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Security and Vulnerability
Analysis (CFSVA)

Data collected in May 2006

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Assessment Capacity (SENAC)

Sudan: Southern Sudan province, Comprehensive Food Security and Vulnerability Analysis (CFSVA)

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Geographic designations:

South Sudan refers to the following States: Northern Bahr El Ghazal, Western Bahr El Ghazal, Warrup, Lakes, 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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LIST OF ACRONYMS

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 Kordofan 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)	
	<ol style="list-style-type: none"> 1. Refine targeting of food aid: <ol style="list-style-type: none"> 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	
	<ol style="list-style-type: none"> 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	
	<ol style="list-style-type: none"> 1. Refine targeting of food aid where possible: <ol style="list-style-type: none"> 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.
	<ol style="list-style-type: none"> 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)	
	<ol style="list-style-type: none"> 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	
	<ol style="list-style-type: none"> 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	
	<ol style="list-style-type: none"> 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. <p>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.</p>

Southern Sudan

1.1 Situational analysis

1.1.1 Overview

Southern Sudan suffered disproportionately in the years of civil war with the north. Over 2 million people were killed and over 4 million people were displaced. Years of fighting destroyed much of the existing infrastructure and rendered new development impossible. Constant insecurity and displacement resulted in the breakdown of traditional livelihoods.

The legacies of conflict are visible throughout society. It has created a generation without proper educational opportunities, access to basic health care services, and a lack of general capacity, all of which threaten future development. Years of displacement and migration away from conflict have lessened agricultural capacity, resulting in low output and productivity. The destruction of infrastructure and stunting of new development has also limited opportunities for employment outside the agricultural sector and limited access to markets, creating further developmental obstacles.

Despite the obvious difficulties that remain, the signing of the Comprehensive Peace Agreement (CPA) in 2005 has notably improved the well-being of households throughout the region, engendering hope for a better future. Consequently, it has given the Government of National Unity (GNU), the Government of South Sudan (GOS), and international organizations a crucial window during which fundamental improvements to health, nutrition, and food security are possible. As a first step in this process, a detailed assessment of the current food security and nutritional situation is necessary. This chapter attempts to provide such an assessment.

1.1.2 Current security situation

With the signing of the CPA, large scale fighting has ceased, eliminating the most significant threat to health and well-being. Various threats to security remain, however. First and foremost among these threats is the persistence of armed tribal factions and militias operating in various areas of Southern Sudan. The most prominent of these include the Sudan People's Liberation Army (SPLA), Joint Integrated Unit (JIU), Sudanese Armed Forces (SAF), People's Defense Forces (PDF), and Southern Sudanese Defense Forces (SSDF). The existence of these groups inevitably results in scattered clashes from time to time. The Lord's Resistance Army (LRA) from Uganda has emerged recently as a particularly destabilizing factor in Eastern, Central and Western Equatoria. This is of particular concern as they have disrupted agricultural activities in the "greenbelt region" whose crop surpluses are often relied upon by surrounding states in times of food shortages.

Maintaining "peace" remains the most significant challenge for both the GNU and GOSS. The most difficult components of the CPA (removal of GOS troops from the south and disarmament) are being implemented gradually. The first phase of GOS troop withdrawals was scheduled to begin on July 9, 2007. Disarmament is being undertaken gradually and with limited success to date. Full GOS withdrawal and militia disarmament is scheduled to be completed in the next few years.

Lesser security threats also remain a significant concern. Crime and banditry is rife in certain areas, particularly along the border with Kenya in Eastern Equatoria. This has had an impact on commerce and has hindered recovery and development to a certain extent. Landmines also pose a threat. A significant number still populate certain transportation routes, especially in areas previously heavily affected by the conflict. This has limited market access and hindered resettlement and development activities. Finally, IDP resettlement activities have introduced another level of potential conflict or tension, with returnees having to compete for natural resources and infrastructure with local residents.

1.1.3 Political progress

Despite continuing, localized insecurity, the GOSS, as well as state and local governments have been established and are in the process of formulating policy guidelines and institutional structures. The Government of South Sudan is now headquartered in the new

Capital, Juba. State governments, meanwhile, are in the process of developing detailed long and short term development plans, intended to guide programme activities.

The establishment of a functioning government at all levels has had immediate benefits. First, the assumption of control by local governments has filled the vacuum that emerged with the CPA. This has bolstered security and provided a framework by which disputes can be handled without resorting to violence. Second, the establishment of these governments has led to an emerging civil service, creating not only employment opportunities, but also providing crucial governing experience and building capacity. As the GOSS matures and the emerging civil service gains more experience, there will be greater opportunity to couple food security and nutrition programmes with ongoing governmental development efforts, with the aim of reaching the more people and having maximum impact.

1.1.4 Economic situation and household livelihoods

While the economy of southern Sudan remains largely informal and is based primarily on subsistence agriculture and livestock, anecdotal evidence seems to indicate that household livelihoods have improved after the signing of the CPA. Resettlement activities have returned many previously displaced to their homes, allowing these households to resume their livelihoods. This promises to bolster agricultural production in the years in ahead. Migration to urban areas has resulted in rapid population growth in many of the urban centres throughout the region. This has increased market dependence and led to substantial increases in demand for various agricultural commodities. As demand has increased so has trade, both locally and with communities across the border in Uganda and Kenya.

As urban areas continue to expand, the need to improve infrastructure has increased. Foreign companies, eager to invest in the rebuilding of southern Sudan, have stepped in to fill this need. Many have begun to partner with local governments and are actively employing local labour. Consequently, construction and infrastructure projects have become common in certain communities and urban centres, creating a new demand for labour and thus a new source of jobs. While the impact of these improvements has been relatively localized, it is likely (with the continuance of peace) that the reach of these activities will expand and the benefits will be felt far beyond these immediate urban centres. As infrastructure improves and as economic opportunities increase, significant improvements in health and food security are likely to follow.

1.1.5 Agricultural sector

While there are no official statistics on what share of GDP is attributed to agriculture in southern Sudan, it is widely considered the most important sector. Agriculture is largely traditional, relying primarily on hand power with very limited use of animals (which have only been introduced recently). Pesticides and herbicides are not common either.

The most fertile areas of southern Sudan (termed the "greenbelt") are in the regions of Western and Central Equatoria. This area receives rain throughout the year and crop surpluses here are often used to supplement food stocks in surrounding states during times of shortage. In much of the rest of southern Sudan (outside of the greenbelt), households rely on a mix of crop production and livestock rearing, supplemented by the gathering of wild foods, hunting wild game or fishing. Within these areas, the importance of crop production (as a share of total households livelihoods) largely depends on the amount of rainfall, flooding etc. Livestock is increasingly important, however. In fact, recent statistics indicate that the exportation of beef has surpassed cash crops as the largest non oil export of Sudan.

Throughout southern Sudan, sorghum, millet and maize are the most important crops, though in certain regions cassava, sweet potatoes, pumpkins, beans, sesame and a variety of other crops are also cultivated. Agricultural production and yield is traditionally determined by several factors:

1. Amount and timing of rain
2. Area planted
3. Availability of agricultural inputs
4. Weeds, pests, diseases and natural disasters

5. Localized insecurity

The cropping season in 2006 was no exception. Insecurity, blamed on the Lords Resistance Army (LRA) in greenbelt regions, militia activity in Jongolei and Upper Nile, and tribal clashes in Lakes, Warrap and Central Equatoria were cited specifically as reasons for reduced crop yields. Likewise, the lack of rain in June and July in parts of Central and Western Equatoria, Unity, Jongolei and Upper Nile states and severe flooding in Upper Nile, Jongolei, Unity, Lakes, Warrap, and Northern Bahr el Ghazal also reportedly caused substantial crop damage.

1.1.6 Obstacles and hurdles

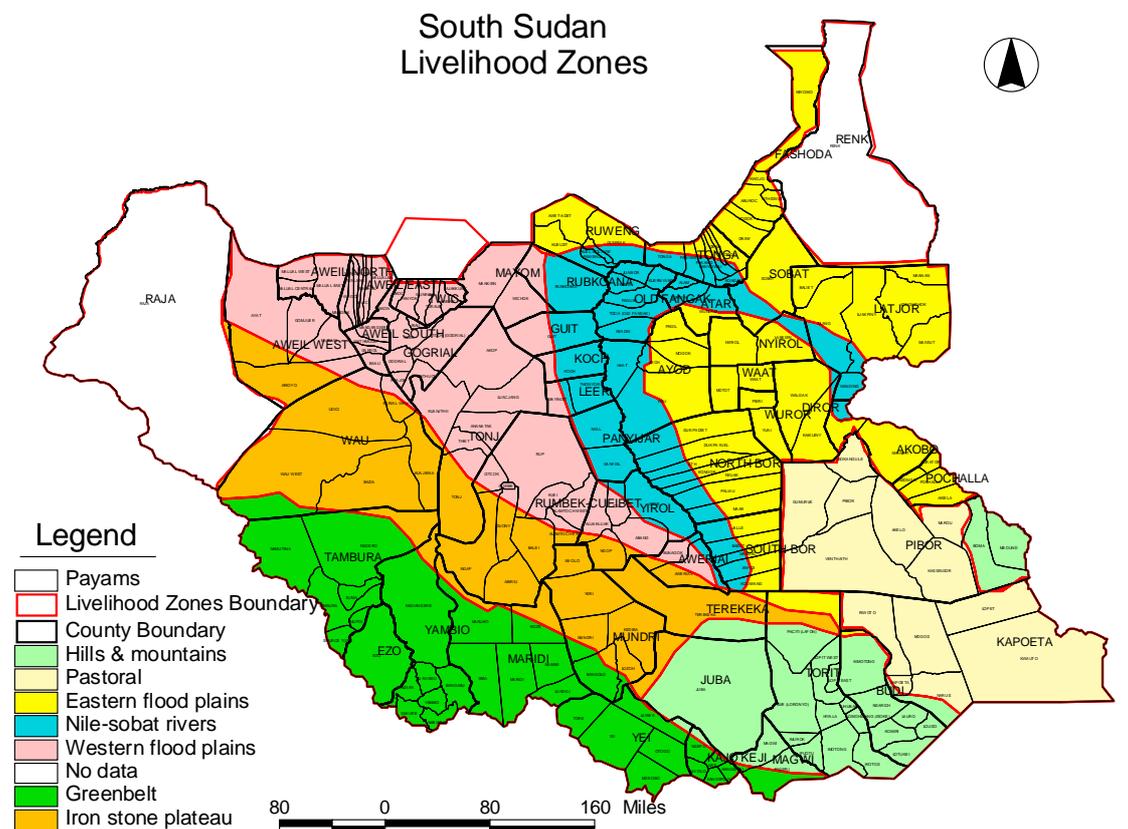
Despite anecdotal improvements in the well-being of households throughout southern Sudan, there are many obstacles that must be overcome to ensure the economic growth and development necessary for sustainable, long-term improvement in health, nutrition and food security. First, and most importantly, it is crucial to maintain the peace. This requires that all parties meet the benchmarks established by the CPA and previously agreed upon by all signatories. This is certainly recognized as a very difficult step. In maintaining the peace, however, investment in southern Sudan will likely continue to increase and assistance from international agencies will continue without disruption, maximizing the beneficial impact on food security and livelihoods.

Another major obstacle to progress remains poor transportation infrastructure. This poses a major problem for the movement of both people and commodities throughout the south, particularly during the rainy season. It also serves as a disincentive to produce surplus crops, as farmers find it expensive and very difficult to transport surpluses to markets. Thus, farmers in fertile areas often do not produce to capacity, even when there are food shortages in surrounding states. Rehabilitating this infrastructure would not only open up markets (improving livelihoods and food security), but it would also improve access to health care, which could have a dramatic impact on both morbidity and malnutrition rates.

1.2 Livelihood strategies of households

1.2.1 Traditional livelihood strategies and income sources

Figure 1. Geographic distribution of traditional livelihood zone in southern Sudan



Much is already known about the livelihoods of household throughout southern Sudan. A joint assessment, conducted by the United States Agency for International Development (USAID), the Famine Early Warning Systems Network (FEWS NET), Save the Children UK, and the South Sudan Centre for Census, Statistics and Evaluation (SSCCSE) has identified 7 main livelihood zones in the region¹. Table 1 provides a brief discussion of each zone.

Table 1. Traditional livelihood zones in southern Sudan

Livelihood Zone	Geography	Climate	Main livelihood
Green Belt	Western Equatoria and parts of Central Equatoria	Wet (1,350-1,600 mms of rain)	Agriculture- Sorghum, maize, cassava, millet, groundnuts, rice, sweet potatoes, fruit, sesame, tobacco, sugarcane, soya beans, vegetables, and coffee
Ironstone Plateau	West Bahr el Ghazal, Southern Warrap and Lakes	Wet (950-1300 mms)	Agriculture- Mainly sorghum and some Maize (assortment of other crops)
Hills and Mountains	Central Equatoria and parts of Eastern Equatoria and Jonglei	2 rainy season in the highlands; 1 rainy season in the lowland	Agriculture- sorghum, cassava, sweet potatos, millet, sorghum, cowpeas, groundnuts, and sesame Pastoralism- cattle, sheep, goats Wild food- roots, fruits, berries, leafy vegetables, and wild game
Arid/ Pastoral	Jonglei and Eastern Equatoria	Arid Sahelian savannah (less than 200 mms of rain)	Pastoralists- cattle, sheep and goats
Nile-Sobat Rivers	Jonglei, Unity and Upper Nile	Wet (700-1300 mms of rain)	Agriculture- sorghum, maize, groundnuts, okra, pumpkin, beans and other legumes Livestock- cattle, goats Wild foods- Water lilies, lalop, roots, vines, berries, leaves, bark, and tubers, and wild game Fish
Western Flood Plains	Northern Bahr el Ghazal, Warrap, and Lakes	Seasonal flooding	Agriculture- sorghum, groundnuts, maize, sesame, pumpkin, beans, millet and rice Livestock- cattle, goats Wild foods- shea butter nut, seeds of water lilly, tamarind, lalop, jackel berry, red fruit, wild rice, and zizupu mycronata Fish
Eastern Flood Plains	Upper Nile and Jonglei	Savannah grassland, and one rainy (700-1300 mms of rain)	Agriculture- sorghum, maize, cassava, sesame, pumpkin, beans, millet and root crops Livestock- cattle, goats Wild foods- lalop, water lilly seeds and reeds, tamarind, gum from acacia trees, fruits, roots, grains, leaves, and wild game Fish

As Table 1 indicates, most households in southern Sudan have traditionally relied on a mix of agriculture and livestock for food and income. Many households supplement these sources with wild foods, wild game, and fishing. Households in the southwest (Western and western parts of Central Equatoria)—in an area termed the “greenbelt”- tend to rely more exclusively on agriculture. Households living in the arid southeast, on the other hand, tend to rely most heavily on livestock, with agriculture only prevalent in certain areas.

1.2.2 Current livelihood activities/ profiles (from the SHHS)

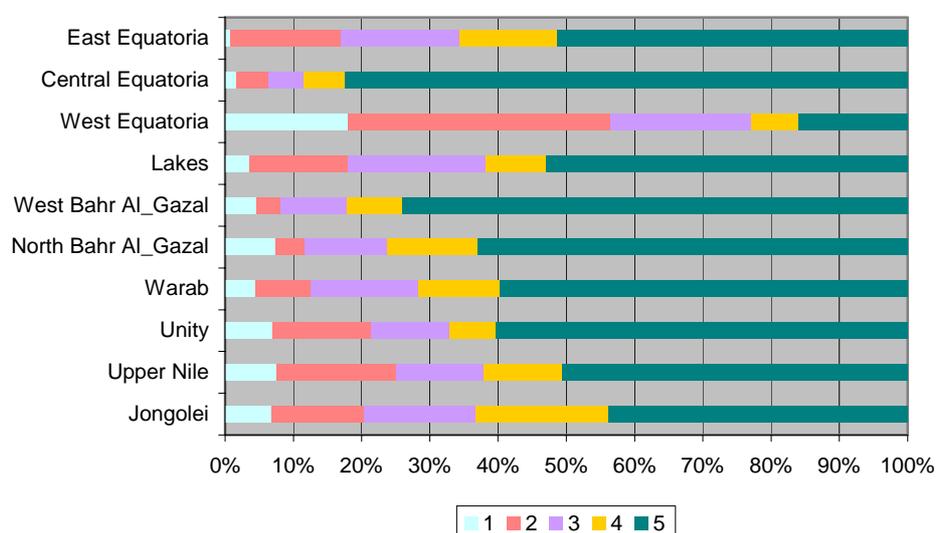
Overall, as figure 2 and table 2 indicate, findings from the SHHS were generally consistent with these traditional livelihood classifications. Outside the primarily agricultural region of Western Equatoria, the majority of households report relying on 4 or 5 different livelihood activities. Most households report relying on agriculture, livestock, collecting natural resources, hunting and gathering, and fishing, in different orders of importance depending upon location. Food aid assistance was amongst the most important livelihood activities in Upper Nile, West Bahr El Ghazal and Lakes states.

¹ Muchomba, E and Sharp, B. (2006). Southern Sudan Livelihood Profiles: A guide for humanitarian and development planning. Southern Sudan Centre, Statistics and Evaluation (SSCCSE) and Save the Children, U.K., July.

Table 2. Top 5 most commonly reported livelihood activities by state in southern Sudan (percent)

	Most reported activity	2nd most reported activity	3rd most reported activity	4th most reported activity	5th most reported activity
Southern Sudan	Agriculture (70.3)	Collecting natural resources (55.3)	Hunting and gathering (50.9)	Livestock (49.9)	Fishing (42.2)
Region					
Jongolei	Collecting natural resources (51.4)	Agriculture (50.0)	Fishing (48.0)	Hunting and gathering (47.0)	Livestock (42.2)
Upper Nile	Agriculture (60.1)	Livestock (53.0)	Food aid assistance (46.0)	Fishing (42.9)	Hunting and gathering (50.9)
Unity	Agriculture (61.2)	Livestock (59.8)	Fishing (48.2)	Collecting natural resources (41.1)	Hunting and gathering (38.7)
Warab	Collecting natural resources (57.3)	Fishing (52.1)	Agriculture (51.8)	Hunting and gathering (50.5)	Livestock (37.3)
North Bahr el Ghazal	Agriculture (62.2)	Collecting natural resources (52.7)	Hunting and gathering (50.8)	Fishing (50.3)	Livestock (40.5)
West Bahr el Ghazal	Agriculture (51.8)	Hunting and gathering (47.0)	Collecting natural resources (42.3)	Fishing (40.4)	Food aid assistance (39.0)
Lakes	Agriculture (73.7)	Livestock (63.7)	Petty trade (43.4)	Collecting natural resources (32.3)	Food aid assistance (30.8)
West Equatoria	Agriculture (76.7)	Collecting natural resources (30.2)	Hunting and gathering (29.0)	Handicraft (25.4)	Petty trade (21.7)
Central Equatoria	Agriculture (73.1)	Collecting natural resources (57.0)	Unskilled labour (53.1)	Livestock (46.9)	Hunting and gathering (46.3)
Eastern Equatoria	Collecting natural resources (74.9)	Agriculture (69.6)	Hunting and gathering (60.4)	Livestock (47.4)	Petty trade (45.6)

Figure 2. Number of livelihoods households that engage in 5 main activities in Southern Sudan



In terms of livelihood profiles, approximately one-fifth of households in South Sudan relied on either “agriculture”, “agriculture, fishing and hunting”, “agriculture and livestock” or “livestock”. As expected, “agriculture” alone was most commonly reported (by approximately 50 percent) of households in Lakes and Central and West Equatoria (the “greenbelt”). “Agriculture, hunting and fishing” was commonly reported in Jonglei, Warab, and North and West Bahr el Ghazal, corresponding to the agro-pastoral zones of the “western flood plains” and “eastern flood plains”. In these states, 32, 33, 31 and 32 percent of households reported this activity. “Agriculture and livestock” were reported by

50 percent of households in Unity and 25 percent of households in East Equatoria, North Bahr el Ghazal, and Upper Nile. Again this roughly corresponded to the agro-pastoral zones of the western and eastern flood plains, though is also picking up some households from Eastern Equatoria, living in the “hills and mountain” zone. Deviating from expectations, reliance on “livestock” only was most common in Jongelei and Warab, not in the arid, typically pastoral areas in Eastern Equatoria (referred to as the “arid” zone). Instead, households in Eastern Equatoria were most likely to report a combination of “livestock and agriculture” or “collection” (15 percent). “Collection” as a main livelihood was reported much less frequently elsewhere. Table 3 discusses these livelihood groups and their geographic distribution in more detail.

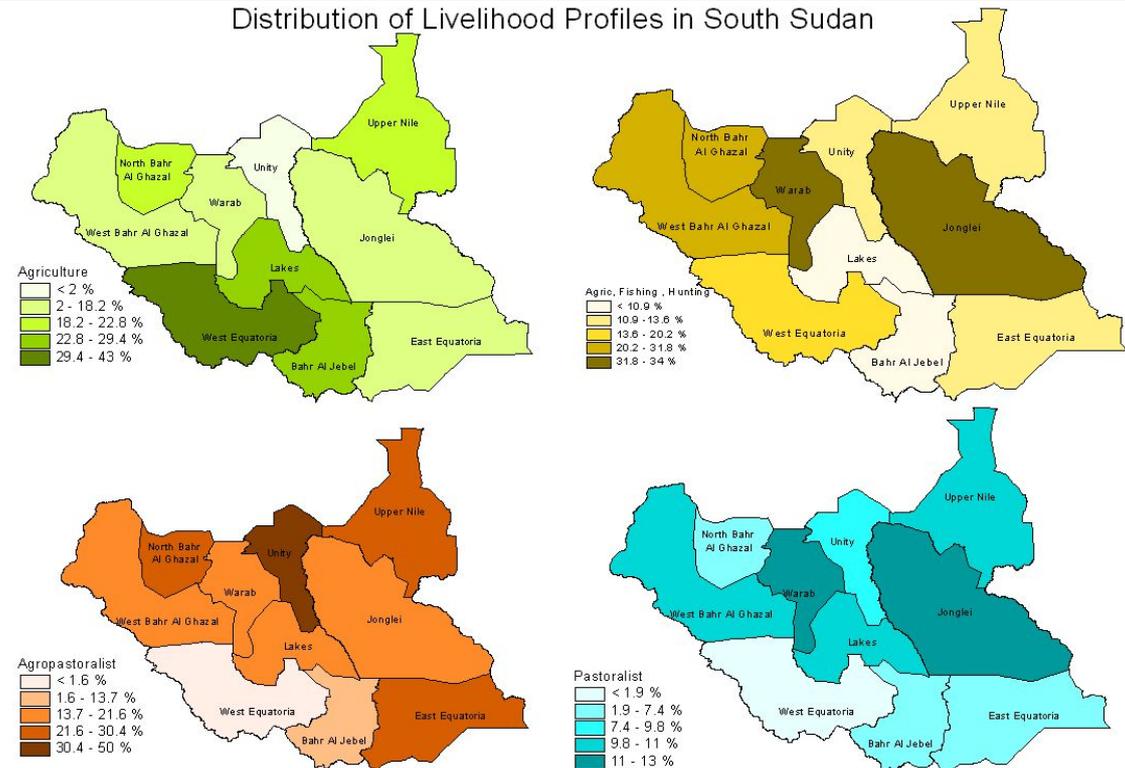
Table 3. Frequency and distribution of livelihoods profiles by state in southern Sudan

Livelihood Profile	N Sample	% in Population (weighted)	Geographic Distribution
Agriculture	2235	22.2	45-50% of HHs in Lakes, Central and West Equatoria; almost 25% of Upper Nile
Agriculture, fishing & hunting	1654	18.4	30-35% of HHs Jongelei, Warab, North and West Bahr el Ghazal; 20% in West Equatoria
Agro-pastoralist	1856	19.4	50% of HHs in Unity; 25-30% in East Equatoria, Upper Nile, and North Bahr el Ghazal
Pastoralist	700	7.6	More than 10% of HHs in Jongelei and Warab
Unskilled	138	1.4	Over 5% of HHs in Central Equatoria; fewer than 5% elsewhere
Skilled labour	71	0.7	Fewer than 5%
Employee	188	2.2	Over 10% of HHs in Upper Nile; fewer than 5% elsewhere
Petty trade	286	3.1	Over 5% in East and West Equatoria, and North Bahr el Ghazal; fewer than 5% elsewhere
Handicraft	135	1.3	Over 5% of HHs in West Equatoria; fewer elsewhere
Collection	502	5.4	Over 15% of HHs in East Equatoria; fewer elsewhere
Food aid assistance	267	2.8	5-10% of HHs in Jongelei, Upper Nile, North and West Bahr el Ghazal and West Equatoria
Other	100	0.7	Almost 10% of HHs in Unity; fewer elsewhere

Figure 3 maps the top 4 most common livelihood profiles by state to better illustrate where the different livelihood activities are flourishing.

Figure 3. Top four livelihood profiles by state

Distribution of Livelihood Profiles in South Sudan



1.3 Agricultural production

1.3.1 Cropping Season

The cropping season varies depending on livelihood zone and crop planted. Table 4 details the planting and harvest periods by type of crop in traditional livelihoods zones.

Table 4. Cropping season by type of crop and traditional livelihood zone in southern Sudan

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Western Flood Plains												
Sorghum	█	█		█	█				█	█	█	█
Groundnut				█	█				█	█	█	█
Maize				█	█		█	█	█			
Sesame				█	█		█	█				
Pumpkins				█	█				█	█		
Rice	█	█					█	█				█
Eastern Flood Plains												
Sorghum				█	█				█	█	█	█
Maize				█	█				█	█	█	█
Sesame				█	█				█	█		
Pumpkins				█	█				█	█		
Nile and Sobat River												
Sorghum	█	█	█	█	█				█	█		
Maize	█	█	█	█	█				█	█		
Pumpkin				█	█				█	█		
Ironstone Plateau												
Sorghum					█	█			█	█	█	█
Maize					█	█			█	█	█	█
Groundnut					█	█	█		█	█	█	█
Cassava	█	█	█	█	█	█	█	█	█	█	█	█
Sesame					█	█	█		█	█	█	█
Greenbelt Zone												
Sorghum			█	█	█		█	█			█	█
Maize			█	█	█		█	█			█	█
Sesame			█	█	█		█	█			█	█
Groundnuts			█	█	█		█	█			█	█
Beans			█	█	█		█	█			█	█
Sweet Potatoes			█	█	█		█	█			█	█
Millet			█	█	█		█	█			█	█
Rice			█	█	█		█	█			█	█
Soya beans			█	█	█		█	█			█	█
Cassava	█	█	█	█	█	█	█	█	█	█	█	█
Vegetables			█	█	█		█	█			█	█
Hills and Mountains Zone												
Sorghum	█	█			█	█			█	█	█	█
Maize					█	█			█	█	█	█
Millet	█	█			█	█			█	█	█	█
Groundnuts	█	█			█	█	█		█	█	█	█
Sesame					█	█	█		█	█	█	█
Cow peas/ greengrass	█	█			█	█			█	█	█	█
Cassava	█	█	█	█	█	█	█	█	█	█	█	█
Arid/ Pastoral Zone												
Sorghum				█	█	█	█	█	█	█	█	█

*Source: Southern Sudan Centre for Census, Statistics, and Evaluation (SSCCSE), Save the Children, UK. (2006). Southern Sudan Livelihoods Profiles: A guide for humanitarian and development planning.

1.3.2 Current land use and main crops cultivated

As discussed in Chapter 4, households in the south have greater access to farmland (73%) than households in ROS (40%) or Greater Darfur (60%). Examined by state, however, access varies. Households in the “greenbelt” and “iron stone plateau” states of Central Equatoria, West Equatoria and Lakes report the most access, with 88%, 92% and 88% having access, respectively. Conversely, households in Jonglei and Upper Nile, where livestock, hunting and fishing are more common, reported the lowest access (at 55-56%).

Not surprisingly, given the displacement and destruction caused by the war, many households throughout the south are still settling down and many are only just now beginning to cultivate crops again. On average, the percentage of households that planted crops in 2005 was lower than the percentage of households that “usually use land for farming” (by 20%). This was likely due at least in part to resettlement activities, with many households in transit during key planting periods. This difference was most pronounced (between 26–39%), in three states: Jongolei, Lakes and Central Equatoria.

In southern Sudan more than 50% of households planted land in the past year with the highest percentage in Lakes, West Equatoria and Central Equatoria. Households in the Equatorial states (West, Central and East) generally reported two harvest seasons per year while households in the rest of southern Sudan reported only one. Food stocks lasted 4-6 months depending on the state, with households in Jongolei, Upper Nile, Unity and Lakes reporting the shortest duration at 4 months and households in Equatoria reporting the longest duration at 6 months. This is largely reflected in the duration of the hunger season, where the hunger season in the Equatorias is 1-2 months shorter than in the rest of southern Sudan.

Table 5. Land use, months harvest last, length of hunger season and maintenance of vegetable plots by state in southern Sudan

	HH uses land for farming	Land planted in past year	Harvests per year	How many months does food last	Duration of hunger season	HH has vegetable plot/garden
Jongolei	56%	26%	1	4	5	16%
Upper Nile	55%	41%	1	4	5	29%
Unity	79%	56%	1	4	4	25%
Warab	72%	58%	1	5	5	22%
North Bahr Al_Gazal	71%	53%	1	5	5	20%
West Bahr Al_Gazal	72%	56%	1	6	5	24%
Lakes	88%	49%	1	4	5	47%
West Equatoria	92%	82%	2	6	3	47%
Central Equatoria	88%	62%	2	5	4	57%
East Equatoria	75%	65%	2	6	4	50%

Table 5 shows the percentage of households producing crops and the percentage of the harvest that is consumed or sold/ exchanged. The crops produced most often in the last year (regardless of state) were sorghum and maize. With the exception of Lakes (where 20 percent of households produced maize), one-third or more of households produced maize in the preceding cropping season. Sorghum production was more varied with one-fifth (Jongolei) to over one-half (Warab, Central and East Equatoria) of households reportedly doing so. Crop production was largely for own consumption regardless of state. Only watermelon was consistently sold or exchanged as (or more) often than consumed (see Upper Nile, Unity, and East Equatoria). Table 5 also provides a detailed breakdown of crop production and use by state and crop type.

Table 6. Percentage of crop producing households and proportion of harvest consumed, sold or exchanged by state in southern Sudan (percent)

Major Crops per State	Percent of households	proportion consumed*	proportion sold or exchanged*
Jongolei			
Sorghum	17	71	29
Maize	20	72	28
Upper Nile			
Sorghum	32	77	22
Millet	9	74	25
Maize	33	75	24
Beans	15	68	32
Pumpkin	22	70	30
Watermelon	12	51	48
Groundnuts	9	56	43
Unity			
Sorghum	33	55	44
Millet	15	51	48
Maize	36	55	44
Other cereals	8	46	54
Beans	21	47	52
Cowpeas	8	69	29
Pumpkin	22	49	50
Watermelon	8	31	68
Groundnuts	11	41	58
Warab			
Sorghum	52	86	13
Millet	13	80	20
Maize	34	88	12
Beans	7	85	15
Pumpkin	16	96	4
Sesame	21	90	10
Groundnuts	22	86	14
North Bahr el Ghazal			
Sorghum	47	73	27
Millet	14	64	36
Maize	32	62	37
Beans	8	63	37
Pumpkin	16	68	32
Sesame	26	59	40
Groundnuts	25	58	41
Rice	7	63	36
West Bahr el Ghazal			
Sorghum	42	66	32
Millet	14	53	46
Maize	38	59	39
Other cereals	8	51	47
Beans	20	52	47
Pumpkin	20	81	18
Cassava	8	44	55
Sesame	27	67	31
Groundnuts	35	65	33
Rice	6	50	49
Lakes			
Sorghum	44	90	10
Millet	27	84	16
Maize	22	92	8
Other cereals	12	86	14
Beans	9	90	10
Pumpkin	10	94	6
Sesame	23	93	7
Groundnuts	38	89	11

West Equatoria			
Sorghum	31	82	18
Millet	24	83	16
Maize	40	68	32
Beans	9	81	19
Cowpeas	8	83	17
Pumpkin	14	89	11
Cassava	54	75	25
Sesame	26	77	23
Groundnuts	64	74	26
Sweet potatoes	6	85	15
Rice	11	67	33
Central Equatoria			
Sorghum	51	82	17
Millet	26	88	11
Maize	50	81	19
Beans	35	83	17
Cowpeas	6	83	15
Cassava	43	80	20
Sesame	22	87	13
Groundnuts	40	72	27
Rice	7	84	16
East Equatoria			
Sorghum	62	72	28
Millet	33	61	39
Maize	38	61	38
Beans	13	67	33
Pumpkin	6	57	43
Watermelon	8	44	56
Cassava	7	65	35
Sesame	26	65	35
Groundnuts	24	64	36
Sweet potatoes	6	63	37

1.4 Food consumption patterns and current household food security

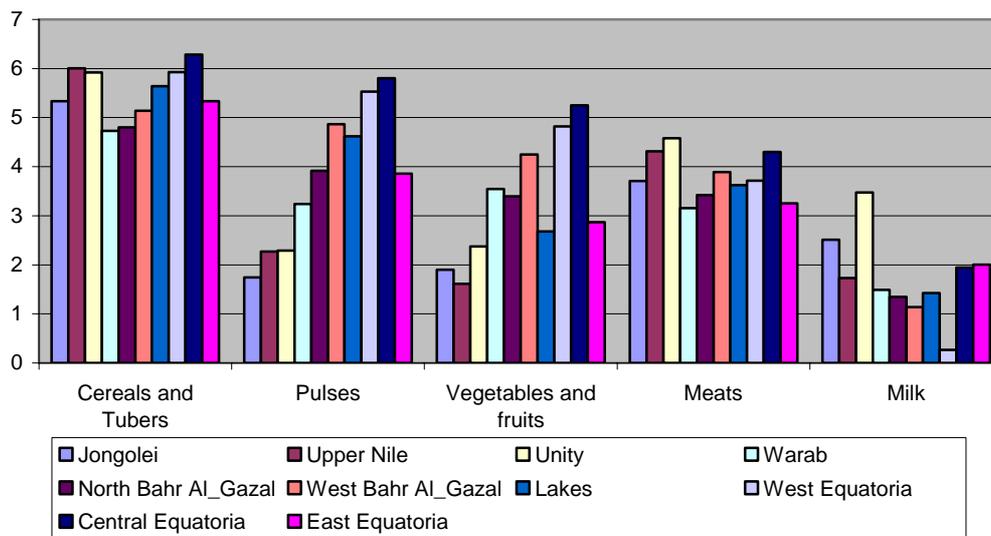
Households in southern Sudan generally have a more diverse diet than households in the rest of the country, though they generally eat less. Below is a discussion of food consumption by state.

1.4.1 Food consumption patterns and sources of food

Figure 4 shows the number of times per week that foods from main food groups are consumed. Cereals and tubers (sorghum, millet, maize, rice, sweet potatoes or cassava) are eaten 5 to 6 times per week, while pulses (beans, groundnuts, sesame and cowpeas), fruits and vegetables (pumpkin, watermelon, etc) are eaten anywhere from 1-2 times per week to 5-6 times per week, depending on the state. Households in East and Central Equatoria report consuming these items more often than households from other states. Here, cereals and tubers are consumed approximately 6 times per week, while pulses are consumed between 5 and 6 times per week. Fruits and vegetables are consumed about 5 times per week. Pulses and fruits and vegetables are consumed least often in Jongolei and Upper Nile. In both states, these food items are consumed 1-2 per week.

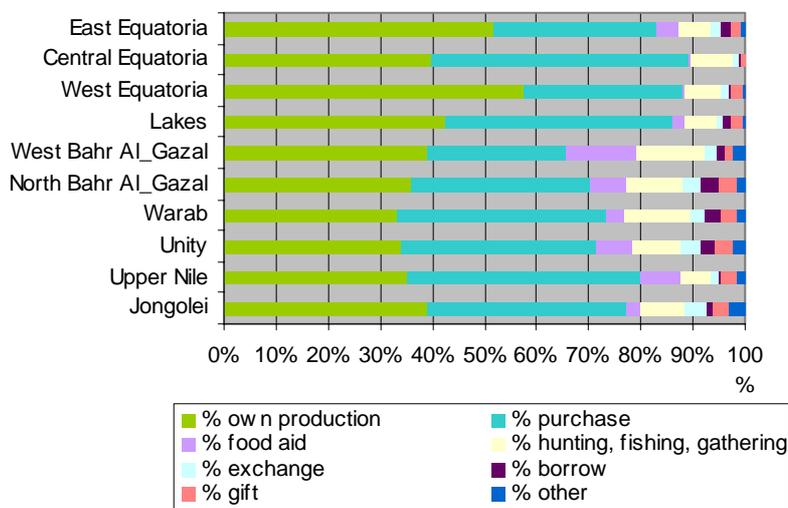
While meat is commonly consumed 3-5 times per week regardless of state, there is much more variation in the amount of milk consumption. Milk is more frequently consumed by agro-pastoral communities in Unity and is consumed least often the primarily agricultural areas of West Equatoria. Generally speaking, meat is consumed most often in the agro-pastoral communities in Unity as well.

Figure 4. Number of times food groups were consumed per week by state in southern Sudan



The majority of food (at least two-thirds) is accessed either through own production or purchase. Own production as a food source is more common in the agricultural regions of East and West Equatoria. Here, 50-60 percent of households report this as their primary food source. Purchase is most common (with 40-50 percent of food accessed in this way) in states with large commercial centres where households have better access to markets.

Figure 5. Source of food by state in southern Sudan

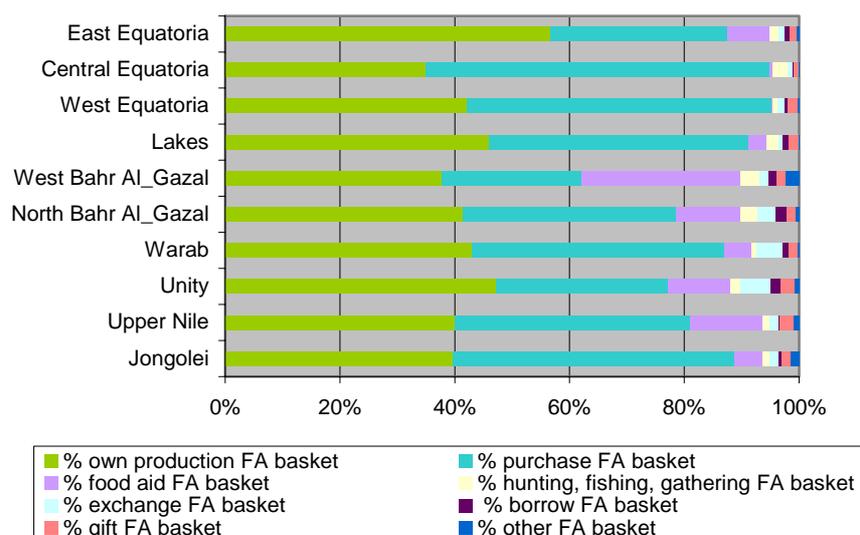


These states include Central Equatoria (where the capital of southern Sudan, Juba is located), Lakes (where the interim administrative capital, Rumbek is located) and Upper Nile (where the large urban centre of Malakal is located).

Food aid is not a common source of food for households in any state, though it is most prevalent in West Bahr El Ghazal, where 15 percent of food comes from food aid.

When examining source of sorghum, oils and sugars (the foods included in the food aid basket), own production and purchase remain the most important sources of food. Likewise, similar patterns are seen in terms of which areas are most dependent on own production versus purchase or vice versa. Notably, however, food aid becomes a much more important food source (for these foods) in Upper Nile than it had been previously. Here, 12 percent of the sorghum, oil and sugar consumed comes from food aid. The state most heavily reliant on food aid remained West Bahr El Ghazal, however, where 30 percent of these foods were attained via food aid.

Figure 6. Sources of food (only food from food aid basket) by state in southern Sudan



1.4.2 Food security status of households in the south

As stated previously, southern Sudan has a higher percentage of food insecure households than Darfur or Central, East Sudan and the three areas. Overall 32.7 percent of households in southern Sudan are food insecure.

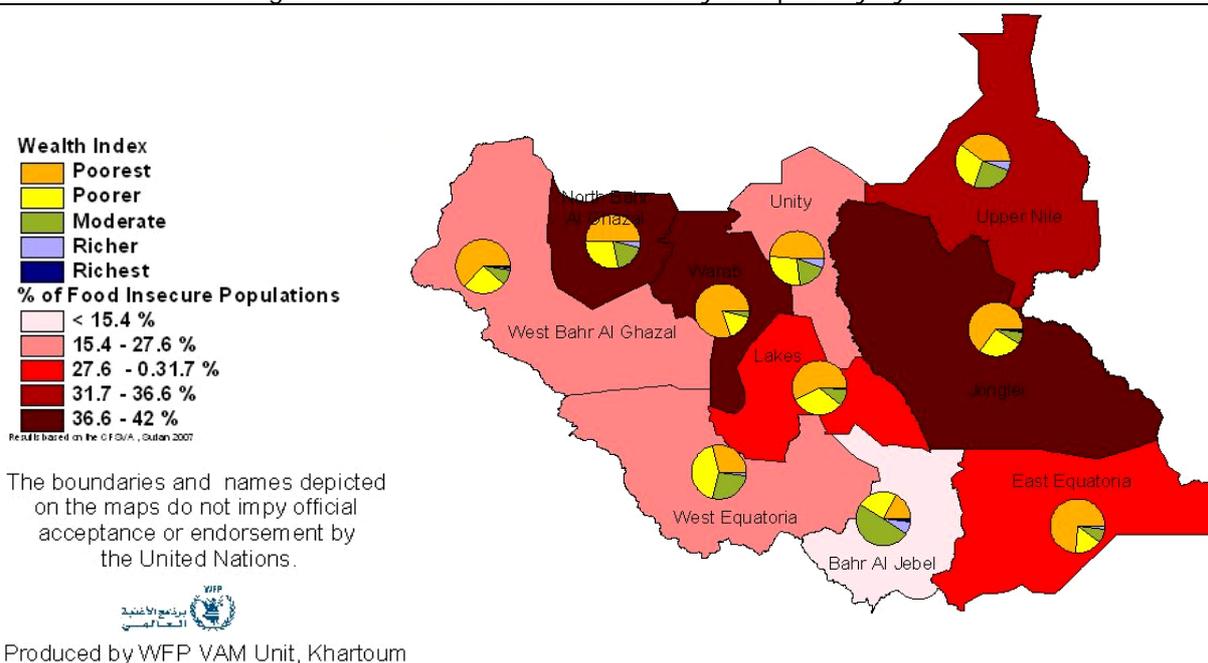
Examined by state, food insecurity was highest (in terms of prevalence and total number affected) in Warab, Jongolei, and North Bahr El Ghazal. In each state, over 40 percent of households (or an estimated 550,000 to 650,000 people) had either poor or borderline food consumption patterns. Conversely, food security was lowest (in terms of prevalence) in the “greenbelt” region of Central and West Equatoria. Table 7 shows the prevalence and number of food insecure by state.

Table 7. Percentage of food insecure households by state in southern Sudan

	Food insecure	Number of people food insecure
Jongolei	40.2%	606,891
Upper Nile	36.6%	380,933
Unity	26.1%	153,870
Warab	41.8%	630,143
North Bahr Al_Gazal	40.5%	573,087
West Bahr Al_Gazal	27.6%	115,301
Lakes	31.7%	303,388
West Equatoria	21.8%	148,486
Central Equatoria	15.4%	164,675
East Equatoria	31.0%	282,923

1.4.3 Geographic and socio-economic distribution of food security

Figure 7. Prevalence of food insecurity and poverty by state



1.4.4 Targeting of food aid

Southern Sudan has historically received large amounts of food aid, given that it was that it was disproportionately impacted during the civil war with north. Now, however, Greater Darfur is receiving an even larger amount of food aid. In total, 700,000 beneficiaries are fed per month in southern Sudan, 2.5 million are fed per month in Greater Darfur and 300,000 are fed per month in ROS.

While food aid, as stated before, is clearly not the only potential response to food insecurity, it is appropriate in certain instances. By examining the percent 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 allotted properly.

This analysis revealed several important findings. First, Jongolei, Warab, and North Bahr el Ghazal all appear to be under-targeted, both in terms of share of food insecure and numbers of beneficiaries (Table 8; Figures 8 and 9). Specifically, each state comprised between 17-19 percent of the food insecure households in southern Sudan, while they comprised only 7 percent (in Jongolei) to 14 percent (Warab) of the beneficiaries of food aid. Likewise, 250,000 to 400,000 people had poor food consumption in each of these states, while only there were only 50,000 to 100,000 beneficiaries per state. Jongolei was particularly underserved.

Also, these findings show that in West Bahr El Ghazal and Unity, the number and share of beneficiaries exceeds the share of food insecure and number with poor food consumption. This leads to one of two possible conclusions. First this may indicate that the both of these states are over-targeted, which would suggest a need to redirect resources away from these areas and towards states more in need. Secondly, and conversely, this could indicate that the food aid being given in these areas is very well targeted and is appreciably lowering the prevalence of food insecurity in these states. If this is the case, cutting food aid would likely lead to significant increases in food insecurity. Unfortunately, the data available does not indicate which explanation is most likely.

Table 8. Food security status, number of food insecure people and share of food aid beneficiaries by state in southern Sudan

	Food insecure	Number of people food insecure	Number of beneficiaries	Share of food insecure/ Share of beneficiaries
Jongolei	40.2%	606,891	55706	18.1/ 8.3
Upper Nile	36.6%	380,933	71643	11.3/ 10.6
Unity	26.1%	153,870	99149	4.6/ 14.7
Warab	41.8%	630,143	94315	18.8/ 14.0
North Bahr Al_Gazal	40.5%	573,087	80425	17.1/ 12.0
West Bahr Al_Gazal	27.6%	115,301	68508	3.4/ 10.2
Lakes	31.7%	303,388	73540	9.0/ 10.9
West Equatoria	21.8%	148,486	12649	4.4/ 1.9
Central Equatoria	15.4%	164,675	62371	4.9/ 9.3
East Equatoria	31.0%	282,923	54589	8.4/ 8.1

Figure 8. Share of food insecure households examined in relation to share of beneficiaries by state in southern Sudan

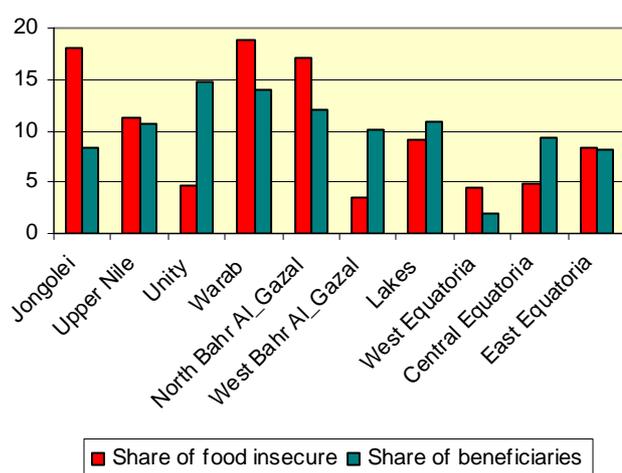
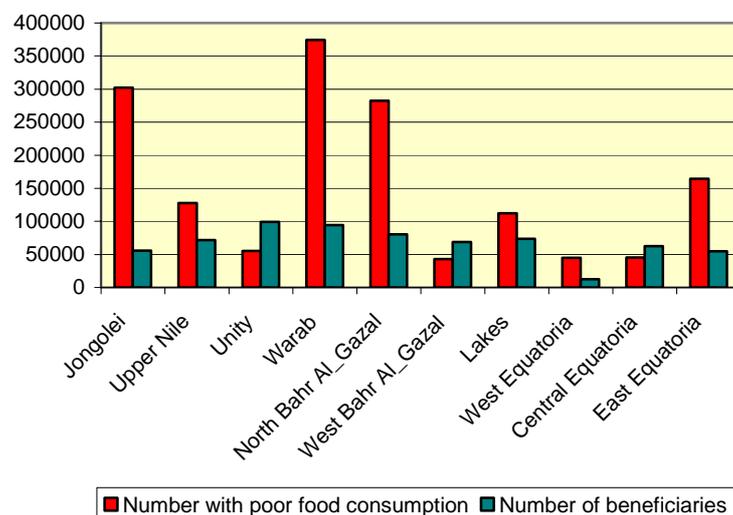


Figure 9. Number of food insecure people examined in relation to number of beneficiaries by state, southern Sudan



1.4.5 Underlying causes of food insecurity

This section explores the immediate and underlying causes of food insecurity in southern Sudan. This section uses the same methodology and general framework to those utilized the two previous chapters.

As southern Sudan is two years into the post-conflict phase, the food security challenges facing households in this region likely comprise a mix of factors, including continuing small scale insecurity/ conflict, natural shocks, household poverty and developmental issues (market access, etc.). Given the highly agricultural and pastoral natures of these households, natural disasters like drought, floods etc pose a particular hazard. Household poverty is one of the largest threats to food security as households in this region are extremely asset poor when compared to households in the rest of Sudan.

Lack of market access and lack of transportation infrastructure also poses challenges, discouraging crop production to capacity in highly productive areas. Alongside these challenges, households in southern Sudan also face specific threats to food security associated with emerging issues like IDP and refugee resettlement which have tended to stress natural resources and at times affect food prices and supply in highly affected areas.

Given the threats faced by households in southern Sudan, the independent variables examined in the probit analysis 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). The dependent variable, assessing food security status, was the dichotomous food secure (yes/no) variable. This analysis followed the same progression as the two previous causal analyses, with characteristics of typically vulnerable households (female headed hhs, hhs with a high dependency ratio, and displaced or refugee hhs, households experiencing shocks) first examined in relation to food security status. Asset wealth and livelihoods were later examined separately (taking account of basic hh characteristics) in relation to food security status. The models assessed are shown below:

$$\text{Probit} = b_0 + b_1(\text{female hhh}) + b_2(\text{high dependency ratio}) + b_3(\text{IDP hhs}) + b_4(\text{refugee hhs}) + b_5(\text{returned IDPs}) + b_6(\text{returned refugees}) + b_7(\text{hh experience one shock}) + b_8(\text{hh experienced two shocks}) + b_9(\text{household experienced three shocks})$$

$$\text{Probit} = b_0 + b_1(\text{female hhh}) + b_2(\text{high dependency ratio}) + b_3(\text{IDP hhs}) + b_4(\text{refugee hhs}) + b_5(\text{returned IDPs}) + b_6(\text{returned refugees}) + b_7(\text{hh experienced sickness/death}) + b_8(\text{hh experienced agricultural shock}) + b_9(\text{household experienced insecurity shock}) + b_{10}(\text{household experienced price shock})$$

$$\text{Probit} = b_0 + b_1(\text{female hhh}) + b_2(\text{high dependency ratio}) + b_3(\text{IDP hhs}) + b_4(\text{refugee hhs}) + b_5(\text{returned IDPs}) + b_6(\text{returned refugees}) + b_7(\text{hh experience one shock}) + b_8(\text{hh experienced two shocks}) + b_9(\text{household experienced three shocks}) + b_{10}(\text{hh wealth index})$$

$$\text{Probit} = b_0 + b_1(\text{female hhh}) + b_2(\text{high dependency ratio}) + b_3(\text{IDP hhs}) + b_4(\text{refugee hhs}) + b_5(\text{returned IDPs}) + b_6(\text{returned refugees}) + b_7(\text{hh experience one shock}) + b_8(\text{hh experienced two shocks}) + b_9(\text{household experienced three shocks}) + b_{10}(\text{agricultural, fishing and hunting hhs}) + b_{11}(\text{agropastoralist hhs}) + b_{12}(\text{pastoralist}) + b_{13}(\text{unskilled labour hhs}) + b_{14}(\text{skilled labour hhs}) + b_{15}(\text{employee hhs}) + b_{16}(\text{petty trade hhs}) + b_{17}(\text{handicraft}) + b_{18}(\text{collection}) + b_{19}(\text{food aid assistance hhs}) + b_{20}(\text{other activity hhs})$$

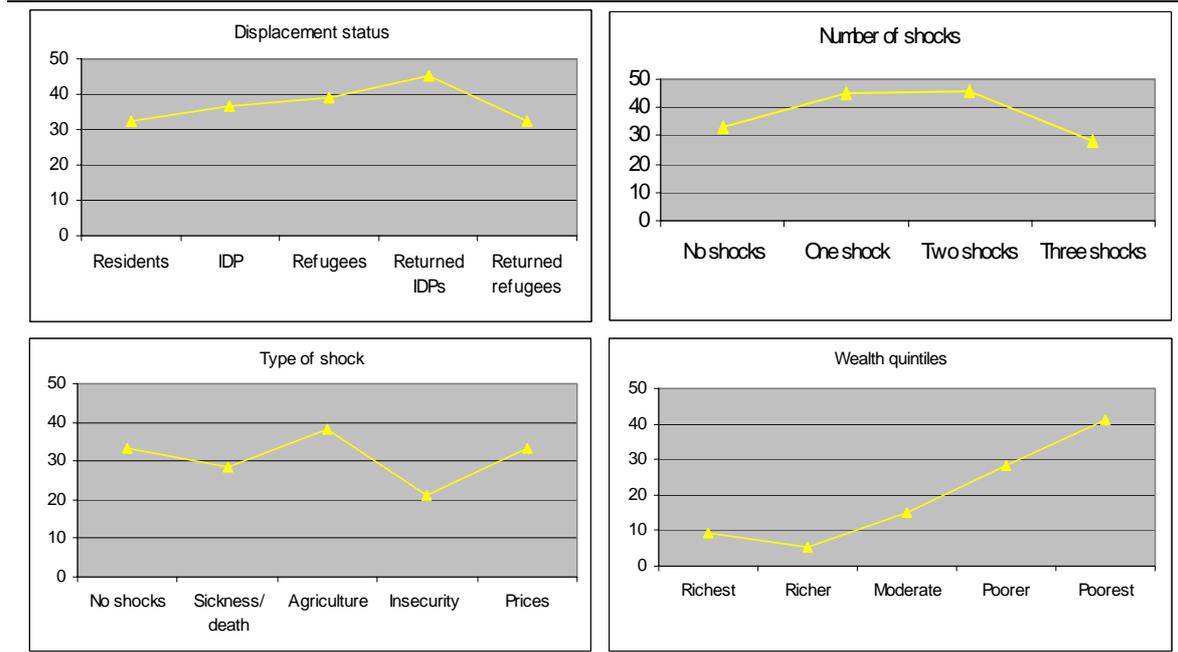
1.4.5.1 Predictors of food insecurity

An assessment of the basic households characteristics associated with food security status revealed several important findings (Figure 10). First, IDP's, returning IDPs and households experiencing one or 2 shocks were all significantly more food insecure than resident households or households who had experienced no shocks. It should be noted that, unlike in Northern, Central and East Sudan and the "three areas", there appeared to be a plateauing effect in terms of shocks. Households affected by more than two shocks were not more affected than households that experienced one or two shocks. Examined by types of shocks experienced, no particular one placed households at significantly greater risk of food insecurity than any other type.

As seen in the rest of Sudan, wealth was the strongest predictor of food security status. Here, the average household in the poorest quintile were more likely to be food insecure by approximately thirty percentage points than the average household in the richest quintile in urban and rural areas respectively. Generally, the effect of wealth on food security status remained constant regardless of household's displacement status or whether they suffered from shocks or not. Likewise, returned IDPs and households experiencing shocks remained significantly more food insecure, even when wealth was accounted for.

When the same analysis was conducted separately for urban and rural areas, findings differed only slightly. In urban areas, households with higher dependency ratio, IDPs, refugees, returning IDPs and refugees as well as households with one or two shocks were all more food insecure than other urban households. Meanwhile, in rural areas only returning IDPs and households with one or two shocks were significantly more food insecure. Likewise in both urban and rural areas, wealth status remained the strongest predictor of food security status.

Figure 10. Significant predictors of food security status, taking account of potential confounders



1.4.5.3 Role of livelihoods

An assessment of livelihoods showed that households relying on “agriculture, fishing and hunting”, “food aid” and “other” activities were all more food insecure than households relying strictly on agriculture. Overall, 38, 48 and 39 percent of households reliant on “agriculture, fishing and hunting”, food aid assistance and “other activities” were food insecure versus only 28 percent of households reliant in “agriculture”. Generally, the effect of livelihood on food security status was not modified by household status or the number or type of shocks experienced. Households reliant on “employed” work were less food insecure than households reliant on “agriculture” (19 percent vs 28 percent).

1.5 Most common shocks

While section 11.4 suggests that the number of shocks experienced may be a key determinant of food security status, table 9 details the top three shocks by state in southern Sudan. Insecurity and violence were listed as the most common shocks experienced by households in Jongolei, Upper Nile and West Equatoria. This is consistent with anecdotal accounts (discussed previously) of LRA activity in parts of West Equatoria and militia activity in Jongolei and Upper Nile, all of which has reportedly disrupted agricultural activities. Other common shocks included drought (North and West Bahr el Ghazal, Lakes, and Central Equatoria), floods (Unity and Warab) and sickness (Central and East Equatoria).

Table 9. Top three most common shocks per state in southern Sudan

State	Type of Shock	Percentage of all households reporting shock
Jongolei	Insecurity, violence	25
	Drought	19
	Livestock disease	15
Upper Nile	Insecurity, violence	18
	Drought	14
	Livestock disease	14
Unity	Floods	26
	Insecurity, violence	25
	Livestock disease	22
Warab	Floods	34
	Higher prices	33
	Crop pest/disease	29

North Bahr el Ghazal	Drought	24
	Higher prices	23
	Crop pest/disease	23
West Bahr el Ghazal	Drought	28
	Crop pest/disease	26
	Sickness in HH	22
Lakes	Drought	31
	Crop pest/disease	24
	Sickness in HH	16
West Equatoria	Insecurity, violence	38
	Sickness in HH	35
	Drought	33
Central Equatoria	Drought	31
	Sickness in HH	31
	Higher prices	26
East Equatoria	Sickness in HH	31
	Insecurity, violence	27
	Drought	27

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

With the signing of the CPA, household exposure to conflict declined substantially while their capacity to cope marginally increased, therefore lowering the overall level of vulnerability. Certain areas remain conflict affected, however. Households in the “Greenbelt region” of West and parts of Central Equatoria, for instance, were vulnerable to conflict for most of 2006 due both to the movement and actions of the LRA and to general crime and banditry along the borders with Kenya and Uganda. The threat from the LRA was particularly acute, as there were repeated reports of looting, theft and murder throughout the year. Central Equatoria, along with Lakes and Warab states, have also experienced sporadic tribal clashes. Households in Jongolei and Upper Nile have remained vulnerable. Scattered towns and villages where IDP resettlement has been intensive are also likely to be more affected by conflict as competition for resources can escalate into small personal or even tribal clashes.

1.6.2 Household vulnerability to drought

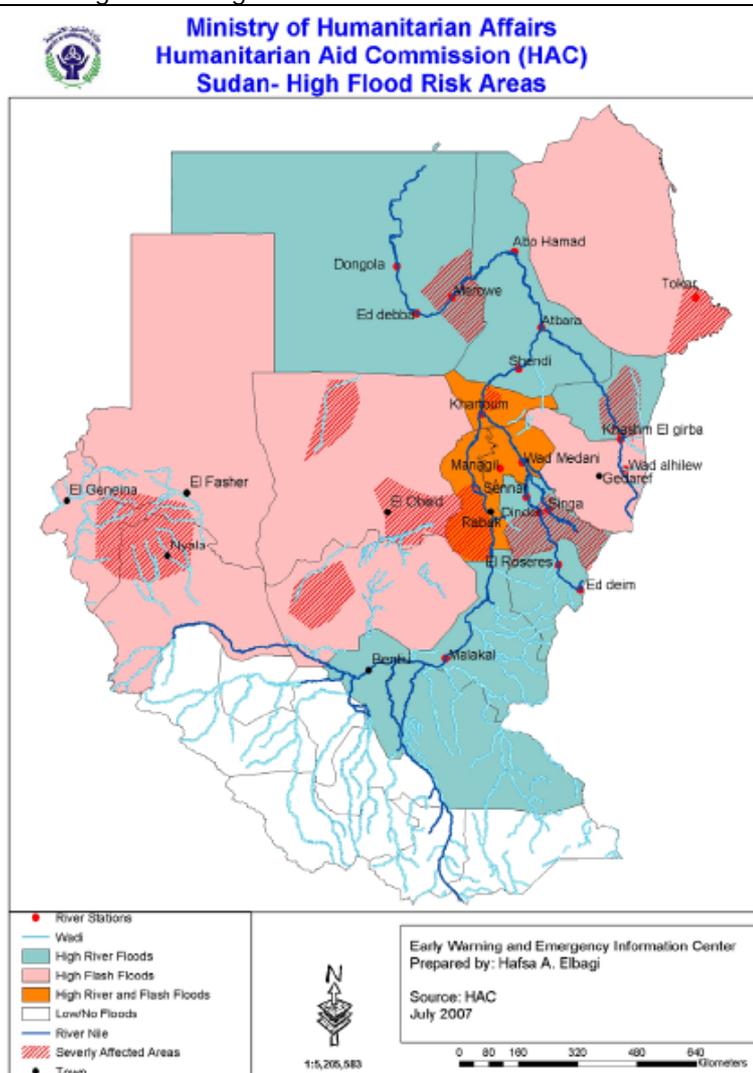
Using the methodology described in Chapter 8, households in the Greenbelt region of West Equatoria were determined to be the most susceptible to drought given their almost complete reliance on agriculture. Households in Lakes and Warab States were also highly susceptible given the combination of their reliance on agricultural or agro-pastoralism and their overall ability to cope (level of wealth). Overall, almost 43 percent of households were vulnerable to drought in West Equatoria, while 41 and 39 percent were vulnerable in Lakes and Warab. Households were least vulnerable in Central Equatoria, given that households in this state were substantially wealthier and thus more able to cope than households in the surrounding states. Overall, less than 18 percent of households in Central Equatoria were vulnerable to drought.

Table 10. Percentage of households vulnerable to drought by state in southern Sudan

Percentage of households susceptible to drought	
Jongolei	26.6
Upper Nile	27.5
Unity	20.8
Warab	39.0
North Bahr el Ghazal	29.5
West Bahr el Ghazal	21.8
Lakes	40.5
West Equatoria	42.5
Central Equatoria	17.1
East Equatoria	36.0

1.6.3 Household vulnerability to floods

Figure 11. High risk flood areas in southern Sudan



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 flood prone areas are considered to be “at risk”.

As figure 11 illustrates, households in Jongolei, Upper Nile, and Unity are particularly vulnerable to high river floods as they are located in the eastern flood plains of the Nile River.

Households in Warab and North Bahr el Ghazal are also vulnerable to flooding though mainly because they are in low lying areas and vulnerable to flooding from streams and rivers that flow from the Nile. These states comprise the bulk of the “Western Flood plains”.

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

1.7 General health and nutrition situation

The main findings from the child health and nutrition section of the household questionnaire for Southern Sudan are reported in the following sections.

1.7.1 Child health

1.7.1.1 Diarrhea

In Southern Sudan, 43 percent of children overall experienced an episode of diarrhea in the two weeks preceding the survey. Diarrheal disease was most prevalent in West Equatorial (54 percent), West Bahr el Ghazal (52 percent) and Unity (51 percent). Diarrhea was least common in Central Equatoria, where only 30 percent of children reported having such an episode.

Almost one-half of all affected children consumed ORS and 42 percent of consumed government recommended homemade fluids. When examined by state, generally one-third to two-thirds of affected children, depending on state, consumed these liquids. ORS consumption was most common in East Equatoria (64 percent), Unity (62 percent), and Central Equatoria (60 percent). Homemade fluids were consumed most frequently in West Bahr el Ghazal (66 percent), East Equatoria (60 percent), and West Equatoria (52 percent).

Table 11. Prevalence of diarrhea and types of treatments by state in southern Sudan (percent)

	Child had diarrhea in last 2 weeks	Drank ORS	Government-recommended homemade fluid
Jongoli	44.6	38.1	33.0
Upper Nile	40.9	47.5	19.5
Unity	51.0	62.0	49.7
Warab	43.7	44.5	42.2
North Bahr Gazal	45.2	48.5	50.0
West Bahr Gazal	52.3	54.7	65.7
Lakes	43.0	44.6	27.3
West Equatoria	53.8	36.9	52.1
Central Equatoria	30.2	60.3	49.5
East Equatoria	44.5	64.3	60.0
Southern Sudan- Overall	43.3	49.1	42.9

1.7.1.2 Fever

Overall, 46 percent of children had a fever in the two weeks preceding the survey. Fever was most prevalent in West Equatoria (54 percent), Warab (52 percent) and Unity (50 percent). In Jongolei and Upper Nile, 36 percent and 37 percent of children (respectively) reported having experienced fever.

In response to fever, slightly over one-half of all affected children were seen in a health facility and close to 90 percent of children took the medicine prescribed by health workers. Visits to health centres varied significantly by region, however, with only one-third (or slightly over one-third) of children with fevers visiting health facilities in Jongolei and Lakes. Conversely, 70-80 percent of children with fevers in Unity and Upper Nile visited health centres. Among children that visited health centres, however, there was little variation in the percentage that took the prescribed medicine. Across states, 80-95 percent of children took the prescribed medicine.

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

	Child ill with fever in last 2 weeks	Child seen at health facility during illness	Child took medicine prescribed at health facility
Jongoli	36.1	36.7	81.8
Upper Nile	37.4	68.9	87.9
Unity	50.3	81.0	95.2
Warab	52.2	49.6	91.0
North Bahr Gazal	47.8	49.0	83.5
West Bahr Gazal	45.7	43.8	81.8
Lakes	49.7	33.5	84.6
West Equatoria	53.8	57.5	83.0
Central Equatoria	42.6	58.7	92.3
East Equatoria	47.3	62.3	94.6
Southern Sudan- Overall	45.6	53.0	88.8

1.7.1.3 Acute respiratory infections

Examining prevalence of acute respiratory infection, 38 percent of children overall reportedly had a cough in the two weeks preceding the survey, and one-quarter of these children had difficulty breathing during these episodes. Examined by state, there were only small variations in prevalence and generally one-fifth to one-third of affected children had such a severe cough that they reported difficulty breathing.

As with treatment for fever, children in Jongolei and Lakes were the least likely to seek treatment for coughs and children in Upper Nile and Unity were the most likely to do so.

Table 13. Prevalence of cough and types of treatments by state in southern Sudan (percent)

	Child ill with cough in last 2 weeks	Difficulty breathing during illness with cough	Sought advice or treatment for illness
Jongoli	40.1	21.0	31.4
Upper Nile	31.5	18.6	71.4
Unity	44.1	33.2	72.2
Warab	35.5	26.6	49.3
North Bahr Gazal	33.2	23.6	48.3
West Bahr Gazal	40.7	29.0	44.4
Lakes	37.6	24.7	29.7
West Equatoria	47.9	30.8	61.5
Central Equatoria	37.8	23.8	68.2
East Equatoria	40.7	26.4	68.0
Southern Sudan- Overall	38.0	24.9	54.7

1.7.2 Child feeding practices

Summary statistics on child feeding by state examined: 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.

Generally, half or more of all mothers reported introducing foods other than breast milk to children within the first six months. Mothers in the Equatorias (East, West and Central) were the most likely to introduce foods other than breast milk during this time. Conversely, children in Lakes and Jongolei were the least likely to receive other foods. The age breastfeeding stopped varied by state, with a low of 5 months reported by mothers in Jongolei and North Bahr El Ghazal and a high of 20 months reported by pastoral women in East Equatoria. Solid foods were introduced into a child's diet sometime between their 5th and 9th month, depending on the state. Children in Unity generally did not receive solid food until 9 months of age, while children in the Equatorias generally received foods in their 5th or 6th month.

Table 14. Child feeding practices by state in southern Sudan

	Other foods in first 6 months	Age at which breastfeeding stopped	Age at which additional foods started
Jongolei	46.9%	5	7
upper Nile	49.2%	16	8
Unity	49.4%	13	9
Warab	57.7%	16	7
North Bahr Gazal	48.5%	5	8
West Bahr Gazal	49.4%	11	8
Lakes	43.9%	9	7
West Equatoria	67.3%	13	5
Central Equatoria	71.6%	10	6
East Equatoria	63.8%	20	6
Southern Sudan- Overall	55.4%	11	7

1.7.3 Children's nutritional status

While the anthropometric data collected as a part of SHHS was not included in this analysis, it was possible to examine general wasting patterns in parts of southern Sudan using secondary data sources. Using 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 it was possible to aggregate available surveys by month to get a rough estimate of the annual patterns in each indicator by general area (in this case, traditional livelihood zones). Data used was compiled (and a similar analysis was conducted) by Care - South Sudan. Adequate data was available for this analysis to be conducted for the following traditional livelihood zones; 1) the Nile and Sobat River Zone/ Eastern flood plains and 2) the Western flood plains.

Figure 12. Annual fluctuations in GAM, SAM, and U5 mortality rates in the Nile and Sobat Rivers/ Eastern flood plains zones

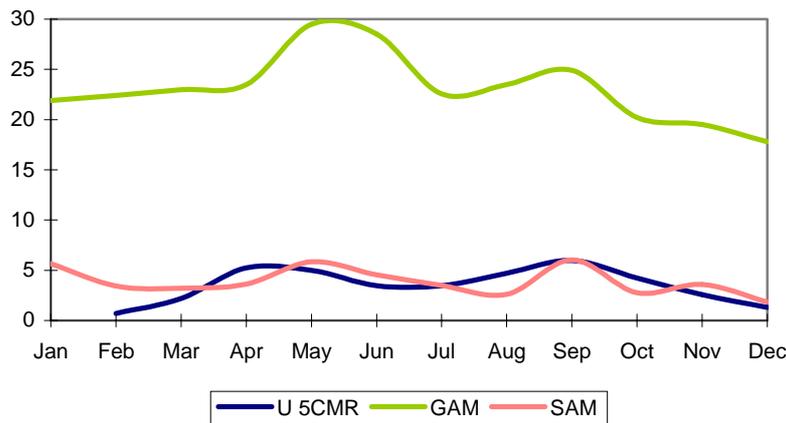
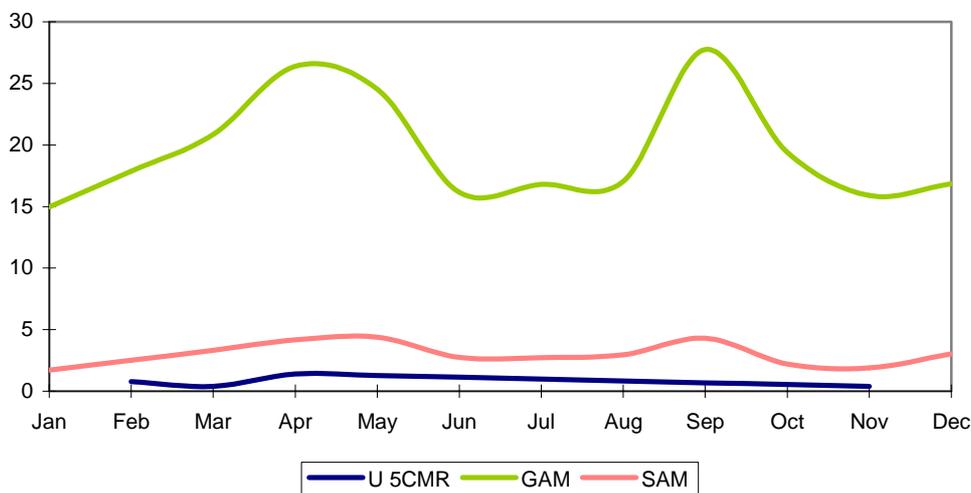


Figure 13. Annual fluctuations in GAM, SAM, and U5 mortality rates in the Western flood plains zone



Figures 12 and 13 are an adaptation of the analysis conducted by Care South Sudan². While these figures should be interpreted carefully (given their inherent limitations—see footnote), they do, given the large number of surveys conducted, likely depict a relatively accurate picture of annual nutritional fluctuations, providing some interesting insights into what may be driving child malnutrition in southern Sudan and whether food aid has a role

² Care southern Sudan. South Sudan Anthropometric Surveys 1998 to 2006: Trends based on Conflict and Immediate Post Conflict Data.

in any potential response³. The first and most basic point, illustrated by these figures, is that children in the Nile and Sobat River Zone/ Eastern flood plains zone appear (across years) to have higher GAM, SAM, and U5MR rates throughout the year than children in the Western flood plains. The reasons for this are unclear, especially given that food security, disease rates (in terms of diarrhea, ARI and fevers), access to health care, and child feeding patterns are similar or—if anything—generally better in the states that comprise the Nile and Sobat/ Eastern flood plains region. Clarifying why these children consistently have higher malnutrition rates (and much higher mortality rates) than their counterparts in the western flood plains is crucial in determining appropriate interventions.

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 becoming strained (with households beginning to rely on less preferred food), 2) cattle are away from the homestead, typically resulting in milk shortages, 3) meningitis outbreaks are common, 4) households being forced to rely on the less safe sources of drinking water, and 5) vector borne and infectious diseases (esp diarrhea) are more prevalent.

Each of these factors tend to work synergistically to affect child malnutrition. As with the other regions of Sudan surveyed, when the dry season progresses, meningitis outbreaks become common and water sources (be they 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. Increased incidence of infectious diseases, initiates a cycle, with illness begetting malnutrition and malnutrition increasing vulnerability to disease. The start of the rains exacerbates the problem by further facilitating the contamination of available water. The arrival of the intertropical convergence zone (ITCZ) which initiates the rains is 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 14 appears to support this hypothesis, as mortality rates in the Nile and Sobat River/ Eastern flood plains mortality rates peak before either GAM or SAM.

Typically, the role of food in this rapid nutritional deterioration has been largely overlooked. As data from the SHHS indicated, however, milk availability is likely an important determinant of child nutritional status. In the pastoral areas of southern Sudan, breastmilk and other milks are a significant component of a child's diet even at two years of age. As figure 14 indicates, over one-quarter of children two years of age received nothing but breastmilk or animal milks in the 24 hour period preceding the survey. While such a heavy reliance on milk (and inadequate consumption of solid foods) might go a long way in explaining some of the chronically high GAM rates observed throughout the year (given the association between milk consumption and linear growth), an acute shortage of milk in April and May could explain at least part of the rapid weight loss seen during this period.

The third finding is an observed second peak in malnutrition rates that occurs in each of these regions around September. This second spike in malnutrition rates is important for two reasons. First, it coincides with the end of the hunger season. Thus, contrary to the prevailing wisdom in southern Sudan (that malnutrition is largely a disease and water issue), the timing of this peak appears to suggest that food shortages may actually play a

³ Limitations include: 1) surveys within and across months are not necessarily from the same year and likely do not cover the same areas, (and they are not representative of the livelihood zones in general); 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) some of these surveys were conducted during the civil war and may therefore the nutritional situation may have been due to nearby insecurity or fighting (vs what would be considered typical fluctuations in nutritional status).

role in high malnutrition at certain times of year. This is important from a WFP perspective, as it might indicate an expanded role for food aid in any comprehensive response.

The second item of significance emerging from this is the role of malaria in childhood malnutrition rates. Given that this peak is at the height of the malarial season (September) and the fact that deteriorating nutritional status is most obvious in areas where childhood fevers are more common (according to SHHS), malaria does appear to be a major factor in this deterioration. Differentiating malaria's impact versus that of food shortages, however, is not easy given the complicated relationship between child nutrition and malaria. First, some (but not all) emerging evidence is suggestive of a synergistic relationship between malaria and malnutrition, with malaria treatments and prophylactic measures (ITN bednets) positively correlated with growth in children (in Gambia, Nigeria, and Kenya) and malnutrition correlated with higher susceptibility to malaria^{4,5,6,7,8}. Some of this evidence indicates that malaria is more likely to affect the nutritional status of younger rather than older children, due to immunity gathered over time⁹. Taken together, however, this evidence suggests that any approach to address deteriorating child nutritional status during this period will be most effective if interventions have both malaria and nutrition components.

1.7.4 Childhood mortality

One of the more interesting findings to emerge in the above assessment is the difference in baseline under 5 mortality rates between regions, with rates consistently higher in the Nile and Sobat River/ Eastern flood plains than in the Western flood plains. As Figure 15 illustrates, U5 MRs hover between 3 and 5 (per 10000 per day) for most of the year in the Nile and Sobat River and Eastern flood plains, while rates remain between 1 and 2 in the Western flood plains. This difference is perplexing when one considers that disease rates, food consumption patterns and access to health care are all similar between the two regions (with children even slightly better off in the Nile and Sobat River/Eastern flood plains)¹⁰. The only discernible difference between the two regions is in baseline malnutrition rates, with children in the Nile and Sobat River/ Eastern flood plains on average 5-10 percent more wasted than children in the Western flood plains. This suggests that a baseline wasting rate of 25 percent coupled with high morbidity is associated with excess mortality rates (above the emergency threshold) while 15 percent wasting (and similar-or even higher-morbidity rates) is not. This might indicate a need to re-calibrate (upwards) the traditional threshold (of 15 percent wasting) for an emergency situation to a level more consistent with excess mortality in this region. Before doing so, however, further, more detailed research on the appropriateness of this emergency threshold would need to be conducted. Finally, these findings also suggest that childhood mortality rates could be lowered in the Nile and Sobat River/ Eastern flood plains, by nutritional interventions aimed at lowering malnutrition rates to levels seen in the Western flood plains (by 5-10 percentage points).

⁴ McGregor IA, Gilles HM, Walters JH, Davies AH, Pearson FA. Effects of heavy and repleted malarial infections on Gambian infants and children. Effects of erythrocyte parasitization. *BMJ* 1956;2:686-92.

⁵ Bradley-Moore AM, Greenwood BM, Bradley AK, Kirkwood BR, Gilles HM. Malaria chemoprophylaxis with chloroquine in young Nigerian children. III. Its effect on nutrition *Ann Trop Med Parasitol* 1985;79:575-84.

⁶ Snow RW, Molyneux CS, Njeru EK, et al. The effects of malaria control on nutritional status in infancy. *Acta Trop* 1997;65:1-10.

⁷ Ter Kuile F, Terlouw DJ, Kariuki S, et al. Impact of permethrin-treated bed nets on malaria, anemia, and growth in infants in an area of intense perennial malaria transmission in western Kenya. *Am J Trop Med Hyg* 2003;68:68-77.

⁸ Genton B, Al-Yaman F, Ginny M, Taraika J, Alpers MP. Relation of anthropometry to malaria morbidity and immunity in Papua New Guinean children. *Am J Clin Nutr* 1998;68:734-41.

⁹ Friedman JF, Phillips-Howard PA, Hawley W, et al. Impact of permethrin-treated bed nets on growth, nutritional status, and body composition of primary school children in Western Kenya. *Am J Trop Med Hyg* 2003;68:78-85.

¹⁰ According to data from collected during the SHHS

1.7.5 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 and whether food aid may be having an impact. It is important to acknowledge up front 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 2003 to 2006. A more complete assessment would examine food aid patterns for the same time period. Secondly, as it was not possible to disaggregate food aid delivery by livelihood zone, approximate livelihood zones were devised, with Unity, Upper Nile and Jongolei comprising the Nile and Sobat River/ Eastern flood plains zone and Warab, Lakes and North Bahr el Ghazal comprising the Western flood plains. 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. 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.

Figure 14. Annual fluctuations in GAM, SAM, U5 mortality rates and numbers of food aid beneficiaries in the Nile and Sobat Rivers/ Eastern flood plains zones

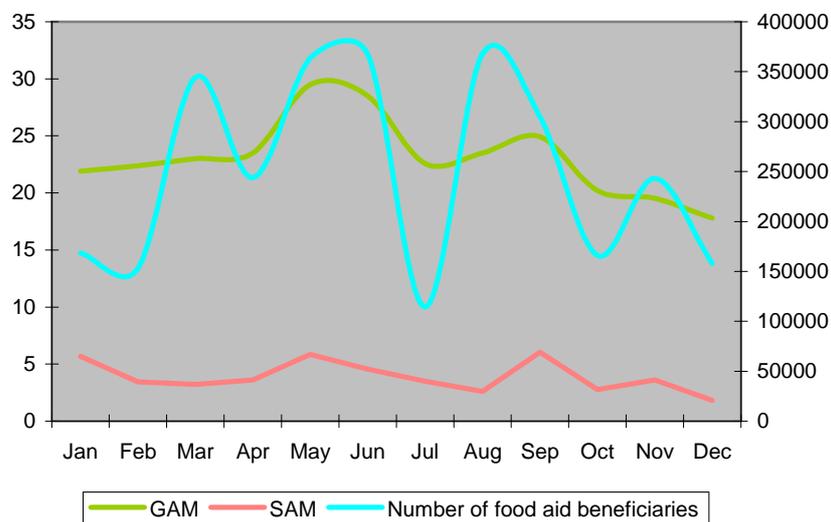
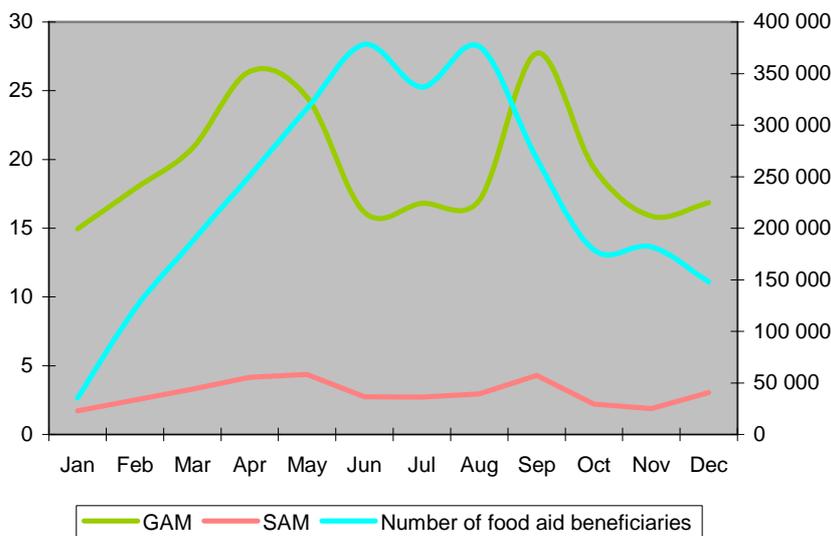


Figure 15. Annual fluctuations in GAM, SAM, U5 mortality rates and numbers of beneficiaries in the Western flood plains zone



Examining figures 14 and 15, several important findings emerged. First, the timeliness of food aid delivery appeared adequate in the Nile and Sobat River/ Eastern flood plains zone and inadequate in the Westerns flood plains. In the Nile and Sobat River/ Eastern flood plains zone, peaks in food aid delivery increased between March and May preceding the first observed peak in malnutrition rates in May and between August and September preceding the second peak in malnutrition in September. Conversely, in the Western flood plains, food aid deliveries did not peak until June, one month after the first large peak in malnutrition rates. Large amounts of food aid continued until August, when food aid deliveries dramatically declined (from close to 400,000 beneficiaries in August to approximately 200,000 in September). This decline in food aid deliveries preceded the second large peak in malnutrition rates in September. Thus, to reach households and children when they are most vulnerable, food aid deliveries in the Western flood plains need to peak one to two months earlier and need to last one to two months longer.

The second important point here is that increases in food aid appear to be roughly correlated with declining child malnutrition rates¹¹. Specifically, in the Nile and Sobat River/ Eastern flood plains, increases in the numbers of beneficiaries in both May and September are followed by declining child malnutrition rates. In the Western flood plains, this correlation is even more noticeable. Here, increases in food aid (between June and August) coincide with the lowest observed child malnutrition rates (of 15 percent). Likewise, sharp declines in food aid deliveries (from close to 400,000 to approximately 200,000 beneficiaries) in September coincide with sharp increases in child malnutrition rates (from 15 percent to about 27 percent). Also, a slight lowering in the number of beneficiaries, which occurs in July, coincides with a slight increase in malnutrition rates at the same time. One may question whether it would be possible for food aid deliveries to have such an immediate impact on child malnutrition rates. The answer is clearly “yes”. Wasting prevalence (low weight for height) is known as a very responsive indicator to changes in disease or diet patterns, which is illustrated nicely by the 5-10 percent increases in wasting prevalence which occur from one month to the next at certain times throughout the year.

1.7.6 Micronutrient deficiencies

1.7.6.1 Iodine deficiency disorder (IDD)

As discussed in Chapter 7, the percentage of households with properly iodized salt was highest in southern Sudan because of the trade with Kenya and Uganda. When examined by state (as Table 15 shows) households in the states near or bordering Kenya (Central Equatoria, East Equatoria, and Lakes) were the most likely to have properly iodized salt. In East Equatoria and Lakes, over 50 percent of households had iodized salt, while in Central Equatoria, almost 80 percent had properly iodized salt. Households in States where market access is difficult or where markets are likely not to have as many Kenyan and Ugandan goods (like Jongolei, Unity, Warab, and Upper Nile) were least likely to properly iodized salt at less than 15 percent. As expected, the overwhelming majority of households accessed salt from marketplaces with fewer than one-fifth relying on food aid or indigenous sources. Reliance on food aid was highest in West Bahr el Ghazal. Here, 17.8 percent of households relied on food aid for salt.

Table 15. Percentage of households with properly iodized salt by state in southern Sudan (percent)

	Not iodized 0 PPM (no colour)	Less than 15 PPM (weak colour)	15 PPM or more (strong colour)
Jongolei	73.9	19.7	6.4
Upper Nile	12.6	72.8	14.6
Unity	41.7	47.5	10.8
Warab	22.7	65.6	11.7
North Bahr Al_Gazal	60.3	18.6	21.2
West Bahr Al_Gazal	42.3	26.4	31.4
Lakes	15.4	25.3	59.3
West Equatoria	18.6	67.9	13.6
Central Equatoria	3.1	18.0	78.9
East Equatoria	18.9	30.6	50.5
Southern Sudan- Overall	28.3	35.2	36.5

¹¹ Again, discussions of observed correlations should not be mistaken for claims of causality.

Table 16. Source of household salt by state in southern Sudan (percent)

	Local market	Food aid	Indigenous, other
Jongolei	90.3	6.2	3.5
Upper Nile	86.6	13.0	.4
Unity	89.2	10.8	.0
Warab	96.7	3.0	.3
North Bahr Al_Gazal	92.8	7.0	.2
West Bahr Al_Gazal	81.9	17.8	.3
Lakes	90.1	9.7	.2
West Equatoria	99.0	.7	.2
Central Equatoria	95.2	4.8	.0
East Equatoria	89.3	10.6	.1
Southern Sudan	91.8	7.6	.6

1.7.6.2 Vitamin A deficiency

Vitamin A supplementation was highest in Central and East Equatoria. Here, 51 percent and 43 percent of children reportedly received a vitamin A supplement within the last 6 months. The percentage was much lower in Jongolei (14 percent), North Bahr El Ghazal (17 percent) and Upper Nile (20 percent). Approximately two thirds of Vitamin A supplements were received during the last national immunization day campaign. Children in Jongolei and Unity were the exception, as only 44 percent and 34 percent respectively received their supplements at that time. Instead, children in these areas mostly received their supplements during visits to a health centre.

Table 17. Percentage of children receiving vitamin A supplementation and source of last supplement in southern Sudan (percent)

	Child received vitamin A in last 6 months		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
Jongoli	13.8	15.9	37.0	44.2	2.9
upper Nile	19.9	21.1	9.6	69.4	.0
Unity	30.5	43.5	22.8	33.6	.0
Warab	33.7	21.0	11.3	67.7	.0
North Bahr Gazal	16.8	14.4	17.3	68.3	.0
West Bahr Gazal	32.8	15.9	22.2	60.7	1.1
Lakes	24.7	3.9	12.9	82.0	1.3
West Equatoria	31.9	10.8	15.8	70.3	3.2
Central Equatoria	51.0	12.9	6.9	79.8	.5
East Equatoria	42.8	14.2	24.3	61.3	.2
Southern Sudan- Overall	29.0	17.0	16.4	66.0	.7

1.8 Conclusions and recommendations

Southern Sudan remains the poorest and most food insecure region in Sudan. This is largely a legacy of the civil war that raged here for much of the past fifty years. Traditional livelihoods and infrastructure have been destroyed and are only starting to be rebuilt. Overall, one-third of all households in southern Sudan are food insecure, compared to 8 percent of household in the ROS and 26 percent of households in Greater Darfur.

1.8.1 Livelihood food security and vulnerability profiles

While "agriculture" was the most prominent livelihood activity in southern Sudan, households that are most at risk of food security tend to be more reliant on "agriculture, hunting and fishing", "food aid assistance", and "other activities". These livelihoods were most prevalent in Jongolei, Unity, Warab and North and West Bahr el Ghazal. Conversely, livelihood activities typically considered more urban like "employed" work, were typically better off.

1.8.2 Geographic Food security and vulnerability profiles

When the geographic distribution of food insecurity was examined, Jongolei, Warab, and North Bahr el Ghazal were determined to have the largest percent of food insecure households. Overall, 40-41 percent of households in these three states had either poor or borderline consumption patterns. Central and West Equatoria had the lowest percentage of food insecure households. Here, only 15 percent and 22 percent of households were food insecure.

1.8.3 Causes of food insecurity and vulnerability

The main predictors of food insecurity in southern Sudan consisted of the following:

1. Wealth status
2. Households status (IDP HH and IDP HH recently resettled)
3. Household experiencing shocks (1 or 2)

Wealth was the strongest predictor of food security status, with households in the poorest quintile more food insecure on average by thirty percentage points than households in the richest quintile (40 percent vs 10 percent food insecure). The poorest states on average included Jongolei, Warab, West Bahr el Ghazal, Lakes and Eastern Equatoria.

Present and former IDP households were both found to be more at risk of food insecurity than settled residents. Current IDP households had a predicted food insecurity prevalence of 37 percent while recently resettled IDPs had a prevalence of 45 percent. Residents had a predicted prevalence of 32 percent.

Households affected by shocks (particularly one or two shocks) appeared to be more vulnerable to food insecurity than households affected by no shocks. No particular type of shock (sickness/death, agricultural, insecurity, or price), appeared to place households at more risk of food insecurity than any other. The states most affected by shocks included West Equatoria (67 percent), Warab (52 percent), East Equatoria (48 percent), and North and West Bahr el Ghazal (43 percent). The states considered most vulnerable various shocks, as determined from the vulnerability analysis, are shown in Table 18.

Table 18. States most vulnerable to insecurity, drought and floods

Type of shock	The states most vulnerable to various shocks		
Insecurity	Equatorias (West and Central)	Lakes	Jongolei
Drought	West Equatoria	Lakes	Warab
Floods	Upper Nile	Jongolei	Unity

1.8.4 Targeting and timing of food aid

The assessment of whether food aid programmes were targeted correctly revealed that some recalibrations may be necessary. In West Bahr el Ghazal and Unity the amount of food aid given in 2006 seemed to exceed needs, when examined either in terms of the share or number of food insecure. At the same time, the amount of food aid given in Jongolei, Warab and North Bahr el Ghazal seemed not quite adequate for the level of need. To illustrate, Unity was home to fewer than 5 percent of the total food insecure in southern Sudan (approximately 50,000 people) but it received almost 15 percent of the food aid (enough for approximately 100,000 beneficiaries). Conversely, Jongolei was home to 18 percent of the food insecure (approximately 300,000 people) but received only 8 percent of the food aid (enough for only 50,000 beneficiaries).

An assessment of the timing of food aid deliveries by annual patterns in childhood wasting levels (in traditional livelihoods zones) revealed that some slight adjustments might be required in the western flood plains while no adjustment was necessary in the eastern flood plains. In the western flood plains, food aid peaks too late (two months after the first of two annual peaks in malnutrition rates) and subsides too early (one month before the second peak in malnutrition). In the eastern flood plains, conversely the peaks in food aid delivery correspond well with the peaks in childhood malnutrition rates.

1.8.5 Recommended food interventions by priority area and priority group

Synthesizing the main findings above, a three pronged approach in terms of food interventions is recommended in southern Sudan.

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 tend to be. Household characteristics associated with food insecurity include:

- Asset poverty
- Households reliant on either a mixture of agriculture, hunting and fishing; food aid assistance or “other activities”
- Current or recently resettled IDP households
- Household frequently affected by or vulnerable to shocks

Households characteristics not associated with food security status include:

- sex of household head
- dependency ratios
- specific type of shock experienced.

In terms of where the food insecure are located, the CFSVA results indicate that Jongolei, Warab and North Bahr el Ghazal have the largest percentage of households with poor or borderline food consumption. The findings also show that West and Central Equatoria have the best consumption patterns, with the fewest number of food insecure.

The first step in refining targeting is to utilize this information in an assessment of the efficacy of present and future food aid programming. This involves assessing communities currently receiving heavy amounts of food aid to determine if they share some of these 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 amounts of food aid delivered are proportional to the numbers of food insecure. The CFSVA has shown that Jongolei, Warab and North Bahr el Ghazal were all substantially under-served in 2006, while West Bahr el Ghazal and Unity appeared to be over-served. The CFSVA recommends that in future, more resources be directed towards Jongolei, Warab and North Bahr el Ghazal. It is not entirely clear, however, whether resources should be re-directed from West Bahr el Ghazal and Unity. While both states appeared to be over-served, high numbers of food aid beneficiaries and much lower numbers of food insecure could simply be an illustration of the effectiveness of ongoing food aid efforts (as seen in Darfur). This decision should be made by programmers familiar with the specific context.

2. Improve timing of food aid deliveries

One of the important findings from this CFSVA is the need to 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. Timing of food aid deliveries in the eastern flood plains region of southern Sudan, on the other hand, appears adequate.

3. Couple food and malarial programmes (August-October)

Finally, the CFSVA recommends that WFP consider food interventions, coupled with anti-malarial programmes, in September and October to try and reduce the deterioration in child nutrition that occurs annually around this time. Coupling food and malarial interventions appear appropriate as this period corresponds with both the end of the hunger season and peak malarial season. Likewise recent research indicates that children

are at greater risk of mortality from malaria when malnourished¹². In fact, children that are severely undernourished (<-3 z-scores) are 9.5 times more likely to die from malaria, while children that are moderately malnourished are 4.5 times more likely to die from malaria. Instituting these interventions appears particularly important in the eastern flood plains region (comprising Jongolei, Upper Nile and parts of Unity). Here childhood malnutrition rates reach as high as 25 percent (with 5 percent severe wasting) during this time and child mortality rates peak at 5/10,000/day. Here, the initiation of malarial and nutrition programmes might substantially impact child mortality.

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.

As for the ROS region, the CFSVA recommends that WFP invest in analytical studies examining the causes of malnutrition in southern Sudan. Again, 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 how to proceed programmatically. This is important in the context of southern Sudan, as WFP's role in the region in the post-conflict phase has become increasingly uncertain.

The need for food aid has been questioned, based on the assumption that the annual deterioration in child nutrition in April and May is not food related. Rather, conventional wisdom contends that this deterioration is due primarily to worsening water sources and disease. This assumption, while reasonable, has not been examined analytically and it serves to discourage food aid programming at a time when it might make a difference. The findings from this study are not robust enough to determine if water and disease are the problem during this period or whether there are food components as well.

Another related challenge is the heavy focus on the first peak in childhood malnutrition rates, largely at the expense of the second peak in malnutrition rates occurring annually in September and October. This has shaped the conventional wisdom discussed above that food aid is not the most appropriate intervention. However, since this second peak occurs at the end of the hunger season, this deterioration is likely due at least in part to food pressures. Therefore, food aid may be a crucial component of any comprehensive response. To determine if this is the case, the primary nutritional pressures on children during September and October must be determined.

Finally, given the perpetually high rates of wasting (at or above the 15 percent emergency threshold for much of the year), discerning true nutritional emergencies remains one of the most difficult challenges for WFP. Childhood mortality differentials between the eastern and western flood plains regions are a good illustration of this. In both regions, baseline child malnutrition rates are at or above the 15 percent emergency threshold with cyclical jumps to as high as 25-30 percent. However, childhood mortality rates are only above the emergency threshold on consistent basis in the eastern flood plains region, with rates jumping as high as 5/10000/day. This leads to several difficult questions:

- Why is there an emergency situation in the eastern but not western flood plains?
- Could this be a result of malnutrition rates being consistently higher in the eastern flood plains (by approximately 5 percent)?
- If so, why would 20 percent baseline wasting be associated with elevated mortality while 15 percent wasting is not?
- Does this indicate a need to recalibrate the emergency thresholds to take account of agro-pastoral growth patterns and diets (milk consumption, etc)?

¹² Caulfield, L, Richard, S, and Black, R. Undernutrition as an underlying cause of malaria morbidity and mortality. DCPD working paper No. 16. Johns Hopkins University Bloomberg School of Public Health.

Only by understanding the causes of childhood malnutrition in this region will WFP have a foundation from which to answer these questions.

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

The CFSVA recommends that programmes to encourage proper child caring practices, with a particular focus on improving child feeding patterns, be incorporated into any nutritional support. This could result in a measurable improvement in disease and wasting prevalence. CFVSA data indicates that 55.6 percent of women report introducing foods other than breastmilk within the first six months of life, contrary to WHO recommendations. This problem was particularly acute in Equatoria, with 64-72 percent of women giving their child other foods during this period. Likewise, the mean age when breastfeeding stopped was 11 months of age, which means that on average, children are being weaned too early. This problem was particularly evident in Jongolei, North Bahr El Ghazal and Lakes. Children in these states were weaned between 5 and 9 months of age.

3. Improve the reach and consistency of vitamin A supplementation programmes

Finally, the CFSVA recommends that vitamin A supplementation programmes be incorporated into nutritional interventions, with an aim to ensure that supplements reach underserved areas and that they are given every six months. While the prevalence of Vitamin A deficiency in southern Sudan is not known, vitamin A deficiency remains an area of concern. Vitamin A deficiency is a significant contributor to childhood morbidity (blindness or infectious diseases such as diarrhea, measles, etc) and mortality (as deficient children are often more severely affected by infectious diseases). CFSVA data indicates that 30 percent of children from southern Sudan received vitamin A supplements in the last 6 months. In particularly underserved areas, like Jongolei, North Bahr el Ghazal and Upper Nile, rates of supplementation were around half the regional average. In these three states, only 14 percent, 17 percent and 19 percent of children received vitamin A supplements in the last six months.

Agricultural interventions

1. Facilitate crop production among recently resettled households

WFP should collaborate with other agencies, like FAO, to facilitate crop production by recently resettled households. The CFSVA has shown that fewer households farmed in the last year than report doing so normally. This is likely driven by resettled households having missed the window for planting, given the resettlement schedule. Consequently, the data also shows 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 continue to support those resettled households that arrived too late for planting.

2. Encourage producing to capacity while working to improve market access

WFP should encourage farmers in productive areas to produce to capacity. There are numerous reports that farming households in the "greenbelt" region of southern Sudan do not routinely farm to capacity. The reasons for this are both structural and security related. First, the LRA has been active in the area, disrupting crop yields and discouraging farming to far away from the homestead. Secondly, these farmers see no benefit in farming to capacity as they do not need the food and they have no means of getting the surplus to markets. As many of the surrounding states could benefit from surpluses in these productive areas, WFP and other agencies should encourage farming to capacity while working in the longer term to improve access to markets. This is a longer term solution though successful connecting these marketplaces could have a substantial impact on food security status of households throughout southern Sudan.