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Sudan:
Rest of Sudan

Comprehensive Food Security and Vulnerability Analysis (CFSVA)

Data collected in May 2006

Strengthening Emergency Needs Assessment Capacity (SENAC)

***Sudan: Rest of Sudan,* Comprehensive Food Security and Vulnerability Analysis (CFSVA)**

Prepared by Jonathan Rivers, Cinzia Papavero, William Nall, Jan Delbaere, Peter Horjus, Daniel Molla, and Billy Mwinga.

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Geographic designations:

South Sudan refers to the following States: Northern Bahr El Ghazal, Western Bahr El Ghazal, Warrup, Lakses, Unity, Upper Nile, Jonglei, Western Equatoria, Central Equatoria and Eastern Equatoria.

Darfur/Greater Darfur refers to the three States in Darfur: North Darfur, South Darfur and West Darfur.

Rest of Sudan refers to the following States: Northern, River Nile, Red Sea, North Kordofan, South Kordofan, Abyei, Khartoum, White Nile, Al Gezira, Kassala, Gedaref, Sennar and Blue Nile.

“The Three Areas” (also known as the Protocol Areas or Transition Areas) refers to South Kordofan, Abyei and Blue Nile States. Their administration and final status will be determined according to specific protocols established under the 2005 Comprehensive Peace Agreement (CPA).

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CPA	Comprehensive Peace Agreement
CPI	Consumer Price Index
DPA	Darfur Peace Agreement
GAM	Global Acute Malnutrition Rates
GONU	Government of National Unity
GOS	Government of Sudan
GOSS	Government of Southern Sudan
HAZ	Height-for-age z-scores
IDD	Iodine Deficiency Disorder
LRA	Lord's Resistance Army
PDF	People's Defense Forces
ROS	Rest of Sudan
SAF	Sudanese Armed Forces
SAM	Severe Acute Malnutrition
SPLA	Sudan People's Liberation Army
SPLM	Sudan People's Liberation Movement
SSDF	Southern Sudanese Defense Forces
U5MR	Under Five Mortality Rates
UNICEF	United Nations Children's Fund
WAZ	Weight-for-age z-scores
WHO	World Health Organization
WHZ	Weight-for-height z-scores

Executive Summary

Introduction

In Sudan, civil war has raged between north and south for decades. While the 2005 Comprehensive Peace Agreement (CPA) ended hostilities, the human toll of the conflict remains evident. Overall, it is estimated that 2 million died, 6 million were displaced and untold millions lost assets, land and livelihoods. Economic and developmental repercussions have been far reaching. Existing infrastructure in the south has either been destroyed or suffered years of neglect. While underdevelopment is a particularly acute problem in the south, the rest of Sudan also faces economic and developmental obstacles. High poverty, childhood malnutrition, morbidity and mortality rates are the norm. The persistence of large-scale civil conflict in Darfur promises only to exacerbate these problems. Continuing conflict has left hundreds of thousands dead and millions displaced in the region.

Despite the numerous problems facing Sudan, the signing of the CPA substantially improved security throughout southern Sudan and the "three areas" and provided a crucial window for the Government and the international community to assess the health and wellbeing of households throughout the country. The 2006 Sudan Household Health Survey (SHHS) is the first step in this process. This survey provides the first comprehensive, state-by-state assessment of the current food security, health and nutrition situation, helping to identify populations most at risk.

Seizing upon this newly available baseline information as well as the results of other relevant assessments and studies, WFP has compiled this Comprehensive Food Security and Vulnerability Analysis (CFSVA) with the objective of measuring the extent and depth of food insecurity throughout Sudan. In this way, the CFSVA is intended to inform relevant decision-making processes to mitigate food crises and increase food security.

Socio-economic situation in Sudan

Sudan is a culturally diverse country with many different ethnicities, languages and religions. The arab and non arab peoples of northern Sudan practice Sunni Islam and speak Arabic as the official language. Northern Sudan (for the purposes of this report) is comprised of two distinct regions: Rest of Sudan (ROS) and Greater Darfur. ROS, which includes the economic and political centres of Khartoum and Port Sudan, is the country's wealthiest and most developed region. Sudan's rapid economic growth in the last 5-10 years has benefited households in this region disproportionately. Greater Darfur is comprised of the three western-most states, North, South and West Darfur. Households in this area, even pre-conflict, were substantially poorer than households in ROS, despite two of its three states traditionally being surplus food producers and the region itself being a primary source of trade revenue from livestock. Given the ongoing conflict and its affects on infrastructure, livelihood opportunities and societal cohesion, wealth disparities between households in Greater Darfur and ROS appear likely to grow.

Southern Sudan (again for purposes of discussion in this report) is comprised of the 10 southern-most states in Sudan. In southern Sudan, there are over 500 different ethnicities and hundreds of dialects. The majority of the population practice Christianity or various other indigenous faiths. Southern Sudan has suffered during the civil war with the north. Years of fighting destroyed much of the existing infrastructure and resulted in a fundamental breakdown of traditional livelihoods. While the wellbeing of households has increased in the post-CPA period, southern Sudan remains the poorest and least developed region in Sudan and one of the poorest and least developed regions in the world.

Population estimates for the country, given persistent conflict and the nomadic nature of Sudanese households, are difficult to verify, though the most recent and trusted estimates put Sudan's population at slightly over 40 million, with just over 30 million in the north (ROS and Greater Darfur) and about 10 million in the south. Information on demographic and household composition is typical for a developing country. Overall, data from the SHHS showed a young population (with a mean age of 16), evenly split between males and females. Households had

an average of 6 members and were usually headed by a 45-year old adult. Nineteen percent of households were headed by women.

When examined by region, the demographic consequences of war, poor infrastructure, high child malnutrition rates and disease were immediately apparent. In the conflict affected regions of Southern Sudan and Greater Darfur, people die younger, households are smaller, household heads are younger and more likely to be female. Overall, the mean age of the population in southern Sudan and Greater Darfur was 4-5 and 2-3 years younger, respectively, than the mean age in the less conflict affected region of ROS. Likewise, the mean age of household head, in southern Sudan, was significantly lower than in ROS (40 versus 47). Finally, reflecting the out-migration and increased mortality associated with the current conflict in Greater Darfur, household size was smallest (5.6) and the percent of female-headed households was highest (33 percent) in this region.

Not surprisingly, household displacement status also depended on the level of conflict in the area. In southern Sudan and Greater Darfur, 16 percent of households reported being currently displaced, while in ROS only 4 percent did. Post CPA, improvements in security in southern Sudan were also evident, as 14 percent of former IDP or refugee households had reportedly resettled in the region.

The conflict has also effected literacy rates. In southern Sudan, 18 percent of respondents reported being literate versus 43 percent in Darfur and 58 percent in ROS. As the CPA has allowed many children in southern Sudan to return to school, regional differences were not as extreme when current enrollment rates among school age children were examined. Overall, 87 percent of children were currently attending school at the time of the survey, with 83 percent enrolled in southern Sudan and 91 percent enrolled in Northern Sudan.

Households throughout Sudan have traditionally survived on a mixture of agriculture and pastoralism, with sedentary agriculture more common in the Greenbelt region of Southern Sudan and nomadic pastoralism more common in the very arid climate of northern Sudan. In recent years reliance on these traditional livelihood sources has waned somewhat, spurred by rapid urbanization, the growing importance of oil in ROS and by continuing conflict and insecurity in Greater Darfur.

Findings from the SHHS on household livelihoods captured the complexity of the situation. Overall, the SHHS identified 12 livelihood profiles. The majority of households still relied on “agriculture” (24 percent), though “other activities” (15 percent) and “employed work” (14 percent) were the second and third most prevalent livelihood profiles. Other livelihoods included; petty trade (8 percent), unskilled labour (8 percent), agro-pastoralism (7 percent), agriculture, hunting and fishing (5 percent), pastoralists (4 percent), skilled labour (4 percent), handicrafts (4 percent), natural resource collection (4 percent) and food aid (3 percent).

Regional disparities in wealth and development were apparent in the SHHS’s data on household livelihoods. In ROS, “employed work” (typically a better off more urban livelihood) equaled “agriculture” in importance, with 20 percent of households reportedly relying on each livelihood. This contrasts sharply with southern Sudan where over three-quarters of households reported relying on a mixture of agriculture and pastoralism, with only 3-4 percent of household reporting that they had “employed work” (approximately the same percentage that relied exclusively on “food aid”). Livelihoods in Greater Darfur were also heavily agriculture-dependent, with one-third of households relying exclusively on “agriculture”. The impact of the ongoing conflict on traditional livelihoods was noticeable, however. Overall, slightly more than 10 percent of households reported that food aid was their primary source of livelihood, while a similar percentage reported “unskilled labour” – firewood/ grass collection or brick-making - according to recent livelihood assessments in the region. Unskilled labour is commonly found in households that have lost access to traditional farming or pastoralist livelihoods.

Household food security in Sudan

Food security status is determined by the combination of aggregate food availability, household food access and utilization.

Availability of food

In Sudan, given climate extremes and insecurity, food availability is a crucial component of household food security status. While the majority of agricultural output in Sudan is from small subsistence farmers, crop production in the north appears increasingly dependent on larger mechanized and irrigated farms. Consequently, household crop production is more common in both southern Sudan and Greater Darfur than in ROS. Overall, 73 and 60 percent of households in the south and Darfur reported farming compared with 40 percent of households in ROS.

The primary staple crops in Sudan are sorghum and millet, as both grow well in arid climates. Overall, 70 and 39 percent of households reported cultivating sorghum and millet respectively. The importance of sorghum and millet varied regionally with maize considered just as or more important in certain areas of southern Sudan. Aggregate crop production data illustrated this, with 84 percent of farming households in southern Sudan cultivating sorghum and 70 percent cultivating maize. On examination of the totality of crops cultivated, production in southern Sudan appears more diversified than production in the rest of Sudan, with 86 percent of households cultivating sorghum, 70 percent of households producing maize, 36 percent producing sesame, 21 percent producing cassava, 27 percent producing beans, and 26 percent producing pumpkins. In ROS, by contrast, sorghum, sesame and millet were the only crops produced in sizeable percentages by the population. Finally, households in southern Sudan were most likely to report maintaining a vegetable garden. Here, 33 percent of households reported such a garden versus only 8 and 3 percent of households in Darfur and ROS.

Access to food

Access to enough food to meet dietary energy needs for the household is also a significant obstacle in parts of Sudan, determined primarily by land productivity, security and market access. In the drier often desert conditions in ROS, households purchase close to 90 percent of their food. In Greater Darfur, household crop production is more common than in ROS but own production remains a relatively small source of food (14 percent). Given the ongoing conflict, fewer households also appear able to consistently purchase food than in ROS. Instead these households (approximately 10 percent of the households in Darfur) reportedly rely on food aid.

In southern Sudan, households generally live a subsistence lifestyle in which 40 percent of food comes from own production and 10 percent from hunting, gathering and fishing. While food purchase remains an important source of food (with 39 percent of food accessed in this way), limited market access and security problems force most households to rely on own production. As southern Sudan transitions into a post conflict, resettlement phase, food aid is more limited than in Darfur with only 4 percent of households reporting food aid as their primary source of food.

Utilization

Food security can only be achieved if all household members have access to safe and nutritious food and if their health status allows them to adequately absorb the nutrients ingested. The best proxy indicators of utilization are child health and nutritional status.

The nutritional situation of children in Sudan is characterized by unusually high wasting (or global acute malnutrition- GAM) prevalence, often above the 15 percent emergency threshold in all three regions. In Sudan, this is hypothesized to be due to the interaction of poverty, poor access to water and sanitation, and high disease prevalence (diarrhea, malaria, etc.). One of the objectives of the CFSVA was to assess causes of childhood wasting but problems with the nutritional data in SHHS precluded this. Instead, the descriptive assessment of secondary data suggests the following:

1. Annual GAM rates range from 10 to 18 percent in ROS, from 10 to almost 30 percent in Greater Darfur and from 15 to 30 percent in southern Sudan.
2. Childhood malnutrition rates appear lower on average in ROS than in either Darfur or southern Sudan (with annual GAM rates peaking at 18 percent versus almost 30 percent in either Darfur or southern Sudan).

3. Childhood malnutrition rates in Greater Darfur and southern Sudan peak twice a year, the first at the start of rainy/ hunger season and the second at the end of the hunger season/ peak malarial season.
4. In ROS, childhood malnutrition rates do not appear to peak annually at the end of the hunger period/ peak malarial season (only at the start of the rainy/ hunger period). This is notable as fever appears to be significantly less common in ROS than in southern Sudan, with many more mothers reporting that they take their child to the health centre if they experience fever.
5. In southern Sudan, data seems to suggest that wasting rates consistently between 20 -25 percent on average combined with elevated morbidity rates are associated with high Under 5 mortality rates, while wasting rates consistently between 15-20 percent on average and elevated morbidity rates are not.

Another aim of the CFSVA was to gather information on micronutrient deficiencies. While the SHHS did not gather information on the prevalence of micronutrient deficiencies, it did assess progress in programmes combating micronutrient deficiencies, namely salt iodization and vitamin A supplementation programmes.

Analysis of the iodine content in household salt revealed that very few households have access to properly iodized salt (only 12 percent of households nationwide,) particularly in ROS. This is largely a result of Government failure to enforce the policy of Universal Salt Iodization (USI) adopted in 1994. Households that had access to iodized salt at the time of the survey (primarily households in southern Sudan and Greater Darfur,) were either the likely beneficiaries of cross-border trade activities with countries such as Uganda or Kenya, or they received their salt via food aid. Progress combating vitamin A deficiency appeared uneven with 80 percent of children in ROS reportedly receiving supplements and only 30 percent in southern Sudan.

Prevalence of diarrhea and fever (in the two weeks preceding the survey,) was much more common among children in southern Sudan than in either Darfur or ROS. Cough appeared common in all regions with 41 and 38 percent of children reporting a cough in Darfur and southern Sudan respectively versus only 28 percent of children in ROS.

Food consumption status as a proxy indicator of food security status

Lacking a standard measurement of food security, the CFSVA determined food security status using a measure of both food frequency and dietary diversity known as the food consumption score (FCS). To capture food frequency, the FCS section asked respondents how much of a certain food item (later aggregated to food groups) was consumed in a typical week. The number of times each food group was eaten was multiplied by a weight, developed according to the nutrient density of the food group. Total scores were calculated and food consumption groups were calculated using standard cut offs. Households in the poor and borderline consumption groups were considered food insecure.

Utilizing this methodology, 8.2 percent of households in ROS were determined to be food insecure, compared to 26 percent of households in Darfur and 33 percent of households in Southern Sudan.

Who are the food insecure and where do they live?

To assess vulnerable groups throughout the country, food security assessments were conducted within regions. The most vulnerable geographic and livelihood groups, according to the SHHS, are discussed below.

Rest Of Sudan (ROS)

South Korfofan had the largest percentage of food insecure households (32 percent). Blue Nile, North Kordofan, Red Sea and Kassala, likewise had elevated food insecurity rates, however prevalence was much lower in these states (11-14 percent food insecure). The states with the lowest percent of food insecure were Northern (1 percent), Gezira (1.5 percent) and River Nile (2.6 percent). Northern and River Nile are two of the three states not covered by WFP programmes.

Livelihood activities most vulnerable to food insecurity in ROS included “agriculture”, “agriculture, hunting and fishing”, “pastoralism”, “unskilled labour”, and “handicrafts”. Conversely, livelihood activities typically considered more urban or market-centred, like “employed work” or “other activities”, were typically better off.

Greater Darfur

Traditional geographic patterns of food insecurity in Greater Darfur prior to the conflict, were largely driven by climate and food productivity factors, leaving households in North Darfur historically most vulnerable. Data from the SHHS, however, now indicates that households in West Darfur, which suffered a disproportionate share of the violence during the time of the survey, were most vulnerable to food insecurity, with a prevalence of food insecurity 7 percent higher than in North Darfur (40 percent VS 33 percent). On the other hand, households in South Darfur remain the least vulnerable with only 13 percent of households reportedly food insecure.

Traditional livelihoods (agriculture, livestock, etc) have been one of the primary casualties of the war. Insecurity and violence have forced historically agro-pastoral communities to migrate to cities or camps. In the process, livestock and other assets (including homes) have been destroyed, sold or looted. The net effect of this has been to undermine livelihoods and to cripple coping capacity. Many of the caretakers in these households have been forced to engage in “unskilled labour” such as wild grass or firewood collection and brick-making in order to provide for the household. Not surprisingly, the SHHS indicated that households engaged in “unskilled labour” were the most vulnerable to food insecurity and were the most conflict affected livelihood group.

Southern Sudan

Jongolei, Warab, and North Bahr el Ghazal were determined to have the largest percentage of food insecure households. Overall, 40-41 percent of households in these three states had either poor or borderline consumption patterns. Central and Western Equatoria had the lowest percentage of food insecure households with 15 and 22 percent of households food insecure.

Households most at risk to food security tended to be more reliant on “agriculture, hunting and fishing”, “food aid assistance”, and “other activities”. As with ROS, households engaged in livelihood activities typically considered more urban or market-centred, like “employed work”, were typically less vulnerable to food insecurity.

What are the causes of food insecurity?

As food consumption was likely driven by different factors in each of the regions examined, region-specific causal analyses were conducted. The main predictors/ risk factors of food insecurity in each region (according to SHHS data) are shown in the following table:

ROS	Greater Darfur	Southern Sudan
1. Asset poor households	1. Asset poor households	1. Asset poor households
2. Female headed households	2. Female headed households	2. IDP households
3. High dependency ratios	3. IDP households	3. Recently resettled households
4. IDP households	4. Households experiencing insecurity	4. Households experiencing 1 or 2 shocks
5. Refugee households	5. Households experiencing multiple shocks	
6. Recently resettled households		
7. Households experiencing multiple shocks		
8. Households experiencing an agricultural shock		
9. Households experiencing a food price shock		

Implications for programming

Taking into account the findings above, the CFSVA has made the following programme recommendations:

Recommended food interventions

Region	Recommended food interventions
Rest of Sudan (ROS)	
	1. Refine targeting of food aid: a. Utilize information in the CFSVA to ensure that food aid programmes reach the most vulnerable b. In accordance with data from 2006, the CFSVA recommends more resources be directed toward North Kordofan and Blue Nile. Levels of food aid to Kassala should be re-assessed. Given that food aid in Kassala is directed towards a long standing refugee community, the CFSVA recommends that any decisions on scaling back food aid to Kassala should be made by programmers familiar with the food security situation on the ground. 2. Improve timing of food aid deliveries by maintaining peak levels of food aid through the month of August (when child malnutrition appears to peak annually).
Greater Darfur	
	1. Continue current targeting and refine targeting where possible. 2. Ensure that food aid programmes continue to target the most conflict affected households. 3. Examine timing of food aid deliveries to determine if there are benefits for ensuring that food aid peaks in June (instead of September) and continues at peak levels until October. 4. Couple food aid and anti-malarial programmes during peak malarial season.
Southern Sudan	
	1. Refine targeting of food aid where possible: a. Ensure that food aid programmes continue to target the most affected by utilizing information gathered by WFP security personnel b. 2006 data revealed that West Bahr el Ghazal and Unity were over-targeted in terms of food aid deliveries and North Bahr el Ghazal, Jongolei and Warab were under targeted. The CFSVA recommends more resources be directed toward each under-targeted state. Levels of food aid to West Bahr el Ghazal and Unity should be re-assessed by programmers knowledgeable about the food security situation on the ground.
	2. Improve the timing of food aid deliveries in the western flood plains region. Here, food aid deliveries should peak in April (instead of June) to correspond with the first annual peak in childhood malnutrition rates. Likewise, high amounts of food aid need to persist one month longer, declining in September (instead of August) as a second large peak in childhood malnutrition is seen during this period. 3. Couple food aid and anti-malarial programmes during peak malaria season (August- October)

Recommended non food interventions

The CFSVA makes the following recommendations for non-food interventions in Sudan:

Region	Recommended non food interventions
Rest of Sudan (ROS)	
	1. Study causes of childhood malnutrition in an effort to better understand the role of food aid in Sudan 2. Institute programmes encouraging proper child caring practices 3. Increase vitamin A supplementation efforts in Kassala and South Kordofan 4. Encourage national salt fortification programmes
Greater Darfur	
	1. Institute programmes encouraging proper child caring practices 2. Increase vitamin A supplementation efforts in South Darfur 3. Encourage national salt fortification programmes 4. Facilitate crop production in agricultural households by disseminating seeds, tools and other farming implements, specifically targeting displaced households
Southern Sudan	
	1. Study causes of childhood malnutrition in an effort to better understand the role of food aid in Sudan. 2. Institute programmes encouraging proper child caring practices 3. Improve the reach and consistency of vitamin A supplementation programmes. Data from the CFSVA indicates that only 30 percent of children from southern Sudan received vitamin A supplementation in the last 6 months and in some particularly underserved areas (Jongolei, North Bahr el Ghazal and Upper Nile) rates of supplementation were around 15-20 percent. 4. WFP should collaborate with other agencies to facilitate crop production in recently resettled households by continuing tool and seed distribution. The CFSVA has shown that fewer households farmed in the last year than report doing so normally. This is likely a consequence of resettled households having missed the window for planting. Consequently, the CFSVA also indicates that these households have more difficulty accessing food. To improve this situation, WFP and FAO should encourage these households to produce crops through seed and tool distributions and WFP should support recently resettled households up to the next agricultural cycle. Farmers in the more productive areas of southern Sudan do not farm to capacity largely because they are unable to transport surpluses to market places. WFP and other agencies should encourage farming to capacity while working on longer term solutions to improve access to markets. Linking farmers in productive areas to market places could have a substantial impact on the food security status of households throughout southern Sudan.

Rest of Sudan (ROS)

1.1 Situational analysis

1.1.1 Overview

The ROS region of Sudan is comprised of 12 states that span three large ecological zones, including the arid desert zones in the north and the low and moderate rainfall savannah zones in the middle and southern parts of the region. Households in the region survive on a mixture of agriculture and pastoralism. Oil has become an important source of economic prosperity and livelihoods, though much of the oil lies in disputed territories between north and south. This region also comprises some of the largest urban centres, including Khartoum, the economic and political centre of Sudan.

Throughout the long turbulent post-independence history of Sudan, households in the northern and central regions of ROS have remained largely unaffected by the various conflicts in Sudan. Certain areas in ROS, however, have experienced the impact of war. The eastern states, like Kassala and Gedarif, have been affected by the long standing insurgent campaign of the Eastern Front Rebel Movement. The Eastern Sudan Peace Agreement, which was signed in October 2006, has since brought an end to this campaign. Households in the "three areas" (Abyei, South Kordofan and Blue Nile) have, likewise, been heavily affected by the war. These regions were the front lines in the long standing civil war between north and south.

1.1.2 Current Food Security Situation

Household food security in the ROS region is defined by local factors, often relating to climate, livelihood or conflict issues. Household food security in the northern states (Northern, River Nile and Red Sea) has been impacted most often by drought, floods and acute increases in food prices. The southern states (and particularly those in the "three areas") have been heavily conflict affected. Thus, food security status has been impacted by limited infrastructure, persistent conflicts over land and water resources, the continued presence of landmines, delays in the normalisation of political and administrative systems, and the need to absorb large numbers of returnees[1]. Efforts to improve food security in this region are largely dependent on the continued implementation of the CPA. Eastern Sudan (Red Sea, Kassala and Gedaref States) has also been conflict affected. This, along with persistent drought, has severely impacted food security status in this region.

1.1.3 Economic Situation and household livelihoods

Overall, the Sudanese economy has been experiencing a prolonged period of economic growth, largely a result of increasing oil exports. Over the past decade, per capita GDP has increased from around 400 USD to over 1000 USD, making Sudan one of the fastest growing economies in Africa. The benefits of these economic improvements, however, have not extended far beyond the economic and political centre of Khartoum, leaving many in urban and rural areas in poverty.

Aside from employment in the oil sector, a large percentage of the population in ROS are subsistence agro-pastoralists, with the importance of agriculture dependent largely on the climate and the annual amounts of rainfall. Households in the desert regions in the north are nomadic pastoralists, while households in the moderate rainfall savannahs of South Kordofan rely more heavily on sedentary farming. Since ROS contains many of the most populated urban centres, employed work, skilled/ unskilled labour and petty trade are also important sources of livelihoods.

1.1.4 Agricultural Sector

In the last decade, the agricultural sector's contribution to GDP has risen to 40 percent, up from 28 percent during the mid 1980's[2]. Agriculture in ROS is not only the largest sector in

[1] WFP, 2006/2007 Annual Needs and Livelihoods Assessment for the Centre, East and "Three Areas".

[2] WFP. 2006/2007 Annual Needs and Livelihoods Assessment for the Centre, East and "Three Areas". .

the economy but it provides the majority of livelihoods in the region[3]. Productivity varies dramatically, given varying climates and is lowest in the north, where rainfall amounts are negligible and highest in the southern states where rainfall amounts are more significant.

In ROS, there are three major farming schemes employed; (1) irrigation; (2) rainfed semi-mechanized and (3) rainfed traditional farming. Traditional rainfed farming in ROS is largely employed in North and South Kordofan. Semi-mechanized rainfed farming schemes are employed throughout the states of Gezira, Sinnar, and Blue Nile. In both traditional and semi-mechanized farming areas, the main planting season is between May and August, with crops harvested anytime between September and February. Sorghum is the main staple crop produced, however, millet, sesame and groundnuts are also important.

Irrigated farming occurs primarily in the Nile Basin, which stretches from Northern state through Khartoum, Gezira, White Nile, Blue Nile and parts of Gedarif and Kassala. According to reports, 4-5 million feddan are currently used for irrigated agriculture[4]. Irrigated schemes allow planting and harvesting throughout much of the year and are used for food crops (ie. sorghum and millet) as well as for almost all the cotton production in Sudan.

The importance of livestock and meat exports to the agricultural sector should not be overlooked. It is estimated that these exports are amongst the most important of all non oil exports. The value of these exports increased from US$98 million in 2003 to US$138 in 2004[5].

1.1.5 Obstacles and hurdles

Obstacles faced by households in ROS are defined by both climate or environmental issues and larger geopolitical concerns. Households in the northern and central regions face poverty, inequitable sharing of resources, food shortages/ higher food prices and natural disasters (like floods, droughts, etc). Households in the eastern and southern regions of ROS, however, are considerably more vulnerable as they face a continuation of the violence if either of the recently signed peace agreements are not honoured.

1.2 Livelihood strategies of households

1.2.1 Traditional Livelihoods and income sources

Households in ROS have traditionally relied on a mixture of agriculture and pastoralism with sedentary agriculture more common in the southern regions and nomadic pastoralism more common in northern areas. The growth of urban centres has also led many households to rely on urban livelihoods like employed work, skilled/ unskilled labour and petty trade. The discovery of oil reserves has recently opened up a new set of employment opportunities and income generating possibilities.

1.2.2 Current livelihood activities/ profiles (from the SHHS)

In the collection of livelihood information for households in ROS, there was a problem with the data. Many households (in fact, a plurality) reported “other activities” as their primary livelihood source. Information on what “other activities” referred to was collected but it was never entered into the dataset. Thus, it was not possible to determine what “other activities” households were engaging in. For purposes of this report, therefore, these activities are simply referred to as “other”.

Not withstanding this problem, findings from the SHHS were generally consistent with previous reports on livelihoods in ROS. “Agriculture”, “other activities” or “unskilled labour”

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[3] Ahmed. E. Adam (2004) Economic Analysis of the Irrigated Cotton Production Constraints in Sudan, Case Study Gezira Scheme. Farming & Rural Systems Series, Volume 61, Margraf Publishers, Weikersheim, Germany.

[4] Abbadi, K., Ahmed, A. Brief Overview of Sudan Economy and Future Prospects of Agricultural Development. Khartoum Food Aid Forum, June 2006.

[5] Abbadi, K., Ahmed, A. Brief Overview of Sudan Economy and Future Prospects of Agricultural Development. Khartoum Food Aid Forum, June 2006.

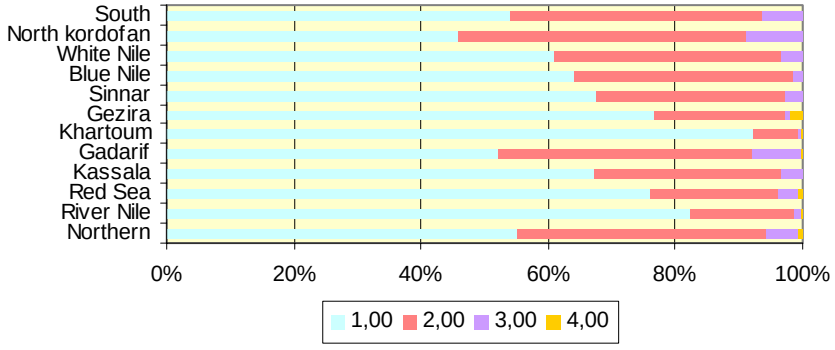
were the most common livelihood activities reported by states. “Agriculture” was the most common livelihood activity in the traditional rainfed farming states of North and South Kordofan and the semi-mechanized and irrigated farming states of Northern, Gezira and Sinnar. “Other activities” was most commonly reported in all other states, excepting Gedarif. Here “unskilled labour” was reported most frequently. The next most common activities reported included a mix of “agriculture”, “livestock”, “employed work”, “petty trade”, “other activities” and “unskilled labour”. The order of importance differed by state. It should be noted that Kassala, Khartoum, and Blue Nile differed slightly from this pattern. In Kassala and Blue Nile, “collecting natural resources” was amongst the most common livelihoods, while in Khartoum, “handicrafts” was common. Table 1 shows the 5 most common livelihood activities by state.

Table 1. Five most commonly reported livelihoods by state in ROS (percent)

	Most reported activity	**2nd most reported activity**	**3rd most reported activity**	**4th most reported activity**	**5th most reported activity**
Central, East and the “Three Areas”	Other (29.5)	Agriculture (27.2)	Employed work (22.9)	Petty trade (13.2)	Unskilled labour (12.4)
Region					
Northern	Agriculture (33.5)	Other activity (27.6)	Unskilled labour (26.7)	Employed work (21.2)	Livestock (14.3)
River Nile	Other activity (33.5)	Agriculture (29.8)	Employed work (25.4)	Handicraft (8.0)	Petty trade (7.9)
Red Sea	Other activity (49.9)	Employed work (33.8)	Livestock (10.4)	Petty trade (7.3)	Skilled labour (5.8)
Kassala	Other activity (27.4)	Agriculture (21.0)	Livestock (20.0)	Collecting natural resources (19.4)	Petty trade (7.9)
Gadarif	Unskilled labour (39.5)	Agriculture (38.9)	Other activity (22.8)	Petty trade (17.2)	Employed work (12.8)
Khartoum	Other activity (38.2)	Employed work (31.9)	Petty trade (8.1)	Skilled labour (6.4)	Handicraft (8.0)
Gezira	Agriculture (29.9)	Other activity (26.9)	Employed work (25.0)	Petty trade (15.1)	Unskilled labour (7.0)
Sinnar	Agriculture (42.2)	Other activity (33.8)	Employed work (18.3)	Petty trade (9.8)	Livestock (9.4)
Blue Nile	Unskilled labour (37.6)	Agriculture (36.0)	Other activity (15.2)	Employed work (14.2)	Collecting natural resources (8.8)
White Nile	Other activity (38.0)	Agriculture (33.0)	Employed work (22.4)	Petty trade (14.9)	Livestock (11.8)
North Kordofan	Agriculture (53.7)	Petty trade (23.4)	Livestock (18.9)	Employed work (16.8)	Other activity (15.6)
South Kordofan	Agriculture (48.7)	Livestock (18.7)	Unskilled labour (16.2)	Petty trade (13.3)	Employed work (12.0)

Figure 1 shows the number of livelihoods engaged in by state. As this illustrates, the majority of household in all states (over 90 percent) reported engaging in one or two activities. Households engaging in three or more activities was most common in Gedarif and North Kordofan.

Figure 1. Number of livelihoods engaged in by state in ROS



In terms of livelihood profiles, the majority of households in ROS reported “other activities” as their main livelihood (25 percent) with 40-45 percent of all households in Khartoum and Red Sea States reporting this. Likewise, twenty to thirty percent of households in Northern, River Nile, Kassala, Gezira, and Sinnar reported “other activities” as well.

“Agriculture” and “employed work” were the second and third most important livelihoods with approximately 20 percent of households reporting these. Agriculture was most commonly reported in North and South Kordofan (39 percent and 42 percent), but a large percentage of households in River Nile, Blue Nile and Gadarif were also involved in agriculture (26 percent, 29 percent, and 29 percent respectively). “Employed work” was reported most often by households in Red Sea and Khartoum states (31 percent and 32 percent respectively), though one-fifth to one-quarter of all households in River Nile and Gezira reported this as well. “Petty trade” and “unskilled work” were the next most commonly reported livelihoods with 9 percent of households reporting them. “Petty trade” appeared most common in Kassala, Gedarif, Gezira, White Nile and North Kordofan, while “unskilled work” was most common in Blue Nile and Gedarif. Fewer than one percent (0.2 percent) of households reported relying exclusively on food aid as their main livelihood. Complete results are shown in Table 2.

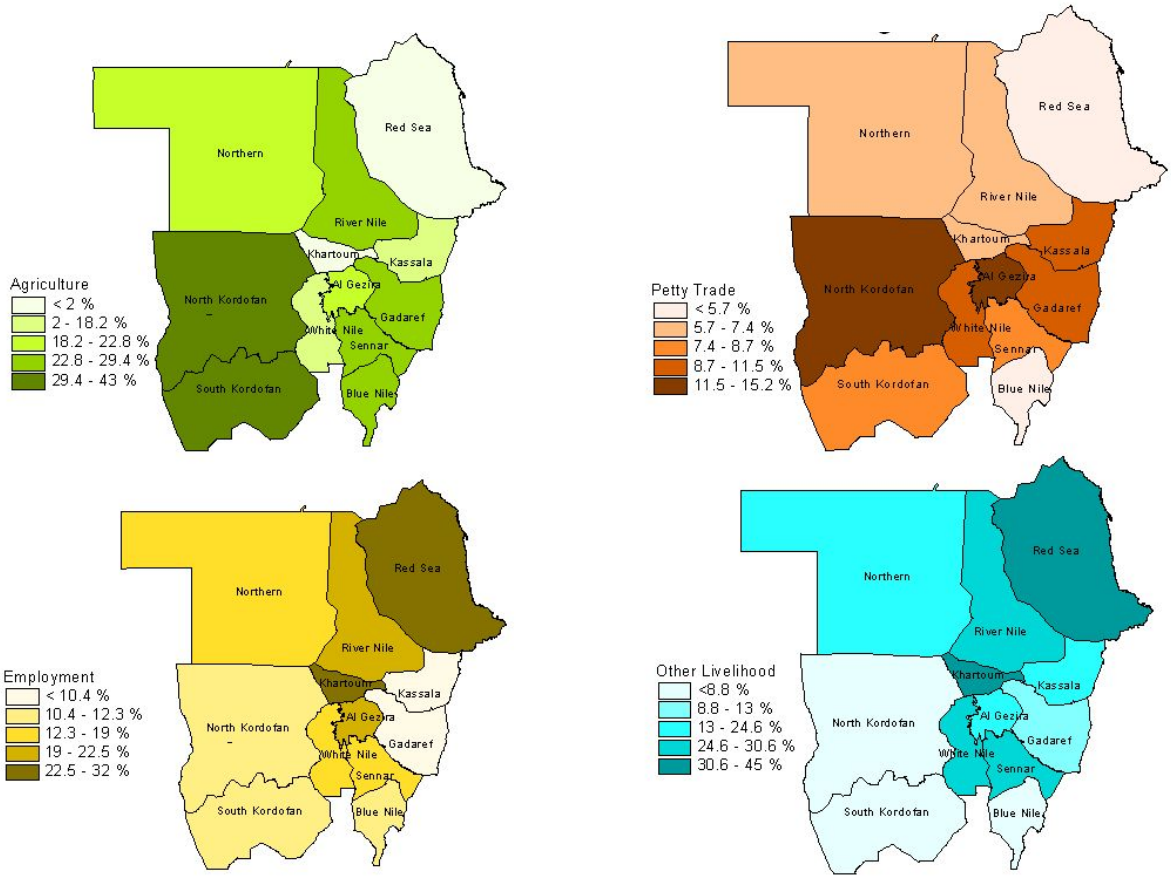
Table 2. Frequency and distribution of livelihood profiles in the ROS region

Livelihood Profile	N Sample	Percent in Population (weighted)	Geographic Distribution
Agriculture	2651	19.9	35-45% of HHs in North and South Kordofan; 25-30% of HHs in River Nile, Blue Nile and Gadarif
Agriculture, fishing & hunting	89	0.6	Fewer than 5% of HHs in any state
Agro-pastoralist	188	1.4	Around 5% of HHs in North Kordofan; fewer elsewhere
Pastoralist	374	3.0	Slightly greater than 10% of HHs in Kassala; fewer than 5% elsewhere
Unskilled work	1185	9.0	10-20% of HHs in Northern and south Kordofan; 25-30% in Blue Nile and Gedarif
Skilled labour	607	5.4	10% of HHs in Northern; above 5% in Khartoum, Gezira, and Sinnar
Employee	2030	19.8	30-35% of HHs in Red Sea and Khartoum; 20-25% of HHs in River Nile and Gezira
Petty trade	1074	9.6	10-15% of HHs in Kassala, Gedarif, Gezira, White Nile, North Kordofan
Handicraft	383	3.8	Just over 5% in River Nile, Kassala, and Khartoum
Collection	278	2.3	Over 10% in Kassala and just over 5% in Blue Nile
Food aid assistance	23	0.2	Almost no HHs rely on food aid
Other	2717	25.0	Approx. 40-45% of HHs in Red Sea and Khartoum; 20-30% in Northern, River Nile, Kassala, Gezira and Sinnar

1.2.3 Geographic clustering of livelihood profiles

Figure 2 maps the top four most common livelihood profiles by state to better illustrate where the different livelihood activities are flourishing.

Figure 2: Top four livelihood profiles by state



1.3 Agricultural production

1.3.1 Cropping Season

The cropping season in traditional rain-fed farming areas of ROS are largely uniform. Planting seasons occur between May and August and crops are harvested between September and December. In irrigated areas and areas located in flood plains along the Nile River, planting and harvesting is done in other times of year as well. Table 3 details the planting and harvest times in states with traditional or semi-mechanized rain-fed farming.

Table 3. Cropping season by state and type of crop in ROS

1.3.2 Current land use and main crops cultivated

As discussed in Chapter 4, households in ROS have the less access to farmland than households in the rest of Sudan. Here, only 40 percent of households have access to farmland, compared to 60 and 73 percent of households in Greater Darfur and southern Sudan respectively. This is to be expected as rainfall patterns are more favourable to crop production in these regions.

Agriculture in ROS takes several forms including traditional rain-fed, semi-mechanized and irrigated farming systems. Mechanized and irrigated farming schemes are most prevalent in eastern states including Gedaref, Sinnar, Blue Nile and parts of Kassala and Gezira. Traditional rain-fed farming is relied upon by households outside of these areas.

Given the various agricultural schemes, there is considerable variation in access to farmland when examined by state. In traditional rain-fed farming areas, the amount of productive farmland is largely driven by rainfall amounts. States in more arid areas like Northern, Red Sea and River Nile have low access to farmland (at 48 percent, 38 percent and 19 percent respectively) while households in more temperate states further south, like North and South Kordofan, have the highest access (at above 70 percent). In irrigated farming areas access to farmland is higher than it would be without these schemes. Overall, 60-70 percent of households in states with the largest irrigated farming sectors, like Sinnar, reported access to farmland. In states like Kassala and Gezira, where only certain regions were irrigated, access to farmland was significantly lower. In these states, only 29 percent and 38 percent of households reported access respectively. Across the ROS region, agricultural production appeared comparable to previous years, as the percentage of households that reported planting crops in 2005 was similar to the percentage that reported usually using land for farming.

As indicated by the cropping seasons, households throughout ROS reported only one harvest lasting 5-6 months depending on the state. Households in Red Sea and River Nile states were the exceptions. Here, households reported that harvests only last 3-4 months.

Hunger seasons typically lasted anywhere from 1-3 months depending on the state, however, households in Red Sea and Blue Nile states reported a slightly longer hunger season at 6 and 4 months respectively. Generally, vegetable gardens were uncommon throughout the region, regardless of state. Only in Northern state did more than 10 percent of households report having one. In most other states, fewer than 5 percent of households did.

Table 4. Land use, length of harvest, length of hunger season and maintenance of vegetable gardens

State	HH uses land for farming	Land planted in past year	How many harvests in one year	How many months food lasts	Hunger season harvest	HH has vegetable plot/garden
Northern	48%	46%	1	6	0	13%
River Nile	36%	33%	1	4	1	6%
Red Sea	19%	12%	1	3	6	2%
Kassala	29%	25%	1	6	0	2%
Gadarif	65%	62%	1	6	1	6%
Khartoum	6%	4%	1	5	0	1%
Gezira	38%	36%	1	8	3	3%
Sinnar	64%	62%	1	8	2	3%
Blue Nile	69%	62%	1	6	4	8%
White Nile	47%	44%	1	6	3	4%
North kordofan	71%	64%	1	5	3	2%
South kordofan	73%	69%	1	5	2	3%
North sudan	40%	36%	1	6	2	3%

Table 5. Percentage of crop producing households and proportion of harvest consumed, sold or exchanged in ROS (percent)

Major Crops per State	Percent of households	proportion consumed*	proportion sold or exchanged*
Northern			
Other cereals	28	87	13
River Nile			
Sorghum	7	76	24
Other vegetables	7	12	88
Red Sea			
Sorghum	10	93	7
Kassala			
Sorghum	23	71	29
Gadarif			
Sorghum	54	70	29
Millet	11	65	35
Maize	7	100	0
Sesame	37	10	90
Groundnuts	12	43	56
Khartoum	**No major crop production**		
Gezira			
Sorghum	33	67	33
Groundnuts	11	14	86
Sinnar			
Sorghum	57	71	28
Millet	8	66	33
Sesame	14	24	76
Blue Nile			
Sorghum	57	82	18
Millet	7	63	11
Sesame	28	22	78
Groundnuts	6	44	56

White Nile			
Sorghum	36	68	31
Sesame	13	12	88
Groundnuts	6	21	79
North kordofan			
Sorghum	18	87	13
Millet	42	89	11
Watermelon	8	77	23
Sesame	27	27	73
Groundnuts	23	29	71
South kordofan			
Sorghum	55	92	0
Millet	17	87	12
Cowpeas	14	87	13
Sesame	24	58	42
Groundnuts	28	59	40

1.4 Food consumption patterns and current household food security

Households in ROS, like the rest of Sudan, have a cereal-based diet, with sorghum and millet as the primary staple crops. When compared to other regions in Sudan, households in ROS tend to have better consumption patterns, consuming more of each food group. Below is a discussion of food consumption patterns and how these patterns differ by state.

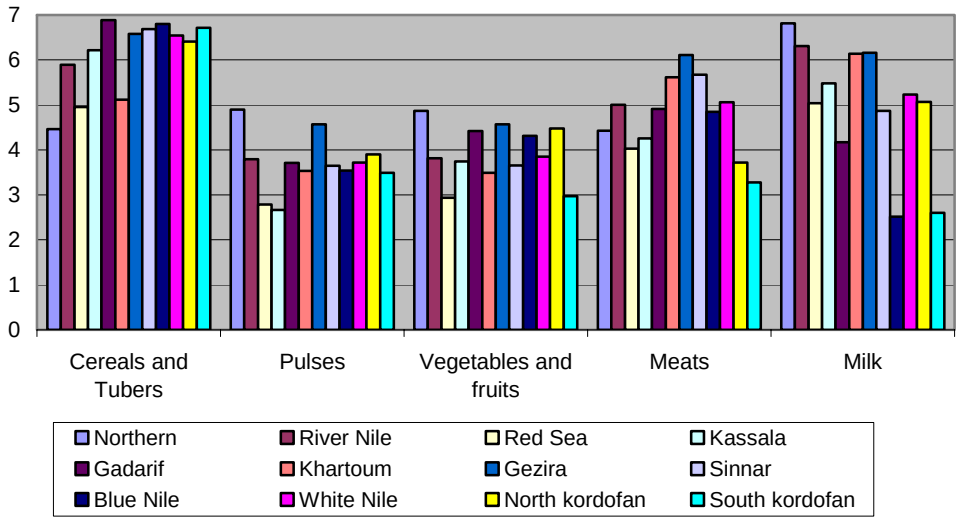
1.4.1 Food consumption patterns and sources of food

Figure 3 shows the number of times per week foods from each main food group are consumed by state. Cereals and tubers (sorghum and millet) are generally eaten 6-7 times per week regardless of state. The only exceptions to this were Northern, Red Sea and Khartoum states. Here, they were consumed 5 times per week or less. Pulses (beans, groundnuts, sesame and cowpeas) were generally consumed between 3 and 4 times per week. Pulses consumption was most frequent in Northern and Gezira states (at 4-5 times per week) and less frequent in Red Sea and Kassala (fewer than 3 times per week).

Fruits and vegetables (pumpkin, watermelon, etc) were consumed between 3 and 5 times per week with households in Northern State reporting the most frequent consumption and household in Red Sea and South Kordofan reporting the least. Meats were also eaten between 3 and 5 times per week. In Khartoum, Gezira and Sinnar households reported the most frequent consumption at almost 6 times per week. Households in South Kordofan reported the least frequent meat consumption at 3 times per week.

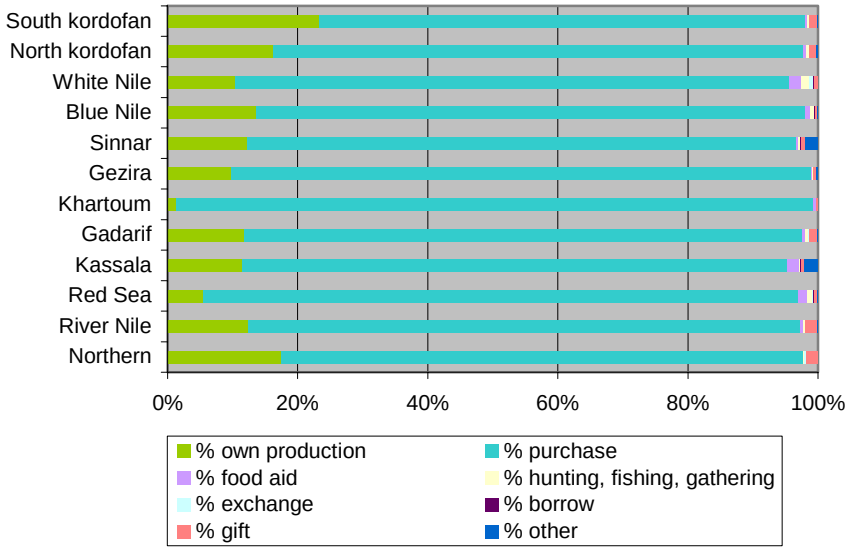
Milk consumption was more varied than the consumption of other foods. Generally speaking, milk consumption was highest in pastoral and agro pastoral areas. States with the most frequent milk consumption were Northern and River Nile. Here households reportedly consumed milk 6-7 times per week. Conversely, households in the states more reliant on sedentary agriculture (like Blue Nile and South Kordofan) were the least likely to consume milk. In both states, households reportedly consumed milk fewer than three times per week.

Figure 3. Number of times food groups were consumed per week by state in ROS



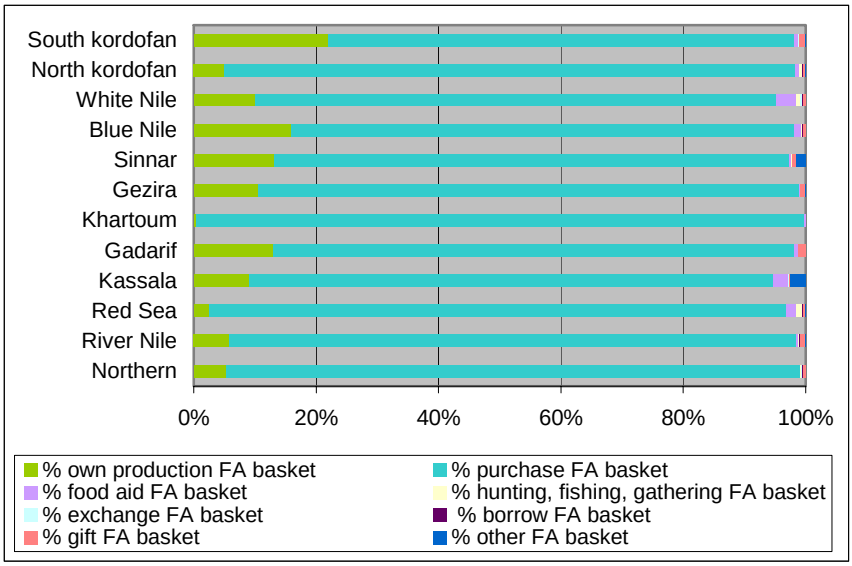
As Figure 4 shows, the majority of households access food (at least three-quarters) through purchase, with urban areas (Khartoum) more dependent on purchase (more than 95 percent) and agricultural areas (South Kordofan) more dependent on own production (over 20 percent). Other means of accessing food, including food aid, borrowing/ gifting etc, were not frequently reported. In fact, fewer than 5 percent of households reported receiving food via ways other than own production and purchase.

Figure 4. Source of food by state in ROS



When examining source of sorghum, oils and sugars only (the foods included in the food aid basket), the same general patterns were seen with purchase remaining the most important source of food and own production a distant second. Illustrating the relative insignificance of food aid programmes in ROS (compared to other regions), the overall contribution of food aid was only slightly more noticeable. Households in both Kassala and White Nile were the most likely to report food aid as their source of food, however, in both states, fewer than 5 percent of households reported this. Other sources of food were even less commonly reported.

Figure 5. Sources of food (only food from food aid basket) by state in ROS



1.4.2 Food security status of households in ROS

As discussed previously, households in the ROS region had the best consumption patterns and were the least likely to be food insecure. Overall, the prevalence of food insecurity here was 8.2 percent.

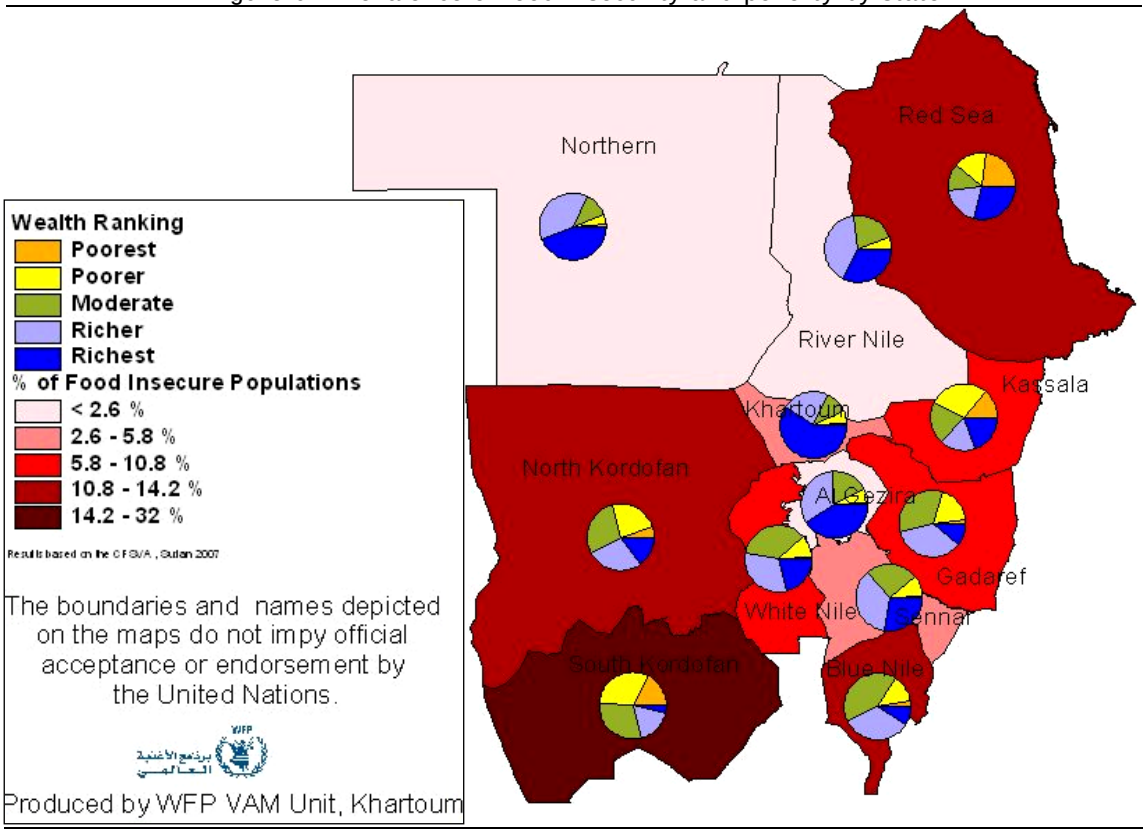
Food insecurity within ROS varied dramatically by state. The states with the largest prevalence of food insecurity included formerly conflict affected areas like South Kordofan (32 percent), Blue Nile (14 percent) and Kassala (11 percent). Areas that have traditionally been vulnerable to food insecurity given poor crop productivity, frequent droughts, high poverty and limited livelihood opportunities, like Red Sea and North Kordofan, also appear to have high rates of food insecurity. Conversely, rates of food insecurity in urban areas like Khartoum are typically much lower, with fewer than 5 percent of households reportedly food insecure. Table 6 shows the prevalence and number of food insecure by state.

Table 6. Food security status by state in ROS

	Food insecure (percent)	Number of people food insecure
Northern	1.0	6393
River Nile	2.6	25272
Red Sea	12.8	94571
Kassala	10.8	186037
Gadarif	9.2	159363
Khartoum	4.2	241357
Gezira	1.5	58210
Sinnar	5.8	76774
Blue Nile	14.2	238336
White Nile	9.8	72689
North Kordofan	13.2	211857
South Kordofan	31.9	380370

1.4.3 Geographic and socio-economic distribution of food security

Figure 6 . Prevalence of food insecurity and poverty by state



1.4.4 Targeting of food aid

Food aid deliveries to households in the ROS region have historically been lower than the amounts sent to Greater Darfur and southern Sudan. In 2006, slightly over 300,000 beneficiaries were fed per month in ROS vs almost 700,000 in southern Sudan and over 2.7 million in Darfur. While it is not possible to assess how well food aid was targeted at household level (given that food aid data was only available at state level), examining the percentage of food insecure households (and the number of people with clearly deficient dietary patterns) by the share and number of beneficiaries per state, it is possible to determine whether resources are being properly targeted.

This analysis revealed several important findings. First, according to Table 7, it appears that two of the three states where WFP has no presence (Northern and River Nile) have amongst the lowest prevalence of food insecurity and the lowest number of food insecure, validating WFP's decision to focus programmes elsewhere.

The third state not covered by WFP programming was Khartoum. Here, food insecurity prevalence was also low although given that Khartoum is heavily populated, the numbers of food insecure were among the highest, second only to South Kordofan. While this seems to argue for extending current programmes to cover Khartoum, it is not clear that this is indeed the best course of action. Given the highly urban nature of Khartoum, food availability is not the issue. Instead, this is likely a poverty issue (and thus food access issue) and food aid, in this context, may cause more problems than it solves.

Secondly, as table 7 and Figures 7 and 8 indicate, Kassala was over targeted both in terms of the share and number of beneficiaries and share of food insecure households (and the number with poor food consumption patterns). Overall, data from the CFSVA indicates that Kassala has approximately 11 percent of the total food insecure in the region, yet they receive 39 percent of the total food aid delivered in ROS. This is explained by the large food aid deliveries to long standing Eritrean refugee populations within the state.

Finally, both North Kordofan and Blue Nile were substantially under targeted. Specifically, North Kordofan had 12 percent of the food insecure in the region (approximately 212,000

people) but was receiving less than 1 percent of the total food aid delivered (enough for fewer than 3,000 beneficiaries). Likewise, Blue Nile had 13 percent of the food insecure in the region (approximately 238,000 people) but received only 7 percent of the total food aid (enough for fewer than 22,000 beneficiaries).

Table 7. Food security status, share of food insecure and share of beneficiaries by state in ROS

	Food insecure (percent)	Number of people food insecure	Number of beneficiaries	Share of food insecure/ Share of beneficiaries
Northern	1.0	6393	--	0.4/0.0
River Nile	2.6	25272	--	1.4/0.0
Red Sea	12.8	94571	43330	5.4/13.8
Kassala	10.8	186037	123341	10.6/39.3
Gadarif	9.2	159363	7584	9.1/2.4
Khartoum	4.2	241357	--	13.8/0.0
Gezira	1.5	58210	1357	3.3/0.4
Sinnar	5.8	76774	2055	4.4/0.7
Blue Nile	14.2	238336	21576	13.6/6.9
White Nile	9.8	72689	15716	4.2/5.0
North Kordofan	13.2	211857	2741	12.1/0.9
South Kordofan	31.9	380370	96,050	21.7/30.6

Figure 7. Share of food insecure households examined in relation to share of beneficiaries by state in ROS

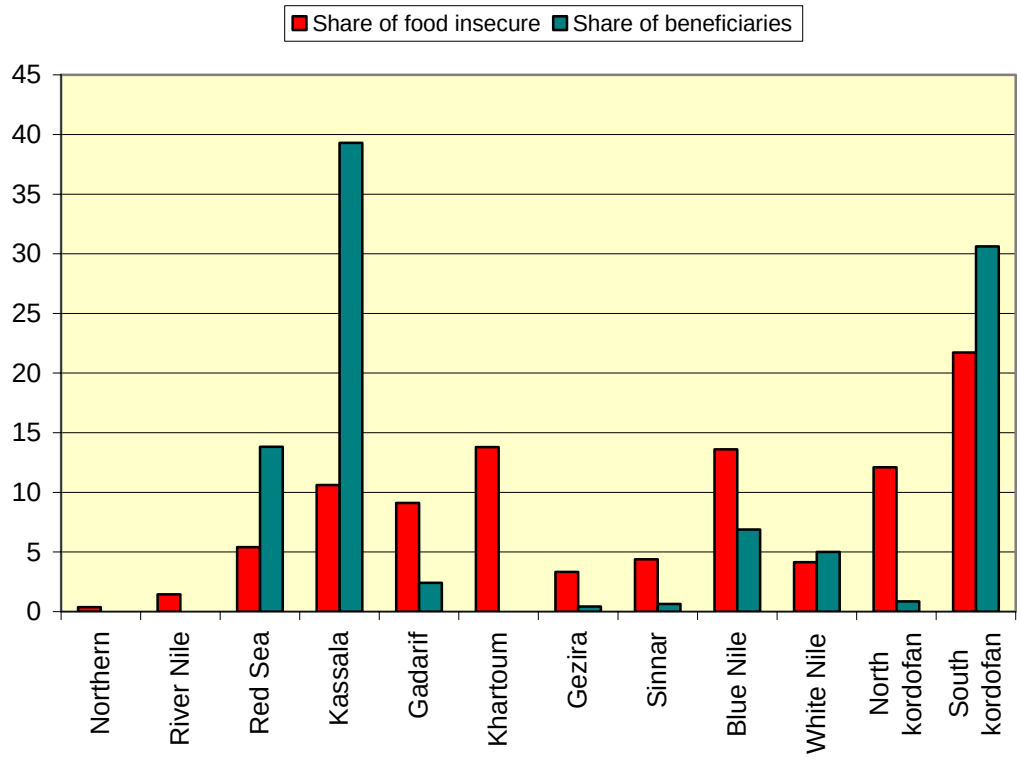
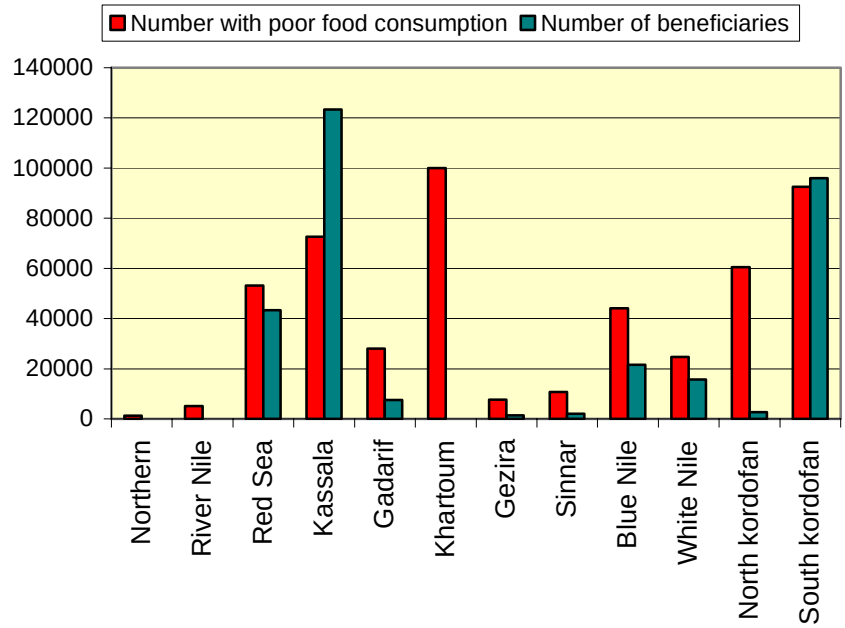


Figure 8. Number of food insecure households examined in relation to number of beneficiaries by state in ROS



1.4.5 Underlying causes of food insecurity

This section explores the immediate and underlying causes of food insecurity in ROS. To assess these causes, probit models were developed using the dichotomous food secure (yes/no) variable as the dependent variable and various demographic, household and socio-economic characteristics (previously determined to be associated with food insecurity in bivariate comparisons) as the independent variables. Stata 9.2 was used for this analysis. To ensure correct estimation of standard errors (ie to properly take account of clustering effects inherent in the sample design), Stata's "robust cluster" command was utilized in the analysis[6].

Persistent high rates of food insecurity throughout Sudan have historically been conflict related. This is reflected by the distribution of food insecurity by region, with households in areas disproportionately war affected (Southern Sudan and Greater Darfur) having the largest percentage of food insecure households. In ROS, however, most states (with the exception of the "three areas") have escaped significant and direct impacts of the conflict. This is reflected in the comparably low rates of food insecurity (5-10 percent). On the whole, ROS is more industrialized, more urbanized, wealthier, and less reliant on agriculture. Given these distinctions, food insecurity in the region is likely due to poverty, livelihoods, or shocks (food price changes, illnesses, deaths, crop loss, etc).

Independent variables examined were: sex of head of household, dependency ratio, household displacement status, wealth index, livelihood strategies, and exposure to shocks (by number and type of shock). For this analysis, several regression models were developed, as the inclusion of each of these variables into the same model would result in problems with collinearity (two variables explaining the same effect, ie. wealth status and

[6] The "robust cluster" command allows the inherent similarities between households within clusters to be taken into account during the analysis. By accounting for similarities within clusters, proper standard errors (and thus 95% confidence intervals, p-values etc) can be calculated. Importantly, accounting for the effects of clustering does not affect the coefficients—or magnitude of effect of each variable in the model. To illustrate, lets say agricultural households—according to regular linear regressions—have a food consumption score 10 points lower than pastoral households, with a p-value of 0.030. Linear regression using the "robust cluster" command will show the same differential in terms of food consumption scores (agricultural households are 10 points lower), but in this case, given the clustering effects, the p-value may rise to 0.05, 0.10 (or even higher depending on how strong the clustering effects are).

livelihoods, as wealth is correlated with livelihoods). The first step was to assess whether characteristics of typically vulnerable households (female headed households, households with a high dependency ratio, and displaced or refugee households, households experiencing shocks) were associated with food insecurity. The next step was to examine (taking account of these basic hh characteristics) the relationship between asset wealth and food security status, assessing whether any of these basic household characteristics modified the effect of asset wealth on food security status. Given that food security determinants are likely different by place or residence, each analysis was conducted separately for urban and rural areas. The last step was to assess the relationship between household livelihoods and food insecurity. Here, interactions between basic household (hh) characteristics and livelihood strategies were assessed as well. The models assessed are shown below:

Probit= b0 + b1(female hhh) + b2(high dependency ratio) + b3(IDP hhs) + b4(refugee hhs) + b5(returned IDPs) + b6(returned refugees) + b7(hh experience one shock) + b8(hh experienced two shocks) + b9(household experienced three shocks)

Probit= b0 + b1(female hhh) + b2(high dependency ratio) + b3(IDP hhs) + b4(refugee hhs) + b5(returned IDPs) + b6(returned refugees) + b7(hh experienced sickness/death) + b8(hh experienced agricultural shock) + b9(household experienced insecurity shock) + b10(household experienced price shock)

Probit= b0 + b1(female hhh) + b2(high dependency ratio) + b3(IDP hhs) + b4(refugee hhs) + b5(returned IDPs) + b6(returned refugees) + b7(hh experience one shock) + b8(hh experienced two shocks) + b9(household experienced three shocks) + b10(hh wealth index)

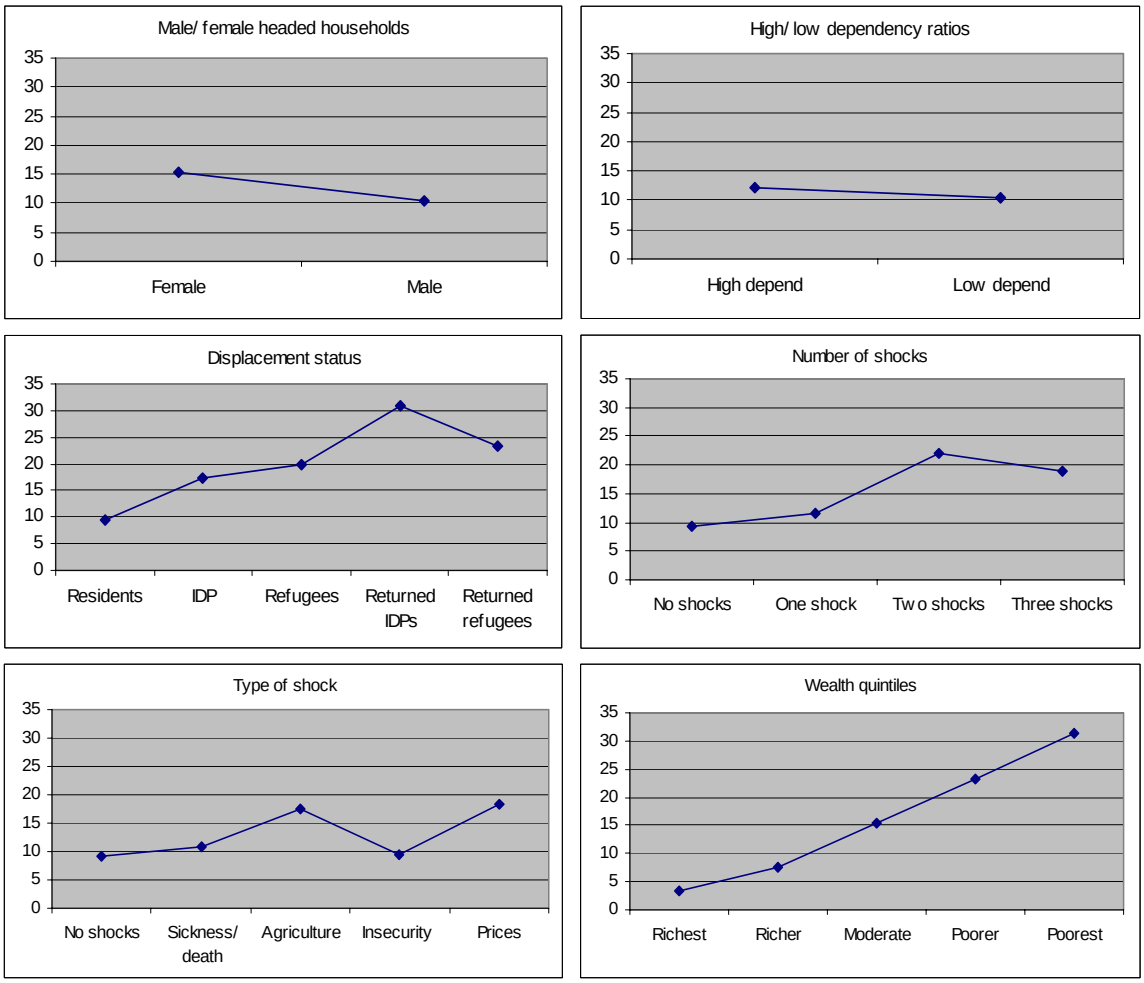
Probit= b0 + b1(female hhh) + b2(high dependency ratio) + b3(IDP hhs) + b4(refugee hhs) + b5(returned IDPs) + b6(returned refugees) + b7(hh experience one shock) + b8(hh experienced two shocks) + b9(household experienced three shocks) + b10(agricultural, fishing and hunting hhs) + b11(agropastoralist hhs) + b12(pastoralist) + b13(unskilled labour hhs) + b14(skilled labour hhs) + b15(employee hhs) + b16(petty trade hhs) + b17(handicraft) + b18(collection) + b19(food aid assistance hhs) + b20(other activity hhs)

1.4.5.1 Basic predictors of food insecurity

As figure 9 indicates, female headed households, households with high dependency ratios, displaced households, and households experiencing shocks were all more likely to be food insecure. Female headed households were more food insecure by approximately 5 percent on average than male headed households. Likewise, current IDP and refugee households were more food insecure on average by 8-11 percent respectively than residents. Former IDP households that have recently been resettled were worst off, with over 30 percent reportedly food insecure (versus 8 percent of residents). Also, households that experienced two shocks were worse off with approximately 23 percent food insecure (vs 10 percent of households that experienced no shock). When examined by type of shock, households experiencing agricultural (drought, floods, crop or livestock disease/pests) and food price shocks were most affected.

A seperate assessment of wealth status indicated that asset wealth, more than any other factor, was the most significant determinant of food security status. Overall, over 30 percent of households in the poorest quintile were food insecure while fewer than 5 percent of households in the wealthiest quintile were.

Figure 9. Significant predictors of household food security status, taking account of potential confounders



When a similar analysis was conducted in urban and rural areas, the same general results were seen with several noteworthy exceptions. In a departure from the overall findings, female headed households and households with high dependency ratios in urban areas were not significantly more food insecure. Wealth status appeared to be a stronger determinant of food security status in rural rather than urban areas.

Assessing the impact of wealth on the overall model in both urban and rural areas, a couple noteworthy findings emerged. First, wealth appeared to be confounding the relationship between food insecurity and shocks. Thus, asset poor households were the only households in urban areas that were affected by shocks to such an extent that food security status worsened. Likewise, in rural areas, while both wealthy and poor households were affected by shocks, poorer households were disproportionately impacted.

1.4.5.3 Role of livelihoods

Similar models were constructed examining the association between livelihood profiles and food security status. This analysis revealed that households relying on “agriculture”, “agriculture/hunting and fishing”, “pastoralism”, “unskilled labour” and “handicraft” work were all more food insecure than households relying on the most prevalent livelihood in the region, “other” activities, while only households relying on “employed work” had better food consumption. The effect of livelihoods was not modified by displacement status or the number of shocks experienced by the household.

1.5 Most common shocks

While section 1.4 suggests that the number of shocks experienced may be a key determinant of food security status, table 8 details the top three shocks by state in ROS. The most common shock reported by households in throughout the region was sickness of

family members. This was true in all states with the exception of Red Sea and South Kordofan. In these two states, higher prices were listed as the most common shock. This contrasts sharply with both Darfur and Southern Sudan where insecurity was the most common shock. Other common shocks included crops pests/ disease, loss or lack of employment opportunities, drought and death in households.

Table 8. Top three shocks reported by households in each state in ROS

State	Type of shock	Percentage of all households reporting this shock
Northern	Sickness in HH	6
	Death in HH	1
	Loss/lack of employment	1
River Nile	Sickness in HH	14
	Crop pest/disease	2
	Death in HH	2
Red Sea	Higher prices	7
	Sickness in HH	6
	Loss/lack of employment	5
Kassala	Higher prices	4
	Sickness in HH	3
	Drought	2
Gadarif	Sickness in HH	12
	Loss/lack of employment	7
	Crop pest/disease	6
Khartoum	Sickness in HH	8
	Loss/lack of employment	7
	Death in HH	2
Gezira	Sickness in HH	4
	Loss/lack of employment	2
	Crop pest/disease	1
	Death in HH	1
	Drought	1
Sinnar	Sickness in HH	10
	Drought	4
	Higher prices	2
	Crop pest/disease	2
	Death in HH	2
	Insecurity, violence	2
Blue Nile	Sickness in HH	10
	Floods	6
	Crop pest/disease	6
White Nile	Sickness in HH	8
	Crop pest/disease	3
	Higher prices	2
	Death in HH	2
	Loss/lack of employment	2
North Kordofan	Sickness in HH	10
	Drought	8
	Crop pest/disease	7
South Kordofan	Higher prices	2
	Sickness in HH	2
	Drought	2

1.6 Household vulnerability to shocks

As stated in Chapter 8, vulnerability to becoming food insecure because of a particular shock depends on the exposure of households to that shock and their capacity to cope with the effects of the shock.

1.6.1 Household vulnerability to conflict

Conflict and violence has characterized Sudan for decades, however, the bulk of the violence has been focused in southern Sudan and Darfur. The northern and central regions of the country have largely escaped the direct impact of the fighting and are not particularly vulnerable to insecurity or violence. This is not the case throughout the ROS region, however. Insecurity and violence was a constant in the "three areas" for much of the civil war between north and south. While the CPA brought an end to the fighting, many households in Blue Nile and parts of South Kordofan (Abyei specifically) remain vulnerable to insecurity should the peace agreement fall apart. Likewise the low level insurgency that plagued Kassala and other eastern states left many households in these areas vulnerable to conflict and insecurity as well. While the Eastern Sudan Peace Agreement has officially ended the conflict, these households remain vulnerable to insecurity if fighting begins anew.

1.6.2 Vulnerability to becoming food insecure from drought in relation to pre-shock food security

Using the methodology described in Chapter 8, poor households in states heavily reliant on sedentary agriculture like North and South Kordofan were the most susceptible to drought while households in more agro-pastoral areas, like Northern and Red Sea states, were less vulnerable. Overall, 31 percent and 39 percent of households in North and South Kordofan respectively, were considered vulnerable to drought while only 6 percent and 8 percent of households in Northern and Red Sea were considered so. Not surprisingly, the area least vulnerable to drought was the primarily urban state of Khartoum. Importantly states heavily reliant on mechanized and irrigated farming schemes, like Gedaref, Sinnar, Blue Nile and parts of Kassala and Gezira, were considered not acutely vulnerable to drought and thus were excluded from this analysis. Complete results of this analysis are shown in Table 9.

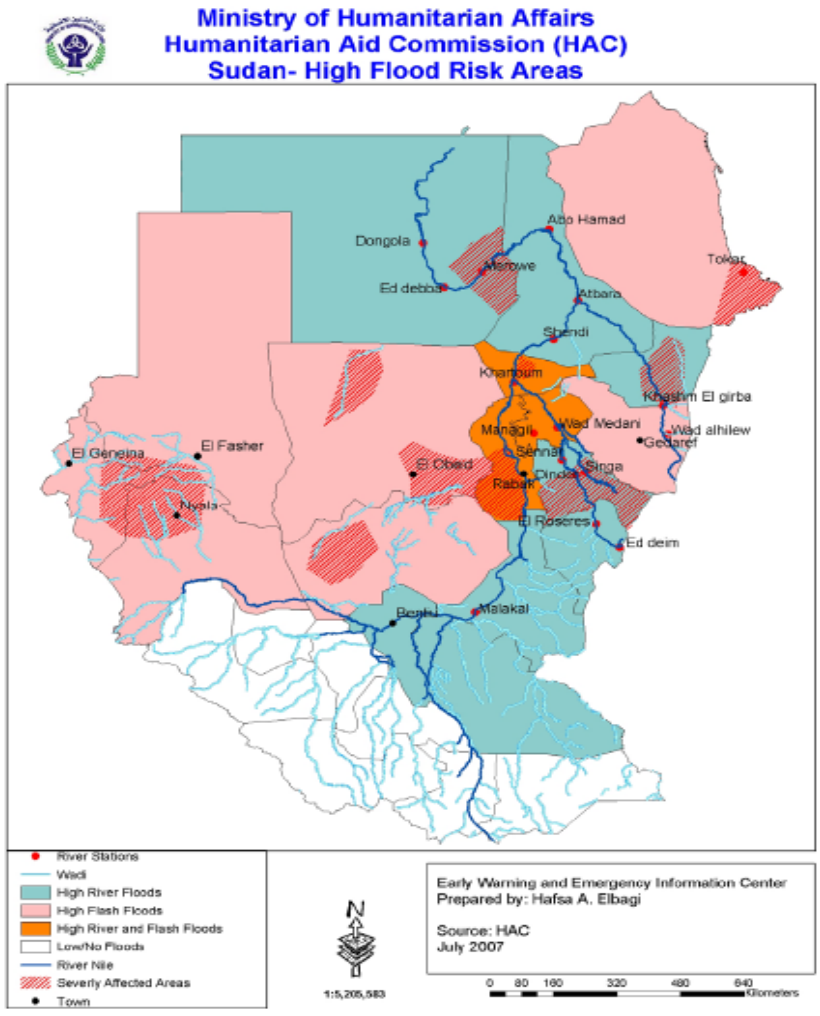
Table 9. Vulnerability to drought by state in ROS

	Percentage susceptible to drought
Northern	6.3
River Nile	20.9
Red Sea	8.2
Khartoum	1.7
White Nile	14.5
North Kordofan	31.1
South Kordofan	39.3

1.6.3 Household vulnerability to floods

As explained in Chapter 8, vulnerability to floods is less easily mitigated by wealth status or choice of livelihoods. Instead, all households located in flood plains will likely be affected and thus all households living in these areas were considered to be "at risk".

Figure 10. High risk flood areas in ROS



Source: Ministry of Humanitarian Affairs, Humanitarian Aid Commission (HAC). Early Warning and Emergency Information Centre. Vol II (1). February 2007

As Figure 10 illustrates, households in ROS appear very vulnerable to flooding. High river flooding is a particular concern in Northern, River Nile, Kassala, Sinnar and Blue Nile states, while flash floods are the concern in North and South Kordofan, Gedaref, and Red Sea states. The central states of Khartoum, White Nile and Gezira are vulnerable to both flash flooding and high river floods. Many regions, however, have been classified as severely flood affected areas.

These include:

- Two regions in North Kordofan (from El Obeid both south and east to border; North central and western region)
- Western region of South Kordofan
- Most of Sinnar
- The southern region of White Nile
- Region north of Khartoum in Khartoum state
- Region in Kassala state from Khashim el Girba to the North
- Southeastern coastal region in Red Sea

Western region of Northern, mostly the areas surrounding Marowe

1.7 General health and nutrition situation

The main findings from the child health and nutrition section of the household questionnaire are reported in the following sections. Overall, the health and nutrition situation in ROS was better than in either Greater Darfur or southern Sudan.

1.7.1 Child health

1.7.1.1 Diarrhea

In ROS, as table 10 indicates, 21.5 percent of children overall experienced an episode of diarrhea in the two weeks preceding the survey. Diarrheal disease was most prevalent in Blue Nile (33 percent), Gedaref (29 percent) and North Kordofan (25 percent) and least common in Red Sea and Kassala (15 percent and 16 percent respectively).

In response to an episode of diarrhea, only one-fifth of children reportedly consumed ORS while almost one-half consumed government recommended, homemade fluids. This pattern persisted regardless of state. The only exception was Kassala. Here as many children reported consuming ORS as did government recommended fluids (42 percent vs 41 percent respectively).

Table 10. Prevalence of diarrhea and types of treatments by state in ROS (percent)

	Child had diarrhea in last 2 weeks	Drank ORS	Government-recommended homemade fluid
Northern	18.6	18.8	55.7
River Nile	17.7	19.6	59.3
Red Sea	15.2	27.5	56.6
Kassala	16.3	41.5	41.1
Gadarif	28.5	17.3	29.5
Khartoum	20.1	21.1	69.2
Gezira	17.4	15.6	54.5
Sinnar	21.8	18.7	58.0
Blue Nile	33.0	17.0	26.9
White Nile	21.2	13.7	42.1
North kordofan	24.8	14.9	38.5
South kordofan	17.9	15.0	35.6
ROS-—Overall	21.5	19.1	47.1

1.7.1.2 Fever

Overall, only 12 percent of children had a fever in the two weeks preceding the survey. While this prevalence was significantly lower than that seen in southern Sudan, it was comparable to Darfur. Fever was most prevalent in Gezira and Blue Nile. In both states, 17 percent of children reported at least one episode in the weeks preceding the survey. Fever was least common in Red Sea state. Here only 4 percent of children reported such an episode.

Table 11. Prevalence of fever and types of treatments by state in ROS (percent)

	Child ill with fever in last 2 weeks	Child seen at health facility during illness	Child took medicine prescribed at health facility
Northern	7.0	76.8	100.0
River Nile	14.1	94.3	100.0
Red Sea	3.9	69.9	95.0
Kassala	10.9	93.6	95.8
Gadarif	11.2	55.9	95.1
Khartoum	8.0	93.2	98.1
Gezira	17.3	88.5	96.7
Sinnar	12.5	62.9	100.0
Blue Nile	17.2	62.4	98.2
White Nile	14.6	77.8	100.0
North kordofan	13.1	65.7	100.0
South kordofan	9.4	57.4	97.9
ROS- Overall	12.0	77.2	97.8

In response to fever, over three-quarters of all affected children were seen in a health facility. Visits to health centres were least common in South Kordofan and Gedarif. Here, only 55-56 percent of children reported being seen. Conversely, health centre visits were more common in River Nile, Kassala and Khartoum, with 90-95 percent of children reporting a visit. Among children that visited health centres, however, there was little variation in the percentage that took the prescribed medicine. Across states, 95-100 percent of children adhered to the medicinal regime.

1.7.1.3 Acute respiratory infections

Examining prevalence of acute respiratory infection, 28 percent of children overall reportedly had a cough in the two weeks preceding the survey, and 15 percent of these children had difficulty breathing during these episodes. Examined by state, there were only small variations in prevalence, with one-fifth to one-third of children experiencing a cough and anywhere from 10-20 percent of these children reporting difficulty breathing. The only exceptions were seen in Blue Nile and North Kordofan. Here, 41 percent and 43 percent of children reported having a cough and one-fifth of these children reported having difficulty breathing during these episodes.

The percentage of children that sought treatment while sick with a cough was almost 10 percent lower than the percentage that sought treatment for diarrhea. Overall, only 69 percent sought treatment. Generally speaking, children were least likely to seek treatment in Blue Nile, Sinnar, North and South Kordofan and Gedarif. Conversely, seeking treatment was most common in Khartoum. Table 12 shows complete results for each state.

Table 12. Prevalence of fever and types of treatments by state in ROS (percent)

	Child ill with cough in last 2 weeks	Difficulty breathing during illness with cough	Sought advice or teatment for illness
Northern	24.6	13.3	80.5
River Nile	24.1	13.4	62.0
Red Sea	21.3	9.5	70.9
Kassala	21.6	11.4	70.9
Gadarif	26.5	14.6	61.2
Khartoum	25.3	15.4	85.8
Gezira	23.8	13.9	74.4
Sinnar	32.0	21.6	58.1
Blue Nile	43.2	20.5	56.5
White Nile	21.6	11.5	70.5
North kordofan	41.4	20.2	59.4
South kordofan	25.3	13.3	58.9
ROS- Overall	28.1	15.5	69.0

1.7.2 Child feeding practices

Summary statistics by state, examining 1) what percentage of children received complementary foods in the first 6 months of life (contrary to WHO recommendations), 2) average age complimentary foods were introduced, and 3) average age breastfeeding stopped, are shown in Table 13 below.

As it indicates, almost 70 percent of all mothers reported introducing foods other than breastmilk to children within the first six months. Mothers in Northern state were the most likely to introduce foods other than breastmilk during this time, with 80 percent reportedly doing so. Mothers in Gezira and Khartoum were the next most likely to do so with approximately three-quarters giving other foods. Conversely the mothers least likely to do so were in Kassala and South Kordofan. Here, 55-60 percent reportedly introduced food other than breastmilk during this period.

Table 13. Child feeding practices by state in ROS			
	Other foods in first 6 months? (percent)	**Age at which breastfeeding stopped**	**Age at which additional foods started**
Northern	79.5	11	5
River Nile	68.2	14	5
Red Sea	65.1	9	5
Kassala	54.7	13	6
Gadarif	66.0	15	6
Khartoum	72.5	12	5
Gezira	73.9	14	5
Sinnar	66.9	14	6
Blue Nile	69.4	15	6
White Nile	71.8	13	5
North kordofan	68.7	15	5
South kordofan	59.5	13	6
ROS-- Overall	68.7	14	5

The age breastfeeding stopped varied by state, with a low of 9 months reported by mothers in Red Sea and a high of 15 months reported by mothers in Gedarif, Blue Nile and North Kordofan. Solid foods were generally introduced into a child's diet sometime in their fifth or sixth month, depending on the state.

1.7.3 Children's nutritional status

While the anthropometric data collected by the SHHS was not included in this analysis, it was possible to examine general wasting patterns in ROS using secondary data sources. To do so, Global Acute Malnutrition (GAM), Severe Acute Malnutrition (SAM) and Under-5 mortality (U5 MR) rates gathered in many localized surveys from 2000 to the present were compiled by month of survey and averaged to attain a mean monthly GAM, SAM or U5 MR rate. Figure 11 shows these fluctuations by month of survey. While this figure should be interpreted carefully (given the inherent limitations—see footnote), they do, given the number of surveys conducted, provide the best available estimate of fluctuations in nutrition and mortality indicators by month[7]. Importantly, this can provide insights into causes of child malnutrition.

Figure 11 reveals several important findings. First, U5 MR, which fluctuates between 0 and 2 per 10,000 per day depending on the month, were significantly lower on average than corresponding mortality rates in either Darfur or southern Sudan. GAM rates, while still high and often hovering near the emergency threshold of 15 percent, again appear to be substantially lower on average than either Darfur or southern Sudan. In fact, annual GAM rates peak at 18 percent in ROS, while they peak at 25-30 percent in the rest of Sudan.

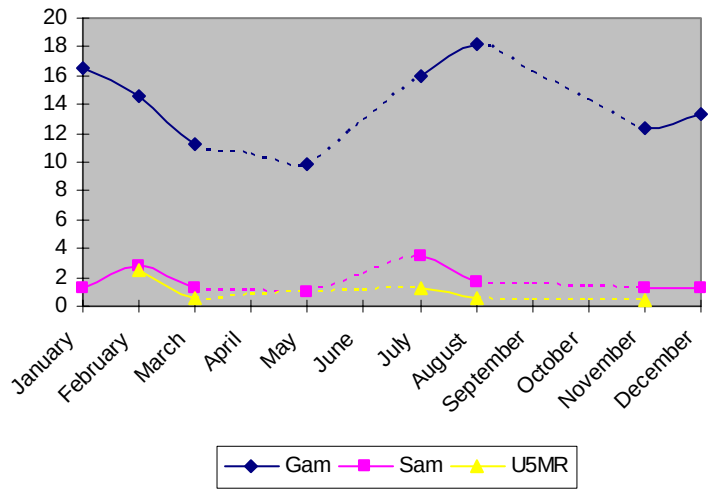
Secondly, this trend analysis confirms what has been seen repeatedly in previous studies--malnutrition rates (GAM and SAM) tend to peak at the start of the rainy (and hunger) season. While this has traditionally been attributed to deteriorating (drinking) water sources (as opposed to food related causes), assessing these patterns according to other well established patterns in terms of disease, livelihoods, etc provide a more robust picture of the converging nutritional pressures on children during this period. The end of the dry season/ the beginning of the rainy season is typically a time when: 1) food supplies are

[7] Limitations include: 1) surveys within and across months are not necessarily from the same year and likely do not cover the same areas ; 2) sample sizes in most cases are quite small (representative of only a small geographic or administrative area) resulting in very large confidence intervals for GAM, SAM, and U5CMR; 3) surveys are conducted by different organizations which likely means that methods and generally quality differ (and for purposes of this analysis differences in methods and quality were not taken into account); 4) GAM, SAM and U5 MR shown are likely the rates for the most vulnerable populations (as ngo's are likely to focus on typically more vulnerable areas); and 5) fewer nutrition surveys have been done in the ROS region than in other regions, making it more difficult to distinguish trends.

becoming strained (with households beginning to rely on less preferred food), 2) meningitis outbreaks are common, 3) households being forced to rely on the less safe sources of drinking water, and 5) vector borne and infectious diseases (especially diarrhea) are more prevalent.

Each of these factors tend to work synergistically to affect child malnutrition. As the dry season progresses, meningitis outbreaks become common. The lack of humidity in the air leaves mucous membranes (primarily in the nose) very dry and more prone to tears which facilitates transmission person-person. Simultaneously, water sources (wells or surface water) tend to dry up forcing households to rely on less desired water sources that are more easily contaminated by animal or human faeces. Consumption of contaminated water leads to higher prevalence of diarrheal disease. Increased incidence of infectious diseases, such as meningitis and diarrhea, initiate the malnutrition infection cycle, with illness begetting malnutrition and malnutrition leaving a child more vulnerable to disease, eventually (in cases of particularly vulnerable children) leading to death. The start of the rains does not alleviate this problem but rather exacerbates it, as heavy rains and resulting floods further facilitate contamination of available water sources. Also, the arrival of the intertropical convergence zone (ITCZ) which initiates the rains is likely associated with a bloom in vector borne and infectious diseases. Taking all of this into account, it appears likely that disease burdens play a large role in this sudden deterioration.

Figure 11. Annual fluctuations in GAM, SAM and U5 mortality rates in ROS



Finally, a broader point can be made here. In ROS, unlike Greater Darfur and southern Sudan, there is only one annual peak in child malnutrition rates. In both Darfur and southern Sudan, the second peak around October is hypothesized in this report to be due to the converging pressures of food shortages (accompanying the end of the hunger season) and peak malarial season. It is noteworthy that in ROS, which is generally less severely impacted by malaria, this second peak is not observed.

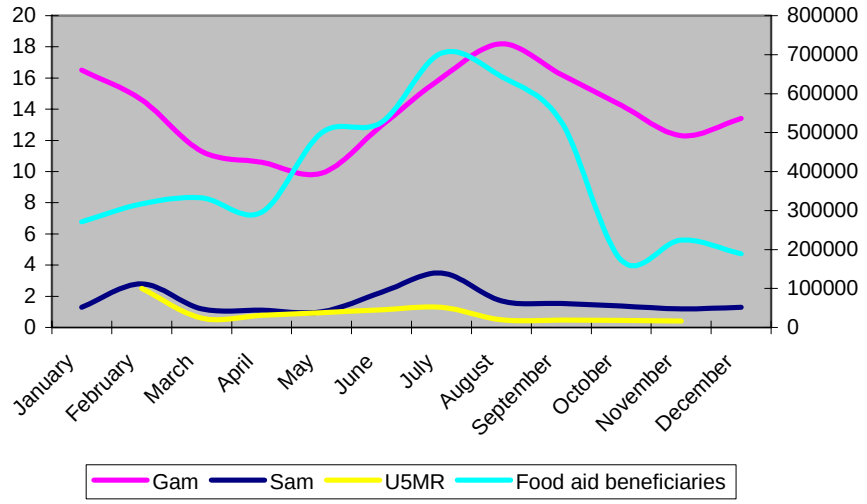
1.7.4 Role of food aid in addressing malnutrition

Examining fluctuations in GAM and SAM rates by the number of WFP food aid beneficiaries by month, it is possible to assess both the timeliness of food aid deliveries (ie. whether peaks in food aid deliveries correspond with peaks in malnutrition rates/ hunger seasons) and whether food aid may be having an impact. It is important to acknowledge that this analysis has some serious limitations. First, this assessment only examines food aid deliveries in one year (2006) while annual nutritional patterns are compiled from data from 2000 to 2006. A more complete assessment would examine food aid patterns for the same time period. Secondly, the number of nutrition surveys per state was not adequate for a state level analysis. Thus, the number of food aid beneficiaries was aggregated to the ROS region level. This overlooks variations in amounts and timing of food aid deliveries and any fluctuations in malnutrition rates by state. Finally and most importantly, drawing conclusions on the nutritional impact of food aid from aggregate data is problematic as there are countless other determinants of malnutrition that this analysis cannot take into account. Therefore, discussions of observed correlations should not be mistaken for claims of causality (or as evidence that food aid is not having an impact). Instead, the intent here is to simply describe the patterns seen, in the hope that it might shed some new insights on the associations being examined.

Examining food aid deliveries in relation to child malnutrition rates, a couple important findings emerged. First, the timeliness of food aid deliveries in 2006 appeared largely adequate, with the number of beneficiaries increasing correspondingly with increases in the prevalence of child malnutrition. Specifically, child GAM rates increased from 10 to 18 percent from May to August. During this same period, the number of beneficiaries rose from approximately 300,000 per month to 700,000 per month. Likewise, from August through November both child malnutrition rates and the number of beneficiaries declined significantly.

Secondly, while the timing was generally adequate, food aid deliveries peaked too early. Specifically, the number of beneficiaries served peaked at approximately 700,000 in July and then declined in August to approximately 600,000. From July to August however, child malnutrition continued to deteriorate with GAM rates increasing by 2 percentage points. In other words, for one month, food aid deliveries declined while malnutrition rates were still rising. As food aid is intended to reach households and children when they are most vulnerable, maintaining peak levels of food aid deliveries for an extra month might be appropriate.

Figure 12. Annual fluctuations in GAM, SAM, U5 mortality rates and numbers of food aid beneficiaries in ROS



1.7.5 Micronutrient deficiencies

1.7.5.1 Iodine deficiency disorder (IDD)

Previous research has shown that parts of Blue Nile state (along with mountainous parts of Darfur) may have some of the highest rates of IDD in all of Sudan. Here, the prevalence may range from 75 percent to 90 percent[8]. The best way to combat IDD is by iodizing household salt. Yet despite government policy which states all salt must be properly iodized, people in ROS still do not have access to locally produced, iodized salt. In fact, as shown in table 14 only 1.4 percent of households have properly iodized salt. When examined by state, 1 percent or fewer of households have access to iodized salt in the majority of states. The only exceptions were Red Sea (6 percent) and North and South Kordofan (4 percent respectively).

Data from the SHHS indicated that almost 100 percent of salt in ROS was obtained from local marketplaces, while only a very small fraction was obtained from either food aid or indigenous sources (Table 14). The only exceptions were Red Sea where households reported receiving 4 percent of their salt from food aid (which explains why a higher percent of their salt is iodized) and Gezira where 17 percent of their salt was reportedly obtained from other indigenous sources.

[8] Bani, I. (2006). Accelerating progress towards universal salt iodization in Sudan: Time for action. New Research, Submitted to the Khartoum Food Aid forum, June.

Table 14. Percentage of households in ROS with properly iodized salt (percent)

	Not iodized 0 PPM (no colour)	Less than 15 PPM (weak colour)	15 PPM or more (strong colour)
Northern	99.0	.8	.2
River Nile	98.0	1.5	.5
Red Sea	92.7	1.3	6.0
Kassala	97.4	1.7	.9
Gadarif	95.6	3.8	.6
Khartoum	98.2	.9	1.0
Gezira	99.6	.1	.3
Sinnar	98.4	.8	.8
Blue Nile	98.9	.7	.4
White Nile	98.6	.7	.7
North kordofan	91.8	3.9	4.2
South kordofan	92.0	3.1	4.9
ROS—Overall	97.2	1.4	1.4

Table 15. Source of household salt in ROS (percent)

	Local market	Food aid	Indigenous, other
Northern	98.6	.4	.9
River Nile	99.4	.5	.1
Red Sea	88.1	4.2	7.7
Kassala	97.1	1.3	1.7
Gadarif	97.7	.9	1.4
Khartoum	99.1	.3	.6
Gezira	82.8	.2	17.0
Sinnar	96.2	.2	3.6
Blue Nile	91.7	.2	8.1
White Nile	99.2	.8	.0
North kordofan	97.9	1.0	1.0
South kordofan	96.2	3.5	.2
ROS-- Overall	94.6	.8	4.6

1.7.5.2 Vitamin A deficiency

In ROS, 83 percent of children reportedly received a vitamin supplement in the 6 months preceding the survey. As table 16 indicates, supplementation rates did not vary much by state. Rates were highest in Sinnar and Gaderif (at 87-88 percent) and lowest in South Kordofan and Kassala (at 74-75 percent).

On average, 87 percent of all children reportedly received the supplement through the national immunization day. This was generally true in all states. Other notable findings include; 1) 16 and 11 percent of supplemented children in Khartoum received their supplement on routine visits to health centres or when they visited due to illness, 2) 13 percent of children in Kassala received their supplements during routine visits to health centres.

Table 16. Percentage of children receiving Vitamin A supplement in ROS and source of last supplement (percent)

	Child ever received vitamin A	Place child got last Vitamin A dose			
	Yes	On routine visit to health centre	Sick child visit to health centre	National immunization day campaign	Other
Northern	83.1	4.4	1.6	93.9	.0
River Nile	81.3	7.5	5.8	86.6	.2
Red Sea	83.3	4.3	3.5	91.8	.3
Kassala	73.9	13.3	3.5	82.9	.3
Gadarif	87.0	9.5	2.1	87.5	.8
Khartoum	84.7	15.5	11.0	73.1	.4
Gezira	84.8	5.1	2.2	92.3	.4
Sinnar	87.7	7.9	2.6	89.3	.2
Blue Nile	83.8	2.4	2.1	94.8	.6
White Nile	79.8	3.0	4.5	92.5	.0
North kordofan	83.6	2.2	1.5	96.0	.3
South kordofan	74.5	5.3	1.8	92.6	.3
ROS—Overall	83.0	8.3	4.6	86.8	.4

1.8 Conclusions and recommendations

In conclusion, ROS is the wealthiest and most food secure region in Sudan. Overall, 8.2 percent of households in ROS are food insecure, compared to 26 percent of households in Darfur and 33 percent of households in Southern Sudan. It should be noted that ROS is not universally better off, however, as certain sub-populations are as bad off as households in parts of Darfur and Southern Sudan.

1.8.1 Livelihood food security and vulnerability profiles

Livelihood activities most vulnerable to food insecurity included “agriculture”, “agriculture, hunting and fishing”, “pastoralism”, “unskilled labour”, and “handicraft”. “Agriculture”, “pastoralism” and “unskilled labour” were prevalent in North and South Kordofan, Kassala, Blue Nile, and Gedarif, while “handicraft” was most prevalent in Khartoum and River Nile.

Conversely, livelihood activities typically considered more urban or market-centreed, like “employed work” or “other activities”, were typically better off.

1.8.2 Geographic Food security and vulnerability profiles

When the geographic distribution of food insecurity was examined, South Korfofan was determined to have the largest percentage of food insecure households. Here, 32 percent of households were food insecure, which was comparable to food insecurity rates throughout much of southern Sudan. Blue Nile, North Kordofan, Red Sea and Kassala, had elevated food insecurity rates, although households in these states were significantly less vulnerable to food insecurity than households in South Kordofan. In these states, 11-14 percent of households were food insecure. The states with the lowest percent of food insecure were Northern (1 percent), Gezira (1.5 percent) and River Nile (2.6 percent). Northern and River Nile are two of the three states not covered by WFP programming.

1.8.3 Causes of food insecurity and vulnerability

The main predictors of food insecurity in ROS consisted of the following:

- Wealth status
- Sex of household head (female headed more vulnerable)
- High dependency ratios

- Households status (IDP HH, refugee households, and IDP HH recently resettled)
- Household experiencing shocks (multiple shocks, agricultural and food price shocks)

Wealth was the strongest predictor of food security status, with households in the poorest quintile more food insecure on average by 25 percent than households in the richest quintile (30 percent vs 5 percent food insecure). The poorest states on average included South Kordofan, Kassala, and Red Sea. Female headed households and households with high dependency ratios were also worse off, by 5 percent and 3 percent respectively.

Present and former IDP households were both found to be more at risk of food insecurity than settled residents. Current IDP and refugee households had a predicted food insecurity prevalence 8 percent and 11 percent higher than residents while recently resettled IDPs had a prevalence of 22 percent higher.

Households affected by shocks (particularly multiple shocks, agricultural and food price shocks) appeared to be more vulnerable to food insecurity than households affected by no shocks. Households affected by multiple shocks were worse off by approximately 15 percent while household affected by agricultural and food price shocks were worse off by approximately 10 percent.

The states most affected by shocks included Gedarif (30 percent), North Kordofan (26 percent) and Blue Nile (25 percent). The states considered most vulnerable to insecurity and drought, as determined from the vulnerability analysis, are shown in Table 17.

Table 17. The states most vulnerable to drought and insecurity in ROS

Type of shock	**Households most vulnerable to insecurity and drought**		
Insecurity	South Kordofan	Blue Nile	Kassala
Drought	South Kordofan	North Kordofan	River Nile

While most of ROS was vulnerable to either river or flash floods, the areas most vulnerable included:

- Two regions in North Kordofan (from El Obeid both south and east to border; North central and western region)
- Western region of South Kordofan
- Most of Sinnar
- The southern region of White Nile
- Region north of Khartoum in Khartoum state
- Region in Kassala state from Khashim el Girba to the North
- Southeastern coastal region in Red Sea
- Western region of Northern, mostly the areas surrounding Marowe

1.8.4 Targeting and timing of food aid

An assessment of whether food aid programmes were targeted correctly revealed that some recalibrations may be necessary. In Kassala the amount of food aid given in 2006 seemed to exceed needs when examined in terms of the share of food insecure. At the same time, the amount of food aid given in North Kordofan and Blue Nile seemed in adequate for the level of need. Kassala, for instance, had 11 percent of the food insecure but received 39 percent of the food aid. North Kordofan, on the other hand, had 12 percent of the food insecure and received less than one percent of the food aid.

An assessment of the timing of food aid deliveries by annual patterns in childhood wasting levels (in traditional livelihoods zones) revealed that overall food aid deliveries were timed correctly though the number of beneficiaries peaked one month prior to annual highs in child malnutrition rates (and declined by 100,000 beneficiaries while malnutrition rates were still rising). Given this situation, maintaining peak food aid levels for an additional month would likely be beneficial.

1.8.5 Recommended food interventions by priority area and priority group

The CFSVA makes the following recommendations:

1. Refine the targeting of food aid

The CFSVA provides rough guidance on what characteristics food insecure households tend to share and where the largest concentration of food insecure households are located. Household characteristics associated with food insecurity include:

- Asset poverty
- Female headed households
- Households with high dependency ratios
- Households reliant on agriculture, pastoralism, unskilled labour, handicraft, or a mixture of agriculture, hunting and fishing
- Current or recently resettled IDP households
- Refugee households
- Household frequently affected by multiple agricultural and food price shocks

In terms of where the food insecure are located, CFSVA results indicate that households in South Kordofan are significantly more vulnerable to food insecurity than households in any other state. Other households at elevated risk include households in Blue Nile, North Kordofan, Red Sea, and Kassala. Conversely, households least vulnerable to food insecurity are located in Northern, River Nile and Gezira.

To better refine targeting, this information should be utilized to determine whether communities currently receiving heavy amounts of food aid (and those communities that are not) share the characteristics indicative of food insecurity. It should be stressed that this is intended only as a guide, as every food insecure household has unique characteristics.

The second component crucial in more effective targeting is to ensure that the share and number of beneficiaries is proportional to the share and number of food insecure. The CFSVA has shown that Kassala was heavily overtargeted (at least in terms of the share of food insecure) while North Kordofan and Blue Nile were undertargeted. Given this, the CFSVA recommends that in the future more resources be directed towards North Kordofan and Blue Nile. It is not clear, however, whether resources should be re-directed from Kassala, as the refugee population remains. This decision should be made by programmemers with knowledge of the current state of food insecurity in Kassala.

2. Improve timing of food aid deliveries

One of the important findings from this CFSVA was that the timing of food aid in this region appeared adequate. The only recommendation from the CFSVA is that food aid programmers take into consideration that August appears to be the annual peak in malnutrition rates for children. This may indicate a need for peak levels of food aid to persist at least through this month.

1.8.6 Recommended non-food interventions by priority area and priority group

Findings from the CFSVA also provide some guidance on what non food interventions or activities should be prioritized. These are discussed below.

Child health and nutrition priorities/ interventions:

1. Study causes of childhood malnutrition;

The CFSVA recommends that WFP invest in analytical studies examining the causes of malnutrition amongst children in ROS and the reasons behind the perpetually high rates of wasting (at or above the 15 percent emergency threshold for much of the year), even in areas typically considered better off in terms of other indicators. While the CFSVA recognizes that WFP's mission is not research oriented, better understanding the origins of malnutrition would facilitate decision-making within WFP on the role of food aid

programmes in the region. It would also be instrumental in maximizing the cost-effectiveness and generalized impact of WFP programmes.

2. Institute programmes encouraging improved child caring practices and particularly child feeding practices;

The CFSVA also recommends incorporating programmes encouraging proper child caring practices, and particularly child feeding patterns into existing nutritional support programmes. The majority of mothers in ROS (ranging from 55 to 80 percent depending on the state) introduce foods other than breastmilk to children under 6 months of age. This practice should be discouraged, by disseminating the recommendations of WHO. Particular attention should be paid to feeding practices in areas typically considered better off (Northern, Khartoum and Gezira) as 70-80 percent of mothers in these areas are introducing other foods too early.

3. Increase vitamin A supplementation programmes, with a particular focus on children in Kassala and South Kordofan states;

The CFSVA recommends that vitamin A supplementation programmes be instituted to improve supplementation rates, particularly in the underserved areas of Kassala and South Kordofan. CFSVA data indicates that supplementation rates throughout ROS are generally good, with over 80 percent of children having received a supplement in the 6 months preceding the survey (most through the national immunization day). In both Kassala and South Kordofan, however, fewer than three-fourths of children have been supplemented. This would suggest a need to expand the reach of supplementation efforts during the national immunization day in both states or to encourage existing health centres within both states to provide supplements to children who have previously not been supplemented.

4. Encourage salt fortification programmes;

Recent studies have indicated that some of the regions most affected by IDD are located in the ROS region and specifically in Blue Nile state. While the Universal Salt Iodization (USI) policy was officially adopted in 1994 as the foundation for the national IDD prevention strategy, this policy has not been properly enforced, leaving people in ROS, without access to properly iodized salt. Households that have iodized salt receive their salt from non domestic sources, either by trade with surrounding countries or from food aid. Given that neither cross-border trade nor food aid receipt is common for households in ROS, the only solution to IDD is to encourage the government to enforce the USI and ensure that all domestically produced salt is iodized. This should be encouraged by WFP.