteriorate. The most recent Integrated Food Security Phase Classification (IPC) alert for Sudan, published in March 2024, highlighted a sharp decline in food security and nutrition due to escalating conflict, threatening millions with acute food insecurity and malnutrition (IPC 2024). Several factors suggest that the extent of food insecurity in Sudan might be more severe than currently reported. These include the timing and the design of the survey:

**Temporal bias in data collection:** The CATI data collection period coincided with the harvest of key crops, like sorghum and millet. That the survey was conducted during the harvest season may produce a conservative view of the food security situation, particularly given that it was assessing rural food security dynamics. The data was captured at a time of year when food availability was temporarily higher. That is, the timing may show a particularly positive level of food access, reflective of seasonal changes. Furthermore, conflict-related trade barriers and movement restrictions might temporarily increase local food availability in rural areas, suggesting a lower level of food insecurity that does not account for the broader impact of the ongoing conflict.

**Survey methodology and limitations:** Originally planned as an in-person survey, with the escalation of the conflict in April 2023, the survey design was changed to one based on phone interviews. This change in design likely has resulted in the exclusion from the survey sample of the most vulnerable households in the rural population, since mobile telephone data collection has an inherent bias towards respondents with higher socio-economic status that have access to mobile phones and credit even during a crisis. This shift not only risks overlooking those with greater food insecurity but also biases the data towards households with relatively better resources and food security.

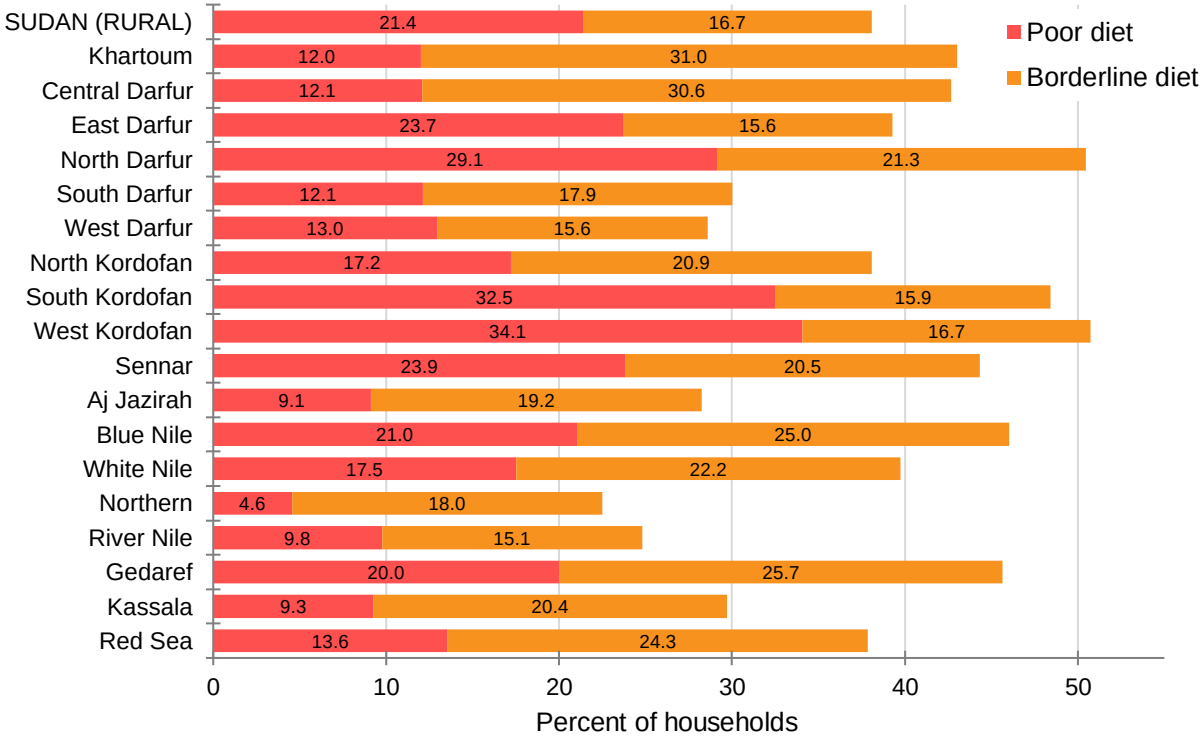
# 4) EMPIRICAL ANALYSIS

## 4.1 Food security situation in rural Sudan

### *4.1.1 Food Consumption Score*

The conflict has affected food consumption across households in rural Sudan. Almost 40 percent of respondents in rural areas were found to be consuming inadequate diets, and more than half of those households consume poor diets (Figure 4.1). States with ongoing active conflict have the highest prevalence of households consuming poor diets—West Kordofan, South Kordofan, North Darfur, and East Darfur.

**Figure 4.1 Food Consumption Score in rural Sudan, by state**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

The diets consumed by rural households in Sudan mainly consist of cereals and oil, both of which, on average, are consumed six days out of seven, and dairy products, which are consumed four days out of seven. Other nutrient-rich foods, such as meat and vegetables (two days per week) and fruit (one day per week) are more rarely consumed.[2] Table 4.1 provide an overview of consumption of food groups by rural households by state.

[2] The low consumption of fruits and vegetables observed is generally in line with their seasonal low availability at the time of data collection.

**Table 4.1 Food groups consumed by rural households, average days in the seven days before the survey the food group was reported consumed, by state**

| STATE | Cereals | Legumes | Dairy | Meat | Vegetables | Fruit | Oil | Sugar |
|---|---|---|---|---|---|---|---|---|
| SUDAN (RURAL) | 6.4 | 3.1 | 3.6 | 2.1 | 2.7 | 1.3 | 5.8 | 4.6 |
| Khartoum | 6.3 | 4.5 | 2.9 | 1.2 | 2.4 | 0.7 | 5.2 | 4.6 |
| Central Darfur | 6.9 | 1.5 | 4.3 | 1.5 | 1.3 | 0.2 | 4.9 | 6.2 |
| East Darfur | 6.8 | 1.9 | 3.6 | 2.0 | 1.6 | 0.6 | 5.5 | 5.2 |
| North Darfur | 6.4 | 1.8 | 3.0 | 1.5 | 1.8 | 0.8 | 5.8 | 4.9 |
| South Darfur | 6.7 | 1.9 | 4.5 | 1.7 | 1.7 | 0.4 | 5.3 | 5.7 |
| West Darfur | 6.8 | 1.7 | 4.6 | 1.8 | 1.4 | 0.2 | 5.0 | 5.8 |
| North Kordofan | 6.5 | 2.7 | 3.4 | 1.7 | 1.7 | 0.6 | 5.6 | 5.0 |
| South Kordofan | 6.3 | 1.9 | 3.0 | 1.6 | 1.7 | 0.5 | 5.2 | 3.8 |
| West Kordofan | 6.5 | 1.8 | 2.8 | 1.7 | 1.4 | 0.7 | 5.9 | 4.1 |
| Sennar | 6.4 | 1.9 | 3.0 | 2.5 | 2.5 | 1.4 | 5.8 | 4.4 |
| Al Jazirah | 6.5 | 3.2 | 4.1 | 2.2 | 3.2 | 1.2 | 5.8 | 4.7 |
| Blue Nile | 6.3 | 2.1 | 2.7 | 2.3 | 2.4 | 1.2 | 5.6 | 4.9 |
| White Nile | 6.6 | 2.7 | 3.3 | 2.0 | 2.4 | 1.0 | 5.9 | 4.5 |
| Northern | 6.2 | 4.7 | 3.9 | 2.1 | 3.3 | 1.9 | 5.8 | 4.7 |
| River Nile | 6.7 | 3.8 | 4.1 | 2.0 | 3.3 | 1.3 | 5.8 | 4.5 |
| Gedaref | 6.4 | 2.1 | 2.6 | 2.3 | 2.2 | 1.3 | 6.1 | 4.1 |
| Kassala | 6.3 | 3.0 | 4.1 | 2.0 | 2.8 | 1.0 | 6.1 | 4.8 |
| Red Sea | 6.1 | 3.3 | 3.9 | 1.6 | 2.2 | 1.3 | 5.1 | 4.2 |

**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

### *4.1.2 Household Food Insecurity Experience Scale (FIES)*

The severity of food insecurity was assessed using the Rasch Model, as outlined in the context of the Food Insecurity Experience Scale (FIES) by Boone (2016). This statistical method, rooted in Item Response Theory models frequently utilized in educational and psychological research (Reise and Revicki 2015), classifies household food security status on a probabilistic scale. The Rasch Model facilitates the comparison of food insecurity rates across different countries by aligning them with a global standard, thereby enabling a standardized measure of food insecurity prevalence internationally. Technical details on the FIES analysis are presented in the Annex to this report.

About 59 percent of rural Sudanese households were experiencing moderate or more severe levels of food insecurity at the end of 2023 (Table 4.2). This high probability highlights the conflict's profound impact on agricultural productivity and household livelihoods, especially in regions traditionally seen as food production sources for urban areas.

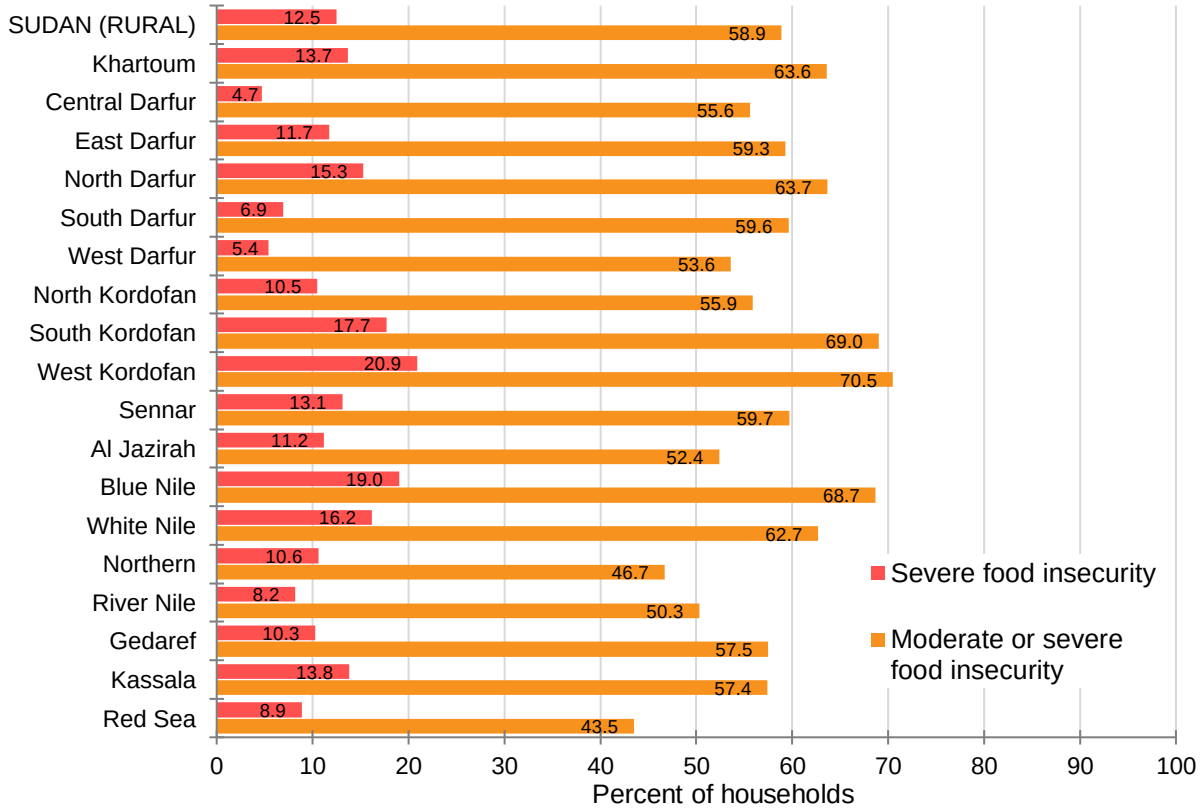
State-level analysis shows widespread severe food insecurity (Figure 4.2). West Kordofan, Blue Nile, South Kordofan, White Nile, North Darfur, Kassala, Khartoum, and Sennar all exhibit rates of severe food insecurity higher than the national average, underscoring how severe and widespread is the food insecurity crisis. Conversely, states like the Red Sea and Northern, which are safer and have better access to markets and humanitarian aid, report the lowest levels of food insecurity. This disparity emphasizes the importance of safety, market accessibility, and humanitarian support in ensuring food security.

## Table 4.2 Household food security status based on raw Food Insecurity Experience Score (FIES) and Rasch Model estimates, by state

| | Food Insecurity Experience Score (FIES) Raw Scores | | Rasch Model | | | |
|---|---|---|---|---|---|---|
| | | | Probability of Moderate or Severe Food Insecurity | | Probability of Severe Food Insecurity | |
| State | Score | Rank (states) | Probability | Rank (states) | Probability | Rank (states) |
| SUDAN (RURAL) | 4.10 | NA | 0.589 | NA | 0.125 | NA |
| Khartoum | 4.39 | 5 | 0.636 | 5 | 0.137 | 7 |
| Central Darfur | 3.83 | 13 | 0.556 | 13 | 0.047 | 18 |
| East Darfur | 4.17 | 7 | 0.593 | 9 | 0.117 | 9 |
| North Darfur | 4.41 | 4 | 0.637 | 4 | 0.153 | 5 |
| South Darfur | 4.03 | 10 | 0.596 | 8 | 0.069 | 16 |
| West Darfur | 3.77 | 14 | 0.536 | 14 | 0.054 | 17 |
| North Kordofan | 3.86 | 12 | 0.559 | 12 | 0.105 | 12 |
| South Kordofan | 4.74 | 3 | 0.690 | 2 | 0.177 | 3 |
| West Kordofan | 4.92 | 1 | 0.705 | 1 | 0.209 | 1 |
| Sennar | 4.16 | 8 | 0.597 | 7 | 0.131 | 8 |
| Aj Jazirah | 3.74 | 15 | 0.524 | 15 | 0.112 | 10 |
| Blue Nile | 4.78 | 2 | 0.687 | 3 | 0.190 | 2 |
| White Nile | 4.38 | 6 | 0.627 | 6 | 0.162 | 4 |
| Northern | 3.37 | 17 | 0.467 | 17 | 0.106 | 11 |
| River Nile | 3.50 | 16 | 0.503 | 16 | 0.082 | 15 |
| Gedaref | 3.95 | 11 | 0.575 | 10 | 0.103 | 13 |
| Kassala | 4.05 | 9 | 0.574 | 11 | 0.138 | 6 |
| Red Sea | 3.16 | 18 | 0.435 | 18 | 0.089 | 14 |

**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.
**Note:** NA = "not applicable".

## Figure 4.2 Household food security status based on Rasch Model estimates of Food Insecurity Experience Score (FIES), by state



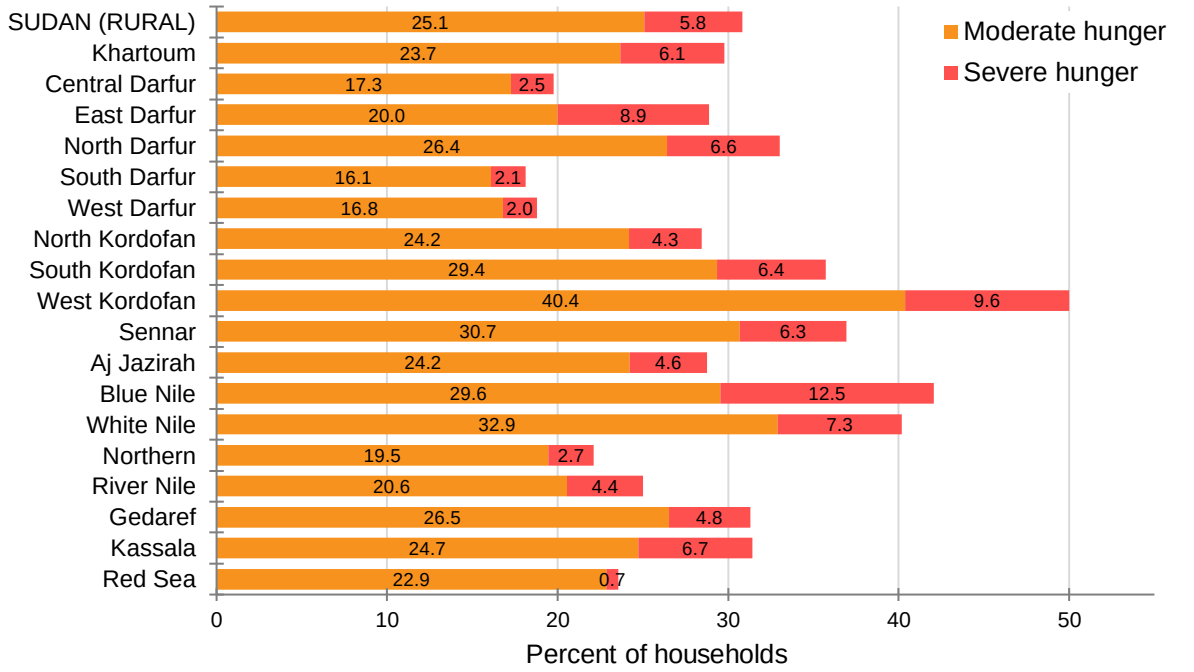

**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

### *4.1.3 Household Hunger Scale*

When asked about the perception of hunger in their household, about 70 percent of respondents reported their household faced no or little hunger. However, 25 percent reported moderate hunger in the household, and 6 percent reported severe hunger.

However, as Figure 4.3 shows, the perception of hunger varies across states. States where households were more likely to report worse food consumption and the employment of coping strategies also reported a higher prevalence of severe hunger—notably households in Blue Nile and West Kordofan.

**Figure 4.3 Household hunger scale, share of households reporting moderate or severe hunger, by state**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

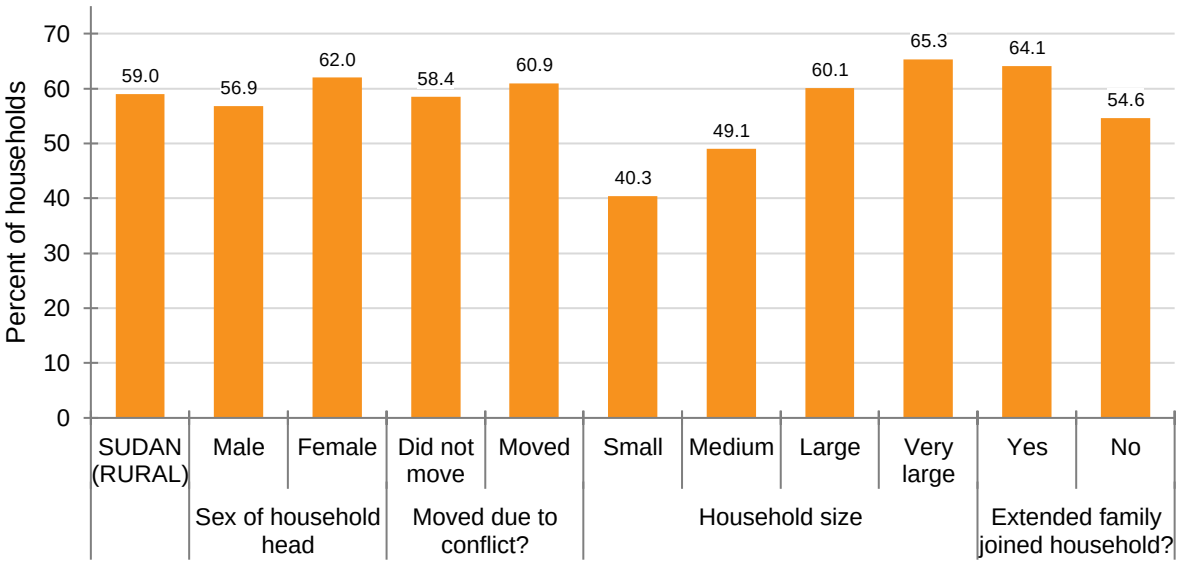
## 4.2 Exploring the determinants of food insecurity

This section examines how demographic, socio-economic factors, and shocks experienced by households contribute to food insecurity, as measured by the Food Insecurity Experience Scale (FIES).

### *4.2.1 Food insecurity and demographic dynamics*

Food insecurity is significantly affected by demographic factors. There is a notable disparity in food security between households headed by men and those headed by women—62 percent of female-headed households reported food insecurity compared to 57 percent of male-headed households (Figure 4.4). This suggests that income inequality or constraints on access to resources disproportionately affects female-headed households. Additionally, displacement due to conflict is important in determining a household's food security. Households that reported moving due to conflict exhibited a higher rate of food insecurity compared to those that had not moved. Displacement may disrupt livelihoods and access to markets and stable food sources, rendering households more food insecure.

**Figure 4.4. Households reporting being moderately or severely food insecure, by demographic category**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

Moreover, the size of the household also correlates with its food security. Larger households are more likely to experience food insecurity, with very large households showing a higher percentage of moderate or severe food insecurity compared to smaller households. This pattern likely reflects the challenges larger households face in meeting the nutritional needs of their members. In addition, households that have had extended family members join their household due to the conflict have a higher percentage of food insecurity than those without new members, highlighting the strain that conflict-related migration and displacement can impose on household food security.

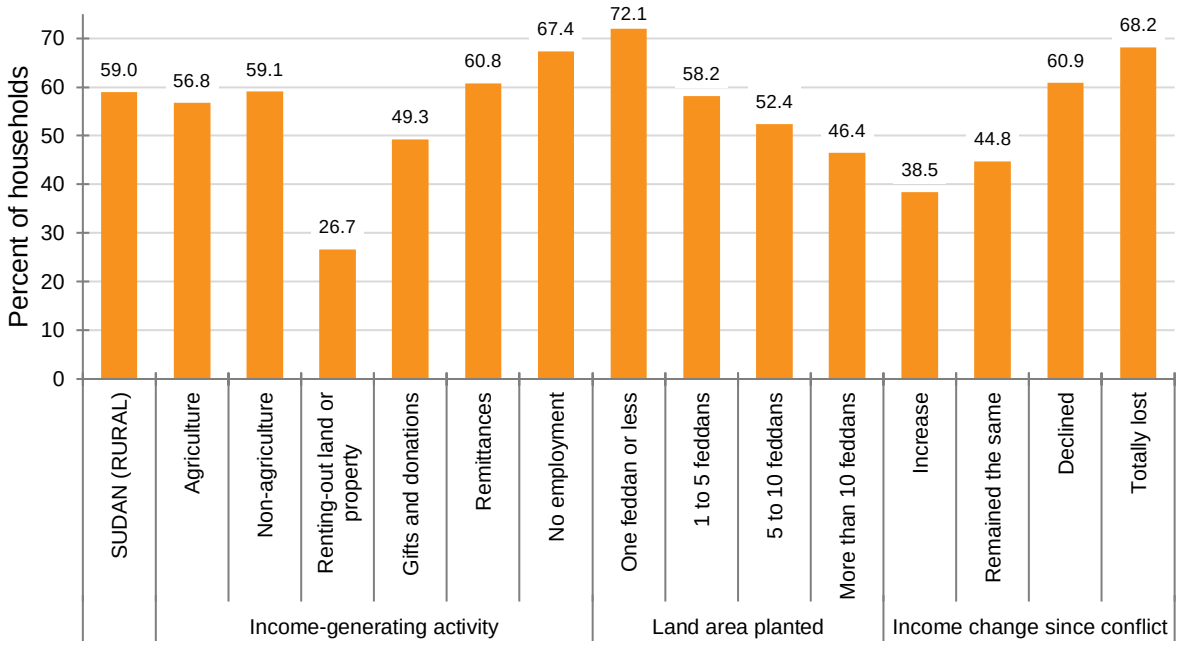
These findings underscore the complex interplay between household demographics and food security. The impact of gender, displacement, and household composition on food insecurity highlights the importance of designing targeted interventions that consider these multifaceted factors to combat food insecurity effectively.

### *4.2.2 Food security, income, and economic activity dynamics*

Overall, the data emphasize that food security is heavily influenced by the nature and stability of income sources, the size of agricultural land, and income dynamics, underscoring the importance of economic stability and growth for achieving food security.

Small differences in food security are seen across various economic activities. Households engaged in non-agricultural activities report slightly higher food insecurity (59 percent) compared to those in agriculture (57 percent), suggesting that agricultural income may offer more resilience (Figure 4.5). Households that reported that they were renting out land and property were more likely to be food secure compared to those reporting other types of main income activities, possibly due to increased demand from migrants and displaced households seeking housing and agricultural land. Employment status is also a critical factor determining food security levels—households without any form of employment or income were most likely to report being food insecure.

**Figure 4.5 Households reporting being moderately or severely food insecure, share by income-generating activity category**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

Furthermore, households with smaller landholdings are more likely to report being food insecure than those households with larger holdings. This suggests that households with larger landholdings benefit from economies of scale and an increased potential for diverse crop production in their farming activities, enhancing household food supply.

Income fluctuations significantly impact food security. Households that reported increases or stable income relative to before the start of the conflict in April 2023 were more likely to report being food secure than food insecure. In contrast, a majority of households that reported either decreases or a total loss of income after the conflict started reported being food insecure.

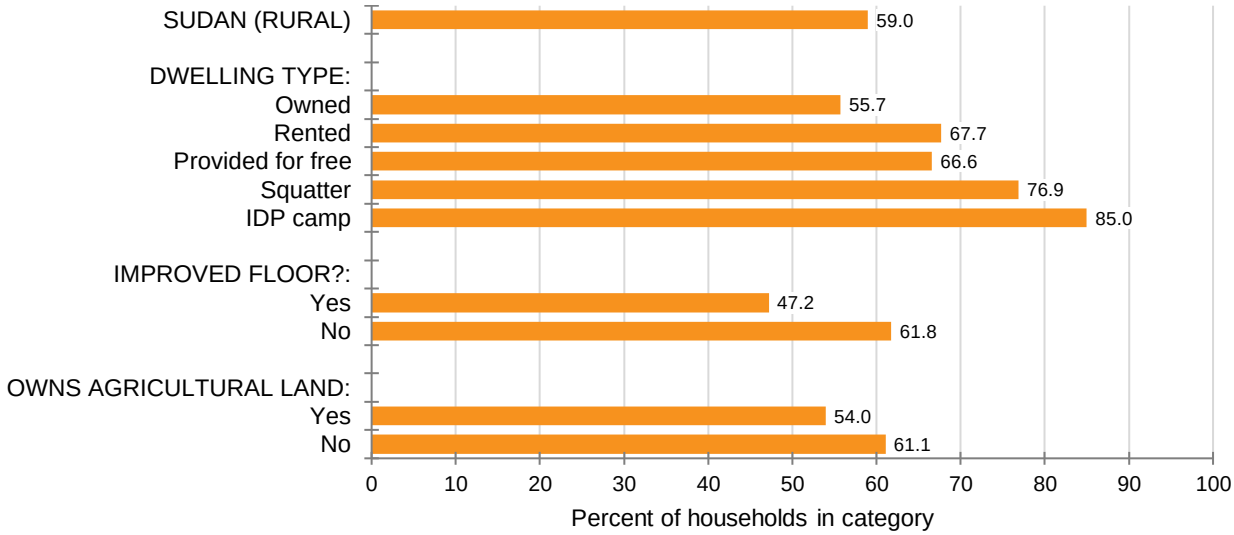
### *4.2.3 Food security and household assets*

With regards to asset ownership and food security, the survey shows that stable and adequate housing along with the ownership of productive assets, like agricultural land, support food security for rural households.

An analysis of the types of dwellings of rural households surveyed shows that households that were owners of their home had a lower prevalence of food insecurity. Homeownership points to financial stability and a larger base of assets that help mitigate food insecurity risks. In stark contrast, individuals residing in informal settlements or IDP camps generally face high levels of food insecurity, underscoring the socio-economic vulnerabilities linked to inadequate housing (Figure 4.6).

Additionally, the quality of housing infrastructure, specifically the presence of improved flooring, is associated with improved food security outcomes. This relationship highlights the importance of housing quality in achieving socio-economic stability that is conducive to food security.

**Figure 4.6 Households reporting being moderately or severely food insecure, by housing and agricultural land ownership category**



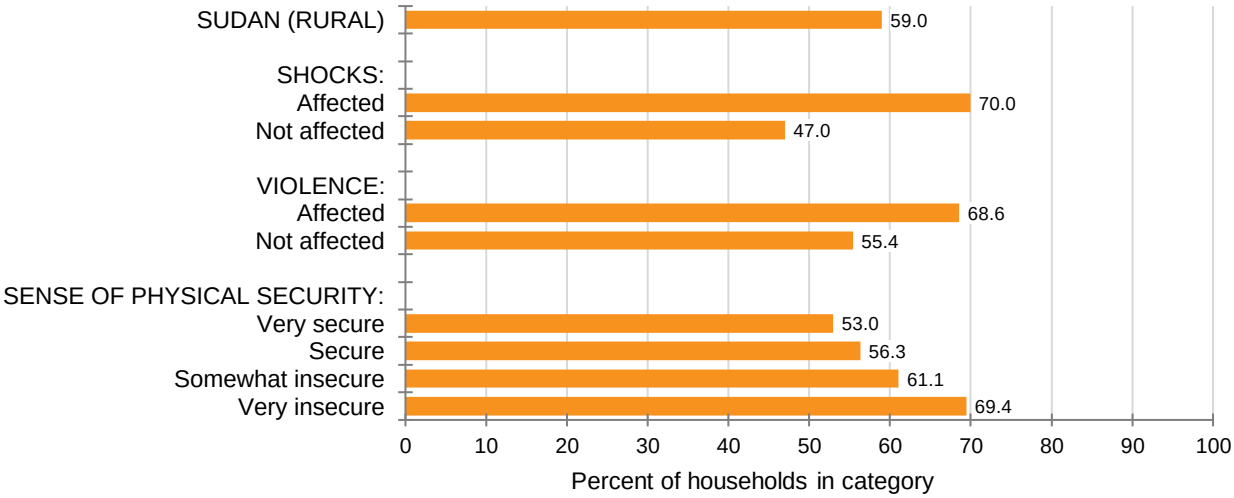

**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

Ownership of agricultural land also plays a critical role in food security. Households owning agricultural land are more likely to report being food secure than are non-landowners. This suggests that land ownership enhances self-sufficiency and resilience by enabling food production and income generation.

### *4.2.4 Food security status and shocks*

The data indicates a significant disparity in food security based on whether the household reported exposure to shocks. Seventy percent of households that experienced shocks reported being moderately or severely food insecure, compared to 47 percent among those not affected. This highlights the detrimental effects of natural disasters, climatic events, or personal crises, like sickness or death, on a household's ability to secure sufficient food (Figure 4.7).

**Figure 4.7 Households reporting being moderately or severely food insecure, by whether experienced shocks or violence and by sense of physical security**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

Further analysis shows that households impacted by any type of violence, which includes theft, intra-household conflict, the SAF-RSF conflict, and other forms—also face a substantially higher rate of food insecurity compared to those not affected. This stark difference supports the view that violence increases vulnerability and impedes the ability to maintain food security.

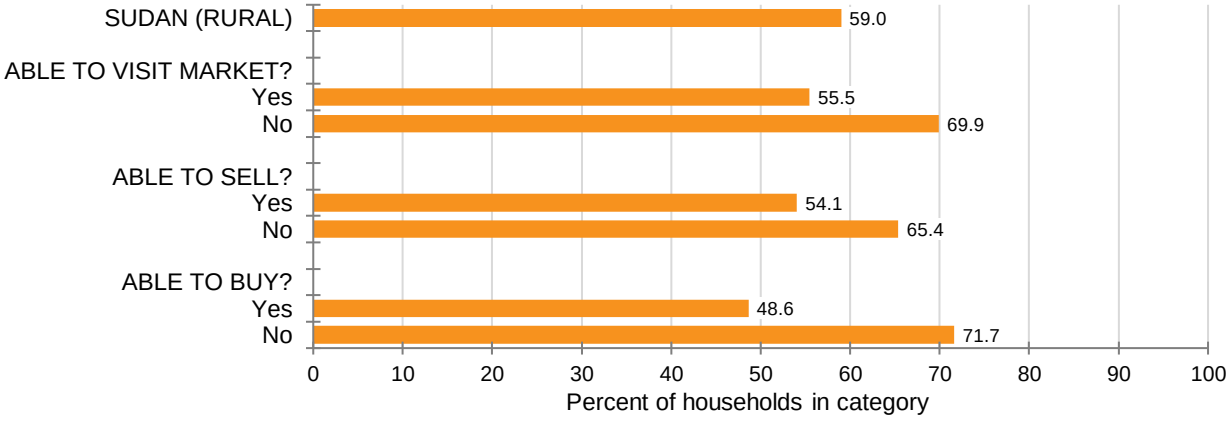
Additionally, households that reported feeling very insecure exhibit a higher prevalence of food insecurity, while those feeling very secure report the lowest levels. This suggests that subjective perceptions of security within a household inversely relate to food insecurity risks, indicating that a stable and secure environment is crucial for households to perceive that they have good access to sufficient food to meet their members' needs.

Overall, the findings underscore that external shocks and violence are significantly intertwined with food insecurity, as they can disrupt societal stability and access to resources. The link between perceived physical security and food security highlights the critical role of peace and stability in achieving food security goals.

### *4.2.5 Food security situation and market access*

Market access plays a crucial role in food security. Rural households that can access markets reported a lower prevalence of food insecurity compared to those unable to do so (Figure 4.8).

**Figure 4.8 Households reporting being moderately or severely food insecure, by whether faced impediments to market access**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

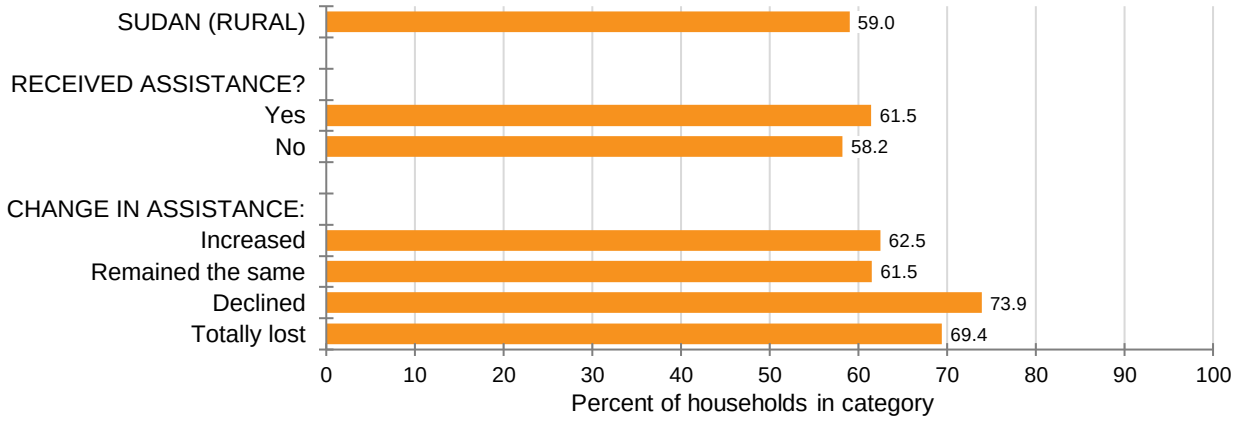
Furthermore, households able to sell in markets were less likely to report being food insecure than those unable to participate in market sales. The ability to buy from the market has a similar relationship to household food security. Households that reported that they were unable to purchase from the market were more likely to report being food insecure than those who reported being able to use local markets as needed. This underscores the importance of both selling and buying capabilities in markets for maintaining food security.

### *4.2.6 Food security status and assistance*

Considering the relationship between food security and the receipt of assistance for rural households, those that did not receive any humanitarian assistance exhibit a slightly lower

incidence of food insecurity than those that did (Figure 4.9). This suggests that assistance may be reasonably well targeted towards households more at risk of food insecurity.

**Figure 4.9 Households reporting being moderately or severely food insecure, by whether received humanitarian assistance and changes in levels received**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

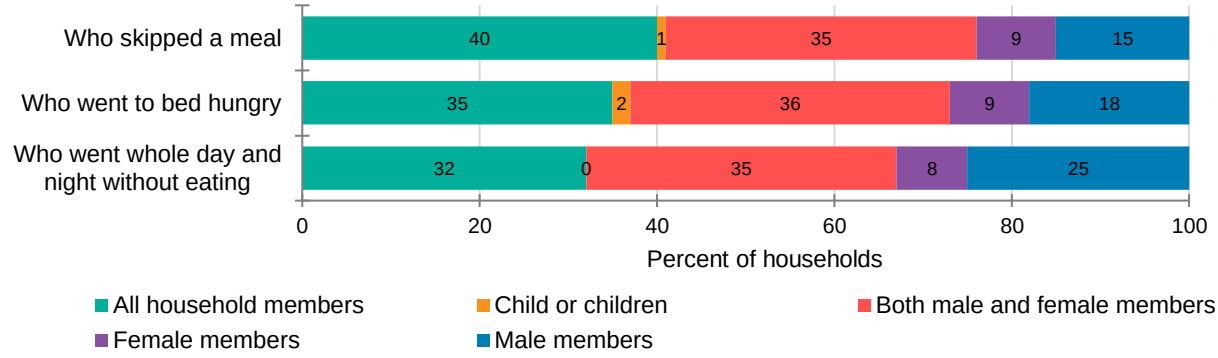
Furthermore, changes in the level of assistance a household receives appears to affect food security outcomes. Households that saw an increase in assistance or maintained the same level of assistance reported lower rates of being food insecure. Conversely, those whose assistance declined or was completely lost show higher rates. This association of loss of assistance with increased food insecurity underscores the fragility of the food security of many Sudanese households and the degree of their dependence on external aid.

While the reception of assistance aligns with higher rates of food insecurity, suggesting effective targeting, any reduction in assistance critically impacts food security, emphasizing the importance of sustained and adequate support for vulnerable populations.

## 4.3 Severity of food insecurity

Figure 4.10 reveals the degree to which severe food insecurity affects entire households and members within those households. In the 30 days before being interviewed, 40 percent of households reported that all household members had skipped at least one meal. This underlines just how pervasive food insecurity is, affecting not just adults but entire families, including children. Additionally, 35 percent of households reported that all members had gone to bed hungry at least once, drawing attention to widespread nightly hunger as a common reality rather than isolated and occasional. Notably, 36 percent of such cases are limited to adult males and females. Further, 32 percent of households reported that all their members went a whole day and night without eating, pointing to acute food deprivation reaching children, with potentially severe long-term impacts on their health and development. About a quarter of these cases affected only male members.

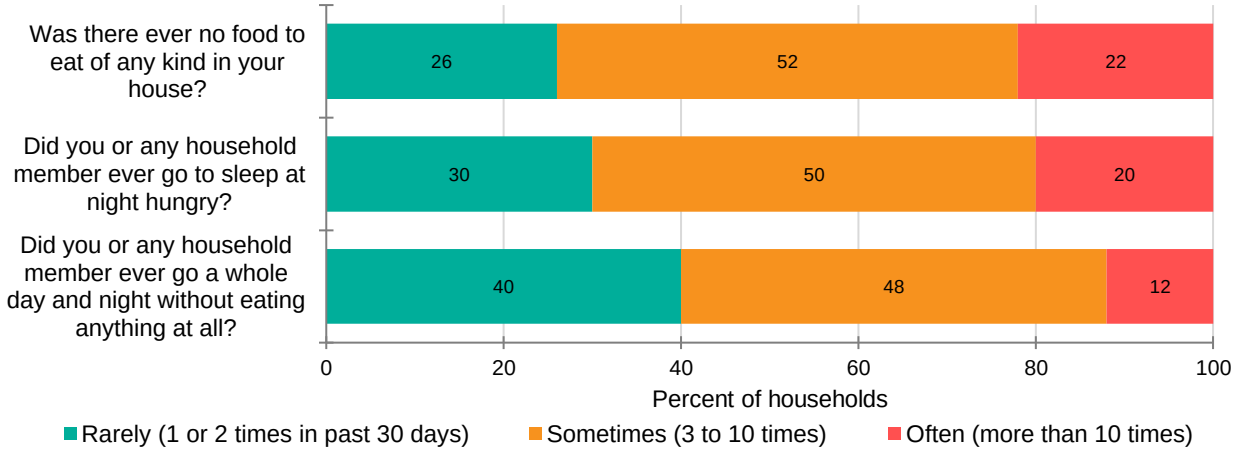
**Figure 4.10 Select food insecurity experiences over the past 30 days experienced by household members, by type of household member**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

The recurring nature of these challenges is evident in Figure 4.11, with only 26 percent of households rarely facing complete food deprivation. Conversely, 52 percent experienced complete food deprivation three to ten times in the past month, and 22 percent more than ten times. Regarding going to bed hungry, half of the households experienced doing so three to ten times in a 30-day period, and 20 percent faced it frequently.

**Figure 4.11 Households reporting select food insecurity experiences over the past 30 days**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

These data highlight the urgent need for effective food security interventions, especially to protect children. This call to action emphasizes the importance of addressing the drivers of household food insecurity and prioritizing interventions to reach the most affected families to build their resilience to shocks affecting their access to food and to secure their future.

## 4.4 Reduced Coping Strategy Index

To bridge any consumption gaps they are facing so that their food intake remains unchanged, households report resorting to coping strategies, such as buying less preferred or less expensive food, limiting portion sizes, or reducing the number of daily meals. As household food insecurity intensifies with a prolonged lack of access to sufficient food, more severe coping mechanisms may be employed, such as borrowing food or restricting the food consumption of adult household members in favor of children.

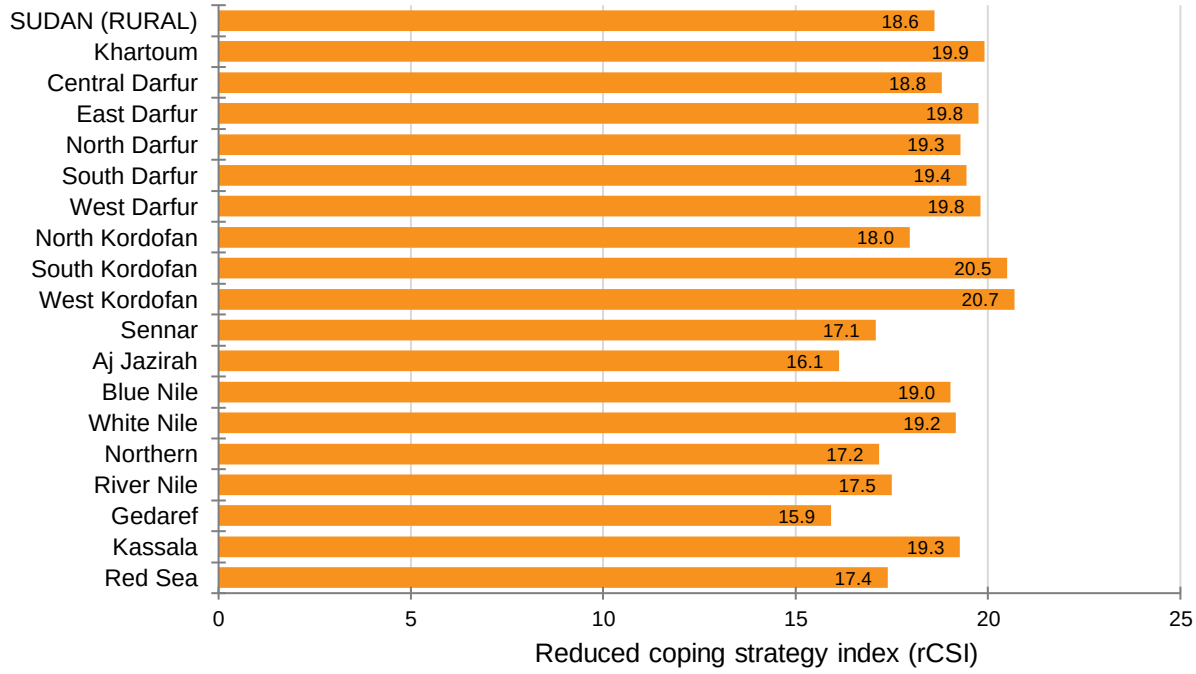
## Table 4.3 Coping strategies, average number of days households reported using specific coping strategy in the previous seven days

| STATE | Consumed less preferred or less expensive food | Borrowed food | Limited portion sizes | Restricted consumption of adults in favor of children | Reduced number of daily meals |
|---|---|---|---|---|---|
| SUDAN (RURAL) | 3.1 | 2.2 | 2.6 | 1.5 | 3.1 |
| Khartoum | 4.4 | 2.0 | 3.2 | 1.6 | 3.6 |
| Central Darfur | 4.3 | 2.1 | 3.5 | 0.9 | 4.3 |
| East Darfur | 4.1 | 2.2 | 3.5 | 1.4 | 3.7 |
| North Darfur | 3.9 | 2.0 | 3.2 | 1.6 | 3.4 |
| South Darfur | 4.3 | 1.9 | 3.6 | 1.3 | 4.0 |
| West Darfur | 4.5 | 1.7 | 3.8 | 1.3 | 4.2 |
| North Kordofan | 3.4 | 1.9 | 2.8 | 1.5 | 3.5 |
| South Kordofan | 3.8 | 2.0 | 3.4 | 1.9 | 3.6 |
| West Kordofan | 3.5 | 2.4 | 3.0 | 2.0 | 3.3 |
| Sennar | 3.1 | 2.2 | 2.3 | 1.5 | 2.8 |
| Al Jazirah | 3.1 | 1.9 | 2.1 | 1.4 | 2.8 |
| Blue Nile | 3.1 | 2.3 | 3.2 | 1.5 | 3.6 |
| White Nile | 3.4 | 2.4 | 2.7 | 1.7 | 3.2 |
| Northern | 2.9 | 1.8 | 2.8 | 1.7 | 2.8 |
| River Nile | 3.2 | 2.1 | 2.7 | 1.4 | 3.1 |
| Gedaref | 2.9 | 1.8 | 2.4 | 1.4 | 2.8 |
| Kassala | 3.1 | 2.5 | 2.4 | 1.9 | 3.1 |
| Red Sea | 2.8 | 2.8 | 2.4 | 1.2 | 3.2 |

**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

The five coping mechanisms generally are implemented with similar frequencies across rural Sudan. The average rCSI does not show large variations across states, ranging between about 16.0 in Al Jazira and Gedaref up to about 20.5 in South Kordofan and West Kordofan (Figure 4.12).[3]

## Figure 4.12 Reduced Coping Strategy Index (rCSI), by state




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

[3] The rCSI ranges between 0 and 56. The higher the score, the more the household can be considered vulnerable to food insecurity, as the higher score reflect the increased implementation by the households of severe food consumption coping mechanisms.

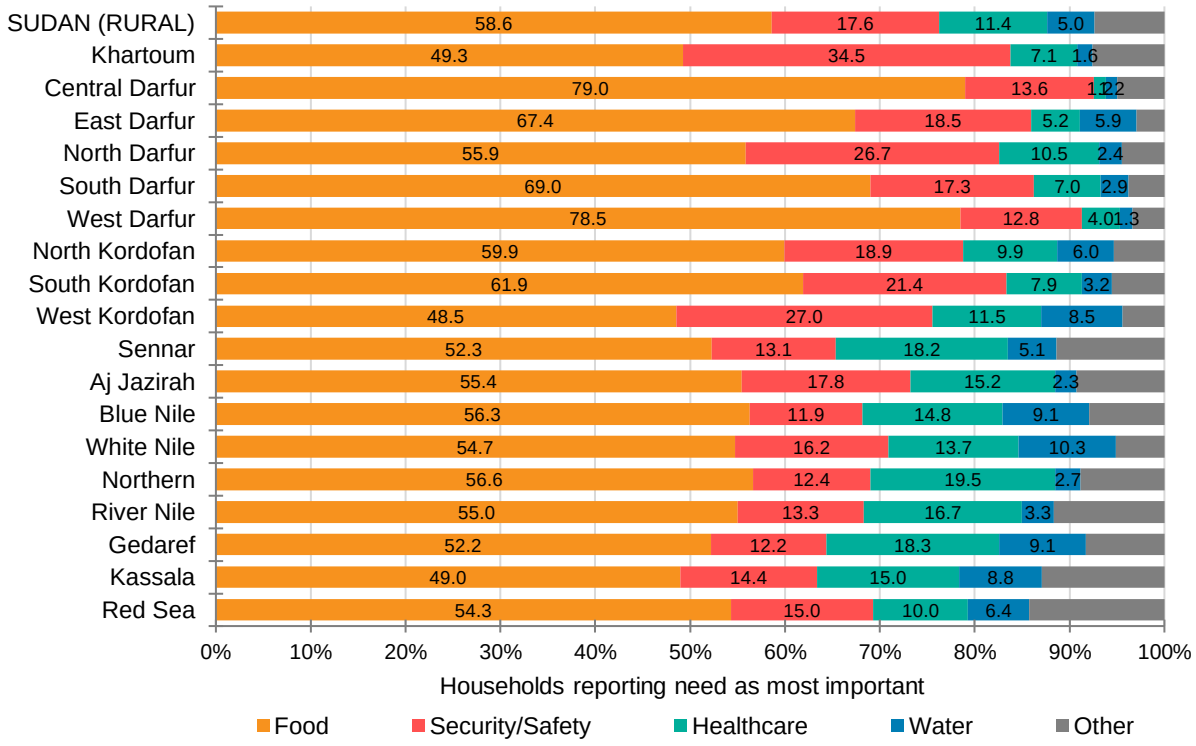
West Darfur and Khartoum, both of which experienced episodes of conflict, recorded among the highest rCSIs at just below 20.0. That these states recorded the highest levels of inadequate diets and high rCSI measures means households living in these states need to rely more frequently on coping mechanisms to manage their food insecurity.

## 4.5 Capability of households to meet their needs

### *4.5.1 Most important needs*

There is widespread concern regarding food security among the survey households. About six in ten households reported that food is their most important need. The highest shares of households highlighting their pressing need for food were in states in the regions of Darfur and Kordofan. Security is the second most reported need, with the highest prevalence in Khartoum, North Darfur, and West Kordofan. Households also reported concerns around access to healthcare.

**Figure 4.13 Most important household need reported by households, by state**

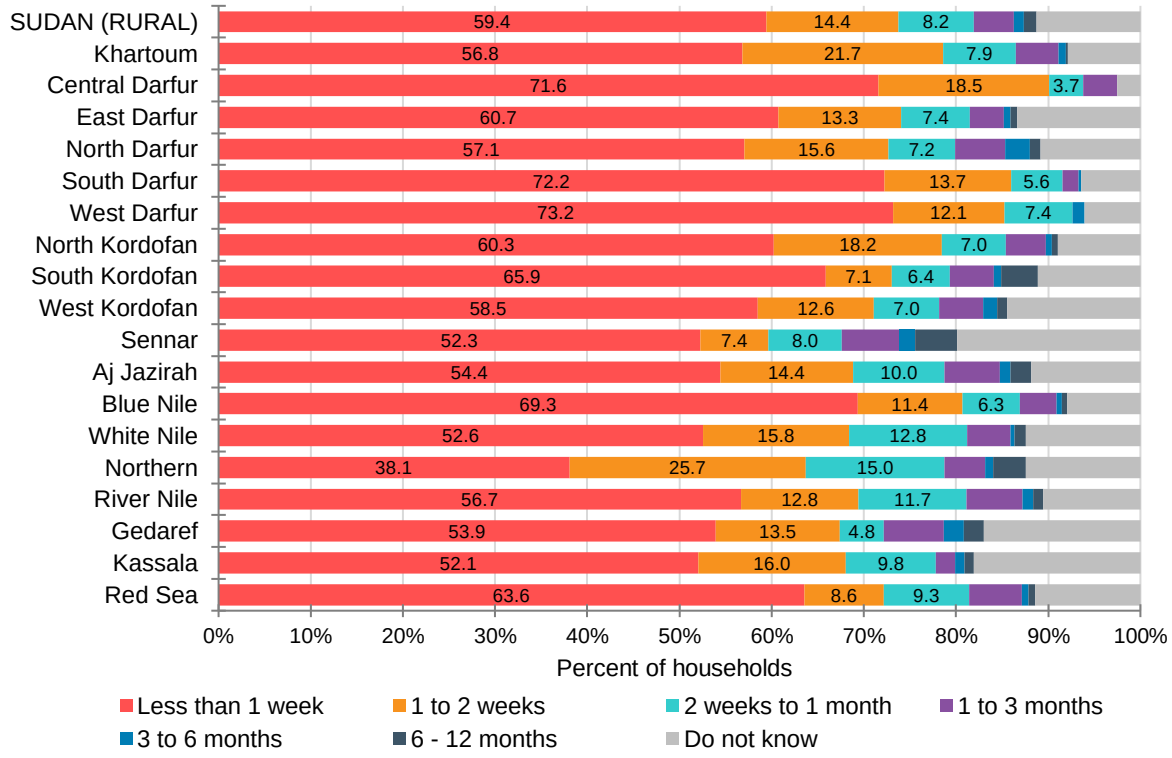



**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.
**Note:** "Other" includes shelter and other needs.

### *4.5.2 Capability of households to meet their food needs*

When asked how long their household could meet its food needs either by relying on food stocks or their cash savings, most households reported that they could do so for less than a week (Figure 4.14). Households in the Darfur region were most likely to report that they had resources that would meet their food needs for less than a week, followed by Blue Nile and South Kordofan. Most Sudanese households must rely on their immediately available resources to meet their immediate food needs. Very few households reported they could meet their needs with their available resources for longer than one month.

**Figure 4.14 Reported expected duration of household reliance on food stocks and savings to meet household food needs, by state**

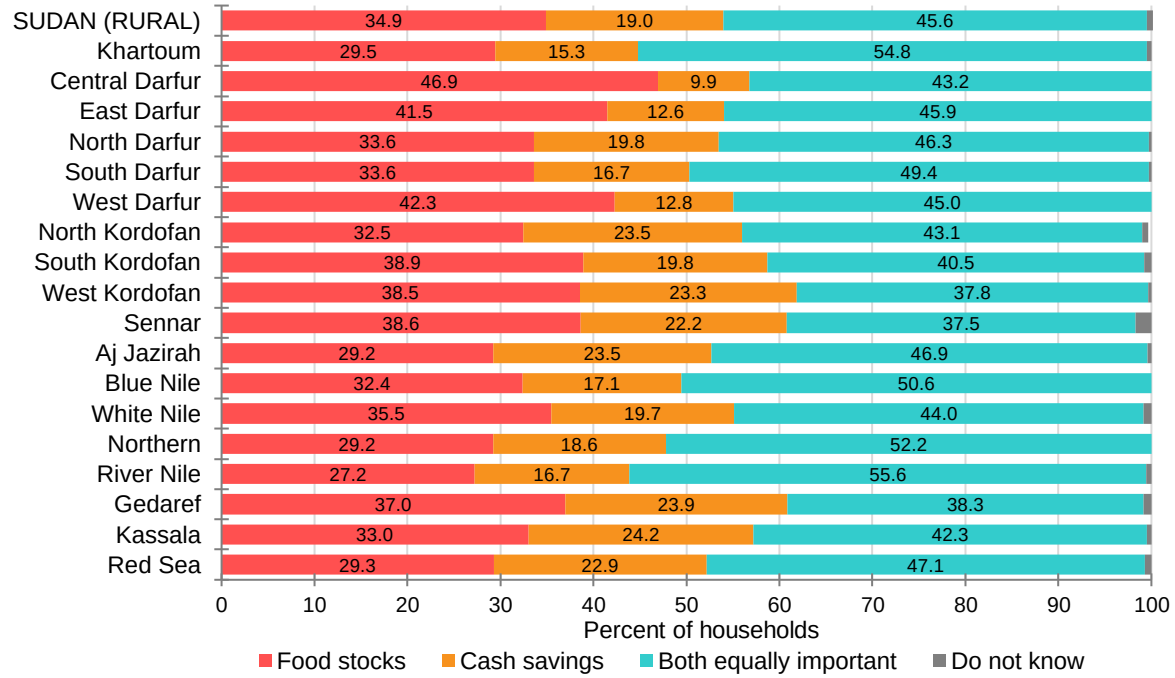



**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

### *4.5.3 Main source used to meet food needs*

Most households reported that cash and food stocks are both equally important to meet food needs, with higher prevalences of this response from households in River Nile, Khartoum, and Northern states (Figure 4.15). Preference for relying on food stocks followed, with somewhat higher prevalences in asserting the primary importance of food stocks in the Darfur region. The proportion of households reporting that cash reserves were most important for meeting food needs was low, ranging between 10 percent in Central Darfur and 24 percent in Gezira, Gedaref, Kassala, and North Kordofan.

**Figure 4.15 Reported preferences of households for holding food stocks or cash savings to meet food needs, by state**

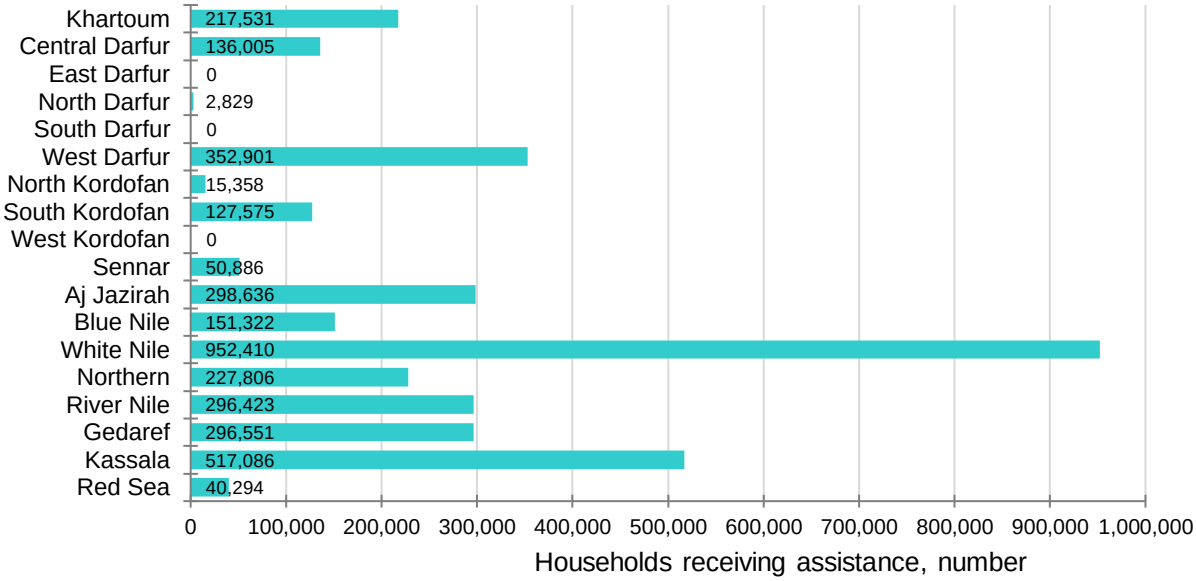



**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

## 4.6 Humanitarian assistance sources and dynamics

At the time of the survey, WFP assisted almost 3.7 million households in Sudan. It should be recognized that even before the conflict not all households in rural Sudan were receiving WFP assistance, as this was targeted to households deemed to be the most in need. However, since the start of the conflict between SAF and RSF, constraints on access because of the conflict have prevented WFP from reaching some of those most in need, particularly in East Darfur, South Darfur, and West Kordofan states (Figure 4.16). Fewer than 3,000 households were assisted in North Darfur for similar reasons.

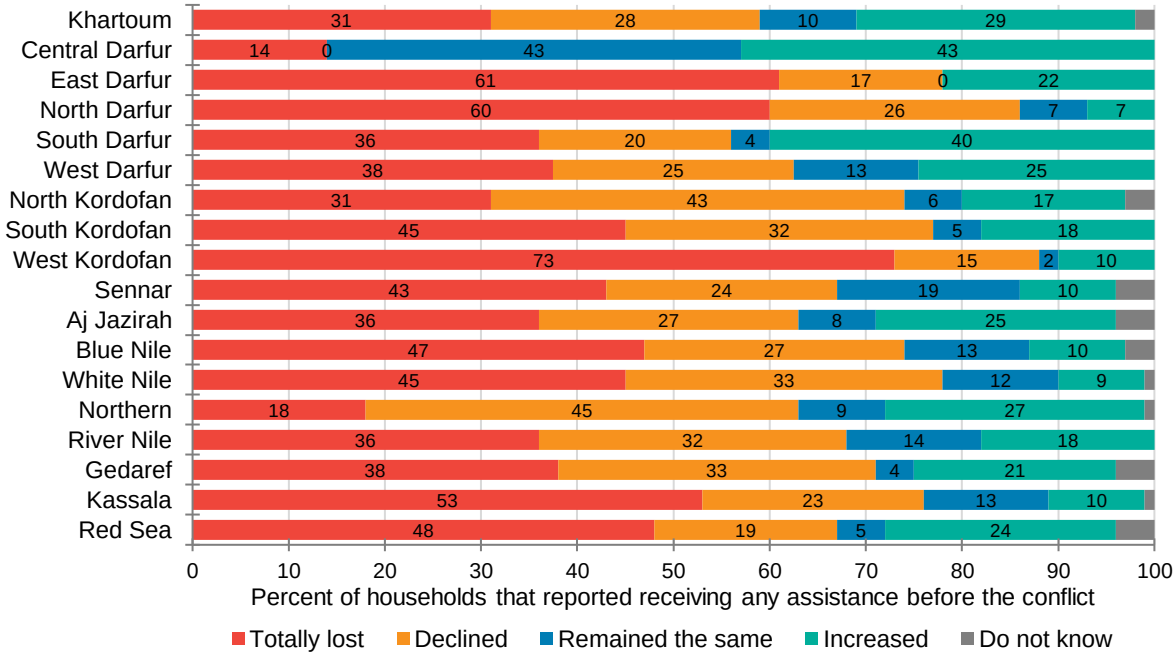
**Figure 4.16 Beneficiaries reached with assistance from World Food Programme in Sudan in late 2023, number by state**




**Source:** Administrative data from WFP-Sudan.

Despite accounting for a small proportion of households, those households that reported having received assistance were asked to compare the level of assistance received before and after the outbreak of the conflict. Most households in West Kordofan, East Darfur, and North Darfur reported they had completely lost the assistance they received before the conflict, while most households in Northern and North Kordofan reported a decline, but not a total loss (Figure 4.17). Most households in Central Darfur reported the level of assistance remained unchanged or increased. Forty percent of households in South Darfur reported that they received more assistance after the conflict than before.

**Figure 4.17 Reported changes between before and during the conflict in the level of humanitarian assistance received by households, by state**




**Source:** Authors' weighted analysis of data from Sudan Rural Household Survey 2023.

# 5) CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

The conflict has severely impacted the food security landscape in rural areas, with profound implications for household diets, coping strategies, and overall food insecurity levels. Data from the first round of the Sudan Rural Household Survey highlights the dire food consumption patterns, the prevalence of food insecurity, and the reliance on coping strategies that may be harmful in the long term among affected populations. Nearly 40 percent of rural households were estimated to be consuming inadequate diets. Households in regions of active conflict, including West Kordofan, South Kordofan, North Darfur, and East Darfur, have been especially affected. The survey data shows that diets are now heavily reliant on cereals and oil, with insufficient intake of foods rich in micronutrients and vitamins. Based on the Food Insecurity Experience Scale, 59 percent of rural households are either moderately or severely food insecure (Figure 4.2). Calculations of the reduced Coping Strategy Index (rCSI) show that most rural households are now employing several coping strategies to manage food insecurity (Table 4.3). Resources for most households were alarmingly low, sufficient for less than a week's food needs, especially for households in the Darfur region and South Kordofan state.

## 5.2 Recommended actions

The pervasive severe food insecurity in rural Sudan necessitates urgent and extensive interventions to enhance food aid, revitalize agricultural systems, and restore supply chains, to mitigate the food crisis and prevent its escalation. Priority areas of action include:

- **Achieve a Lasting Ceasefire:** Achieving a ceasefire in Sudan is essential to mitigate the detrimental effects of conflict on food security. A ceasefire will provide stability for agricultural production, enable humanitarian access, restore all market activities, and facilitate the return of displaced persons to their homes.
- **Provide Life-saving Humanitarian Assistance:** Ensuring the safe and timely delivery of life-saving humanitarian assistance will prevent the worsening of an already dire situation in those states where assistance is currently hampered by limited or no access.
- **Targeted Nutritional Programs:** Implement programs that ensure the distribution of nutrient-rich foods to address the dietary gaps identified in rural households, focusing on the inclusion of meats, fruits, and vegetables to improve overall nutrition.
- **Enhance Agricultural Support:** Immediate interventions to support agricultural activities are crucial, especially for smallholder farmers who have been disproportionately affected by the conflict. This includes providing access to quality seeds, fertilizers, and farming equipment to boost crop productivity.
- **Strengthen Market Access:** Efforts should be made to improve market functionality and accessibility, allowing households to sell produce and buy essential goods, which is vital to their maintaining food security. This includes repairing and securing roads and market infrastructure to ensure safe and efficient trade.

- **Expand Social Protection Measures:** Increase the coverage and effectiveness of social protection programs to provide direct food aid, cash transfers, and other forms of assistance to the most affected households, particularly in high-conflict areas.
- **Community-Based Resilience Building:** Support local community initiatives that aim to build resilience against food insecurity through sustainable practices, such as community gardens, local food procurement policies, and the provision of education on how to improve food and nutrition security at household and community levels.
- **Comprehensive Data Collection and Monitoring:** Continue to refine data collection methodologies to ensure accurate representations of the well-being of both rural and urban populations, adapting to the dynamic and evolving nature of the conflict to understand better and more effectively respond to household needs on the ground.

# ANNEX

## Food Insecurity Experience Scale—full analysis

The Food Insecurity Experience Scale (FIES) is an experience-based measure of household or individual food security. The FIES Survey Module consists of eight questions regarding people's access to adequate food. The questions focus on self-reported food-related behaviors and experiences associated with increasing difficulties in accessing food due to resource constraints. The following questions are asked in the module:

> During the last 12 months, was there a time when, because of lack of money or other resources:
>
> 1. You were worried you would not have enough food to eat?
> 2. You were unable to eat healthy and nutritious food?
> 3. You ate only a few kinds of foods?
> 4. You had to skip a meal?
> 5. You ate less than you thought you should?
> 6. You ran out of food?
> 7. You were hungry but did not eat?
> 8. You went without eating for a whole day?

Annex Table 1 presents the distribution of FIES row scores based on responses to the eight questions comprising the FIES Survey Module. A score of zero indicates that the respondent did not answer 'Yes' to any of the questions, while a score of 8 signifies that a 'Yes' answer was given to all eight questions.

### Annex Table 1 Distribution of Food Insecurity Experience Scale (FIES) raw scores

| Value | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| **Count** | 438 | 383 | 425 | 631 | 578 | 577 | 561 | 576 | 335 |
| **Percent of households** | 9.7 | 8.5 | 9.4 | 14.0 | 12.8 | 12.8 | 12.5 | 12.8 | 7.4 |

**Source:** Authors' analysis of data from Sudan Rural Household Survey 2023.

Annex Table 2 presents the number of responses of 'Yes' to each question in the FIES Survey Module from the 4,504 households in the SRHS sample.

### Annex Table 2 Food Insecurity Experience Scale (FIES) column scores

| FIES Survey Module question | Count |
|---|---|
| Worried you would not have enough food to eat? | 3,427 |
| Unable to eat healthy and nutritious food? | 3,000 |
| Ate only a few kinds of foods? | 3,299 |
| Had to skip a meal? | 2,123 |
| Ate less than you thought you should? | 2,613 |
| Ran out of food? | 1,628 |
| Were hungry but did not eat? | 1,722 |
| Went without eating for a whole day? | 589 |

**Source:** Authors' analysis of data from Sudan Rural Household Survey 2023.

## Rasch modeling

**Psychometric analysis:** Annex Table 3 provides item parameters related to FIES and its Rasch modeling. The severity column indicates the level of severity associated with each FIES variable. The relative severity of the items is determined based on the understanding that the more severe an item is, the less likely respondents are to report it. Infit and outfit values assess the model's goodness of fit.

An adequate fit to the Rasch model is indicated by infit statistics of between 0.7 and 1.3 for each item. In the model here, there are no items with infit values larger than 1.3, which indicates that the model is good.

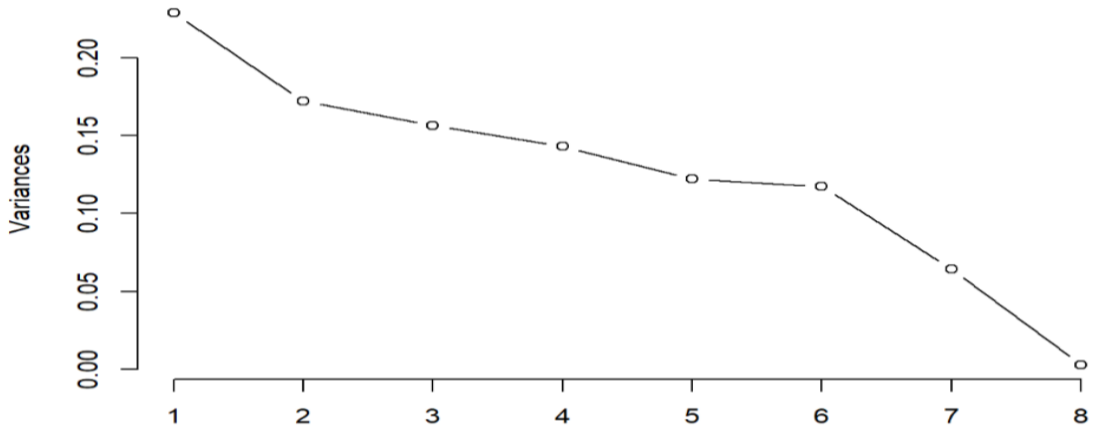
### Annex Table 3 Food Insecurity Experience Scale (FIES) question parameters

| FIES Survey Module question | Severity | Standard error | Infit | Outfit |
|---|---|---|---|---|
| Worried you would not have enough food to eat? | -1.98 | 0.05 | 1.14 | 1.92 |
| Unable to eat healthy and nutritious food? | -1.18 | 0.05 | 1.10 | 1.52 |
| Ate only a few kinds of foods? | -1.75 | 0.05 | 0.91 | 1.42 |
| Had to skip a meal? | 0.21 | 0.04 | 0.92 | 0.90 |
| Ate less than you thought you should? | -0.56 | 0.04 | 0.93 | 1.06 |
| Ran out of food? | 1.00 | 0.05 | 1.02 | 1.18 |
| Were hungry but did not eat? | 0.83 | 0.04 | 0.82 | 0.77 |
| Went without eating for a whole day? | 3.19 | 0.07 | 0.99 | 0.76 |

**Source:** Authors' analysis of data from Sudan Rural Household Survey 2023.

**Principal Component Analysis:** Annex Figure 1 is employed to assess the percentage of variance explained by principal components derived from the matrix of residuals. The absence of a sudden jump following the first component affirms that these variables can be interpreted as forming a measurement scale for a single-dimensional latent trait.

### Annex Figure 1 Food Insecurity Experience Scale (FIES) principal component analysis (PCA) plot




**Source:** Authors' analysis of data from Sudan Rural Household Survey 2023.

**Residual correlation matrix:** A residual correlation exceeding |0.4| between two items is indicative of a substantial degree of correlation. Such high residual correlations suggest a potential overlap in meaning between the paired items, implying a certain level of redundancy. Given that each item is designed to address a distinct facet of food insecurity, the presence of redundant questions compromises the precision and accuracy of measuring

food insecurity. However, in the current analysis, it is noteworthy that there is no instance where the residual correlation between any pair of items exceeds 0.4, indicating a lack of significant redundancy in the surveyed questions.

### Annex Table 4 Food Insecurity Experience Scale (FIES) residual correlation matrix

| FIES Survey Module question | WORRY | HEALTHY | FEWFDS | SKIPPED | ATELESS | RANOUT | HUNGRY | WHLDAY |
|---|---|---|---|---|---|---|---|---|
| Worried you would not have enough food to eat? (WORRY) | 1.000 | | | | | | | |
| Unable to eat healthy and nutritious food? (HEALTHY) | 0.011 | 1.000 | | | | | | |
| Ate only a few kinds of foods? (FEWFDS) | 0.014 | 0.110 | 1.000 | | | | | |
| Had to skip a meal? (SKIPPED) | -0.111 | -0.122 | 0.052 | 1.000 | | | | |
| Ate less than you thought you should? (ATELESS) | -0.089 | -0.060 | 0.065 | 0.119 | 1.000 | | | |
| Ran out of food? (RANOUT) | -0.172 | -0.104 | -0.103 | -0.007 | 0.012 | 1.000 | | |
| Were hungry but did not eat? (HUNGRY) | -0.052 | -0.103 | -0.021 | 0.193 | 0.105 | 0.173 | 1.000 | |
| Went without eating for a whole day? (WHOLDAY) | -0.075 | -0.067 | -0.037 | 0.063 | -0.040 | 0.082 | 0.113 | 1.000 |

**Source:** Authors' analysis of data from Sudan Rural Household Survey 2023.

**Rasch reliability:** An acceptable Rasch reliability value for an eight-item FIES scale is greater than 0.7. In assessing reliability, both the observed distribution and the equal proportion are considered, and it is favorable when each surpasses the 0.7 threshold. In the current analysis, both the reliability value for the observed distribution of 0.73 and that for the equal proportion of 0.75 exceed 0.7, indicating a satisfactory level of reliability for the eight-item FIES scale.

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