

## Helpdesk Report: Seasonality in South Sudan

Date: 22 April 2015

### Query:

The questions are:

1. Document the characteristics of seasonal spikes in South Sudan: what sector/ areas of needs is concerned (food insecurity, acute malnutrition, diseases, anything else), what is the extent of seasonal spikes (how do prevalence/ incidence/ caseloads change), what are the triggers? What is the extent of a spike in a 'normal year' and the extent of a spike in abnormal circumstances?
2. Investigate the extent to which humanitarian and development interventions in the country plan seasonally (dry season planning, surge plans in health, nutrition, food security or social protection, etc)

**Enquirer:** Anais Lafite, Humanitarian Adviser, DFID South Sudan ([a-lafite@dfid.gov.uk](mailto:a-lafite@dfid.gov.uk))

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### 1. Key points

#### Areas of need affected by seasonality:

- Acute malnutrition tends to be highest during the lean season April/May – August. The lean season occurs at the same time as the rainy season, when the incidence of malaria and diarrhoea increases. This creates a double burden of vulnerability. The rainy season also brings logistical constraints to the implementation of nutrition activities, hampering communication and the transport of nutrition supplies (Nutrition Cluster, 2014).
- Seasonal analysis of conflict incidents shows that more than 63 percent of the conflicts in 2012 occurred between January and May, coinciding with the dry period when households experience depleted food stocks and have to rely on the market to

meet their food needs. It is also when competition for water and pasture is highest, which act as a trigger for unresolved inter-communal conflicts. However the incidences are lowest during the rainy season (June –August) when movements are constrained due to poor road networks) (Republic of South Sudan Ministries & UN agencies, 2013).

### **When do seasonal spikes occur?**

April/May is the beginning of the lean season. Early harvesting starts in September with access to food improving. Onset, cessation, intensity and distribution of seasonal rainfall depends on locality.

The peak of malnutrition, according to ACF seasonal admission trends, occurs every year between April and June which coincides with the dry season and diminishes with the coming of the rains. Lower attendance is noted at the most critical period of the hunger gap. Two issues may explain this: 1) agricultural labour may take priority over attending a nutrition programme; 2) Flooding may restrict access for those attending ACF nutrition centres and for those delivering outreach activities (Andrey, 2011).

### **The size of the seasonal effect:**

- Data vary on the estimate of the seasonal effect on nutrition. Pre- and post-harvest data were available for 5 counties. The decrease in GAM post-harvest ranged from 3% to 62% (Humanitarian Response, 2015).
- Estimates for 2004/5 in North, South and West Darfur suggests fluctuation in GAM of between 10% and 20% (Nielsen et al., 2011).
- Diarrhoea prevalence remains the same between October 2011 and June 2012 but increases dramatically in October 2012. Fever rates increase around February to June. Acute respiratory infections fall from October 2011 to June 2012 then rises by 16% points in October 2012 (Republic of South Sudan Ministries & UN agencies, 2013).
- Other analyses look at pre- and post-harvest data but do not distinguish by state. Or look at data by state but do not distinguish by season.

### **What is being done:**

- Limited evidence was found. Further evidence may be available and could be requested directly from organisations if required.
- In particular, a paucity of evidence was found on development programmes' seasonality planning, as opposed to humanitarian programmes' seasonality planning.
- The impact of conflict must be considered when assessing the impact of seasonality on food security in South Sudan, as seasonality also impacts on stability.
- Malnutrition may be made worse by irregular funding and a lack of the inclusion of seasonality in planning. Developing strategic models may help address this.
- An estimated US\$600 million is needed to improve food security in South Sudan.
- There is some evidence of relevant stakeholders including seasonality in their planning. For example:
  - The Logistics Cluster have committed resources to improve their seasonality planning.
  - Concern Worldwide include seasonality planning in their Food, Income and Markets (FIM) programme development, including the implementation Cash for Work and unconditional cash transfers programmes.
  - Welt Hunger Hilfe's orientation framework is not specific to South Sudan, but considers resilience and shock resistance. Multi-sectoral seasonal calendars, risk assessment are recommended. Short term safety nets to bridge temporal food shortages, such as Cash transfers and Cash for Work programmes, are also recommended.

## 2. Overview

Seasonality in South Sudan affects agriculture, food security, nutrition, water quality, disease, conflict, displacement and trade. Many of these are interrelated. This report focuses primarily on nutrition and food security.

### **Areas of need affected**

The prevalence of acute malnutrition has seasonal variations in South Sudan. It is highest during the lean season (lasting from April/May up until August for some regions) before the harvest. The lean season occurs at the same time as the rainy season, when the incidence of malaria and diarrhoea increases. This creates a double burden of vulnerability. The rainy season also brings logistical constraints to the implementation of nutrition activities, hampering communication and the transport of nutrition supplies (Nutrition Cluster, 2014).

There is some evidence of a pre-rainy season lean season which has implications on both food production as well as the hygienic and sanitation environment (Woldetsadik, 2009). In the months preceding the rains, both fish and milk, major components of the diet, are at an annual low. The cattle are grazing in the distant 'toic' (lowlands) and as the rivers and pools dry up, fish no longer supplements the diet. Therefore as crop stocks continue to be eaten the population becomes increasingly vulnerable to food shortages. The situation is further compounded by the lack of water available at this time of the year. With pools and rivers increasingly drying up the population are forced to share the dirtier water used by cattle with other household uses. Morbidity data confirmed that this season sees a peak in diarrheal diseases (Andrey 2011). Acute malnutrition usually coincides especially with high diarrhoeal disease incidence and to some degree with livestock and population movements (Woldetsadik, 2011).

### **Triggers for seasonal spikes**

Seasonal analysis of conflict incidents shows that more than 63 percent of the conflicts in 2012 occurred between January and May, coinciding with the dry period when households experience depleted food stocks and have to rely on the market to meet their food needs. It is also when competition for water and pasture is highest, which act as a trigger for unresolved inter-communal conflicts. However the incidences are lowest during the rainy season (June – August, when movements are constrained due to poor road network) (Republic of South Sudan Ministries & UN agencies, 2013).

Tribal fighting can occur during periods of animal movements in search for pasture, high food prices and limited access can occur from January to April (Ververs 2009). In addition to this seasonal feed and water availability and quality is noted as a factor which affects livestock. Lastly, flooding in the rainy season affects roads forcing trucks to carry small loads over long distances resulting in increased average unit cost of transportation (Republic of South Sudan Ministries & UN agencies, 2013).

### **Opportunities**

The rainy season brings some opportunities, however, including for fishing. Fish is a seasonally important source of food in many parts of the country, and throughout the year in the Nile- Sobat corridor and other areas with permanent water bodies. All the states have important natural fishing grounds which are easily accessed during the year. With the expansive Sudd (stretching about 100,000 hectare of swamps), the fishing potential is huge and the seasonal flooding that occurs in some areas further provides longer fishing opportunities for communities (Republic of South Sudan Ministries & UN agencies, 2013).

Above average rainfall in 2012 caused flash flooding in many states, however they have generated good pasture conditions and water availability for animals and supported crop production (NND and UNICEF, 2012).

## **When do seasonal spikes occur?**

South Sudan typically has varied onset, cessation, intensity and distribution of seasonal rainfall depending on locality. April/May is generally the beginning of the lean season. Early harvesting starts in September with access to food improving. There are areas within the unimodal (one rainy season) as well as those in the bimodal (two rainy seasons) rainfall zones. In the greater Equatoria, March to May rainfall contributes significantly especially during the first cropping season, particularly in the south-western part of the country where the Greenbelt lies, while May to October rains are more significant across the South. The Equatoria region exhibits bimodal seasons and rainfall starts in April, whereas unimodal seasons exist in Bahr el Ghazal and Upper Nile regions with rainfall running from May through October. Land preparation normally begins in March in Equatoria except in the arid/pastoral zone and April in other parts of the country. Since the country relies on rain-fed agriculture, the seasonal rainfall patterns dictate the agricultural activities. In the 2012 agricultural season, cultivation started as usual in April in Western Equatoria and in May in Bahr el Ghazal and Upper Nile. However, above average rainfall received between July and September resulted in localised flooding which inundated cropped areas in Warrap, Lakes, Northern Bahr el Ghazal, Unity, Jonglei and Upper Nile states. (Republic of South Sudan Ministries & UN agencies, 2013)

The peak of malnutrition, according to ACF (Action Against Hunger) seasonal admission trends, occurs every year between April and June which coincides with the dry season and diminishes with the coming of the rains. Lower attendance at outpatient therapeutic programmes (OTPs) and stabilisation centres (SCs) is noted at the most critical period of the hunger gap in Warrap and Northern Bar el Ghazal States. Two issues may explain this: 1) agricultural labour may take priority over attending a nutrition programme; 2) Flooding may restrict access for those attending ACF nutrition centres and for those delivering outreach activities. (Andrey, 2011).

## **By how much does it change?**

This section provides the data on seasonal change that was identified. It also highlights interannual and regional differences.

### Seasonal

SMART data shows variation in seasonal intervals for 5 counties. Three counties from Jonglei State with pre- and post-harvest 2014 data show a 46%, 42% and 3% decrease in global acute malnutrition (GAM) post-harvest. Two counties in Warrap State show a 62% and 22% decrease (Humanitarian Response, 2015). This highlights a substantial regional range if data are accurate.

Nutrition Cluster (2014) analysed the results of 24 pre-harvest SMART nutrition surveys conducted in 23 counties of seven states during the pre-harvest season of 2013. GAM levels ranged from 5.4 percent in Wulu County (Lakes State) to 35.6 percent in Gogrial East County (Warrap state). Seven post-harvest SMART nutrition surveys were conducted in South Sudan in 2013, showing levels of GAM that ranged from 10.3 percent in Koch County (Unity State) to 16.0 percent in Mayendit County (Unity State). This analysis does not show seasonal variation as it looks at the range of GAM for different states pre- and post-harvest.

Nielsen et al. (2011) found that through 2004 and 2005, GAM among IDPs and residents in North, South and West Darfur states fluctuated between 10 percent and 20 percent due to seasonality. GAM and severe acute malnutrition (SAM) showed marked seasonal fluctuation in these states, peaking around June–July. The authors state that seasonal fluctuation was homogeneous across states. Under-five death rate fluctuated by 54 percent (RE = 1.54; 95

percent CI 1.32–1.80) with season homogeneously across populations and states and was generally lower around the first quarter of the year.

The number of admissions into supplementary feeding programmes in Darfur remained nearly static over the course of 2012 and has not shown the usual seasonal increase according to data from NND and UNICEF (2012a). Numbers of children treated for SAM increased in April, May and June 2012, both in comparison to last quarter (reflecting usual seasonal variations) and in comparison to the same quarter last year (reflecting improving geographical coverage with community management of acute malnutrition).

OCHA South Sudan (2014) estimate that 60 percent of roads are impassable in the rainy season, which lasts about 5-6 months.

### Seasonal and regional

Figure 1: Child Morbidity in October 2012 and seasonal trends over 1 year. (Republic of South Sudan Ministries & UN agencies, 2013)

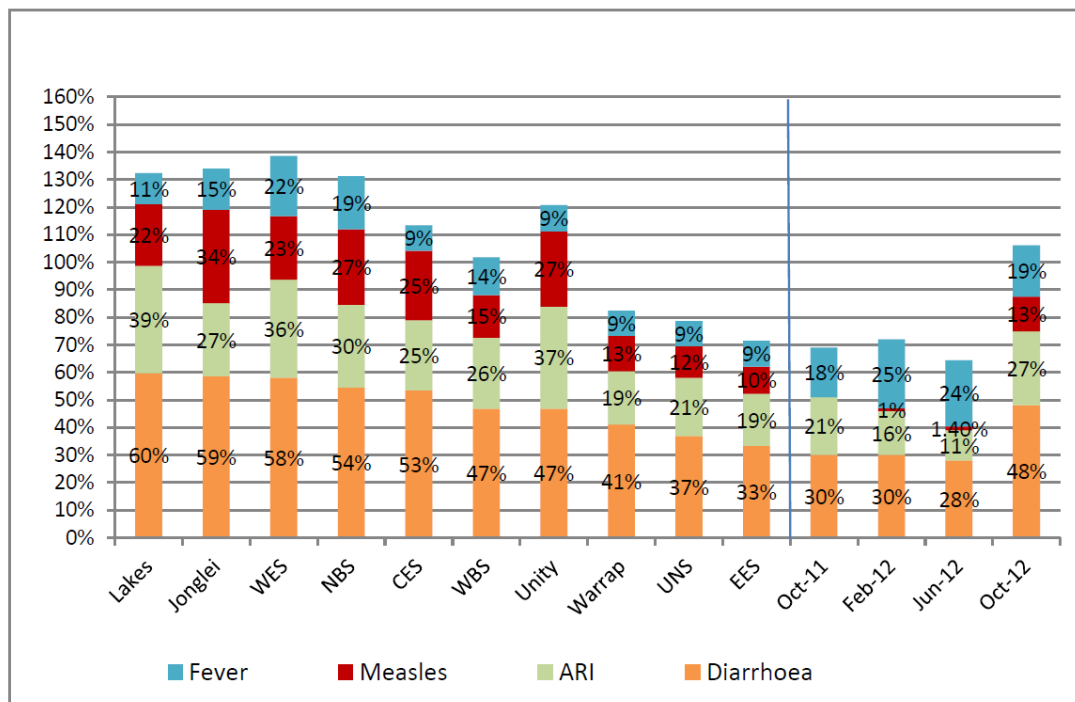


Figure 1 shows that diarrhoea prevalence remains the same between October 2011 and June 2012 but increases dramatically in October 2012. Fever rates increase around February to June. Acute respiratory infections fall from October 2011 to June 2012 then rises by 16 percentage points in October 2012.

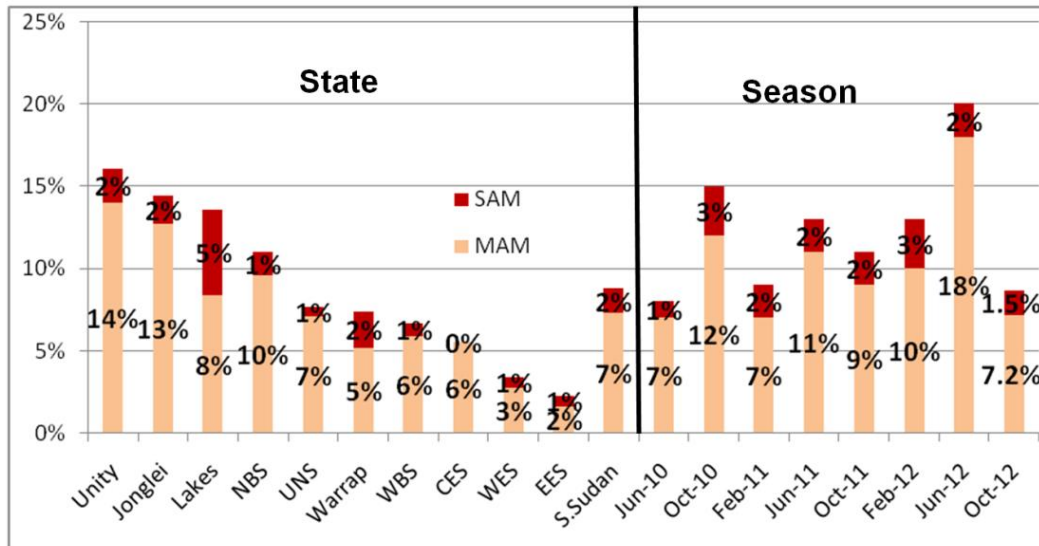
Woldetsadik (2011) notes that outbreaks of measles, which aggravate malnutrition in children under 5, are less seasonal and more related to low vaccination coverage and crowding.

The late onset of the rainfall in almost all the areas of the Republic of South Sudan in 2011 had serious implications on agricultural production (a minimum cereal loss of 30 – 40 percent of the previous year’s harvest) ( Woldetsadik, 2011).

GAM rates between 2005-2008 (DFID, 2014):

- GAM rates peaked in a different month each year: June 2005, April 2006, May 2007, January 2008.
- Size of peaks in different years estimated from before the hunger gap varies slightly from year to year: 15-25% 2005, 18-27% 2006, 17-32% 2007, 14-24% 2008.

Figure 2 Acute malnutrition rates in October 2012 by State and seasonal trends from 2010 (based on FSMS MUAC) (Republic of South Sudan Ministries & UN agencies, 2013)



Acute malnutrition rates (severe and acute combined) from quarterly data from Figure 2:

- There is annual variation: 8% in June 2010, 13% in June 2011, 20% in June 2012.
- Annual peaks differ: in October 2010, June 2011; June 2012.
- Largest interval over the two years differs: 9-13% Feb-June 2011, 13-20% Feb-June 2012.

The report that this figure was taken from also notes that illness in children is higher in the wet season, 52-80% in June. And 46% in October, after the wet season (Republic of South Sudan Ministries & UN agencies, 2013).

### Regional

There was average to above average rainfall in South Sudan in 2012. Data from Republic of South Sudan Ministries & UN agencies (2013) gives a snapshot of regional variation for this year. While the central part of the country received 120-160 percent of annual rainfall, parts of Jonglei, Upper Nile, and Western Bahr el Ghazal received near average (80-120 percent) rainfall. In Kapoeta, rainfall amount was exceptionally above average (above 160 percent) (Republic of South Sudan Ministries & UN agencies, 2013).

### Interannual

Reflecting the poor harvest in the 2013/14 agricultural season, food security had deteriorated substantially compared to May 2013 in Central Darfur. The proportion of food secure households has decreased by 30 percent for IDPs, 35 percent for mixed communities and 26 percent for resident communities. However, the proportion of households that reported experiencing food challenges in getting enough food for their needs in May 2014 had decreased from May 2013. The improvement was unexpected, given increased food prices and lower production this year. Middle Upper Arm Circumference (MUAC) measurements

improved from the same time the previous year, to a relatively acceptable level (WFP, 2014a). This provides a mixed picture.

In East Darfur in May 2014, MUAC measurements had increased compared to May 2013. The increase is from 8 to 40 percent for mixed communities and from 6 to 15 percent for children in resident communities. Compared to May 2013, the proportion of surveyed households found to be food secure increased for households in IDP communities (from 79 to 88 percent) and for residents (from 67 to 87 percent). A moderate decline in food security is seen among households in mixed communities (from 94 to 85 percent). The cost of the local food basket (LFB) in May 2014 is 4.00 SDG (per person per day), a decrease from 4.65 compared to May 2013. The decrease in the cost of the food basket is a result of lower prices of fresh milk, beef and onion (WFP 2014 b). Overall, the picture in East Darfur shows a deterioration in nutrition and food security in East Darfur between 2013 and 2014.

In Central Darfur, the cost of the LFB was SDG 6.34 (per person per day), an increase of 60 percent compared to May 2013 (SDG 3.97) (WFP, 2014a). This significant increase is likely due to conflict.

In May 2014, North Darfur, the proportion of food insecure households had increased slightly for all community types compared to the same period of last year according to data from WFP (2014c). Given the exceptionally low crop production, very high food prices and increased conflict, the current food security situation was better than expected, possibly as a result of increased food assistance helping to stabilise the situation. The LFB cost in May 2014 was 4.3 SDG per person per day, the highest on record. The current price was 41 percent above the May 2013 level, almost 150 percent above the May 2012 level, and 250 percent above the May 2011 level.

#### Conflict

The number of people in South Sudan facing Crisis (Integrated Food Security Phase Classification, IPC Phase 3) and Emergency (IPC Phase 4) increased by roughly 30 percent between December 2014 and January 2015 (FEWS NET, 2015). This is likely due to conflict and trade flow issues. A significant deterioration in food security is likely in the coming months and the size of the food insecure population (IPC Phase 3 or higher) is likely to be almost double by June 2015. Estimates are that 2.5 million people will face Crisis and Emergency food insecurity between January and March, rising to 3.5 million between May and June.

#### New data

A recent simple spatial survey (S3M) is comprehensive in its coverage of all 18 states in South Sudan (Sudan National S3M, 2013). It measured a range of health, WASH and nutrition indicators. However, seasonal variations are not accounted for. Data collection took place during June / July 2013 for 14 states and in November 2013 for the remaining 4 states (Khartoum, Red Sea, South and West Kordofan). Using this data to assess which states are most in need should be cautioned. June/July data is likely to show worse conditions than data from November.

#### **What is being done?**

This section focuses on what is being done by humanitarian and development actors, and whether or not they plan seasonally. The desk-based helpdesk methodology of broad internet-based searches using key words did not encounter material to directly answer this question or further develop an understanding of what is being done. In particular, a paucity of evidence was found on development programmes' seasonality planning, as opposed to humanitarian programmes' seasonality planning. Such evidence may exist, but is yet to be published online. Or the lack of development evidence as opposed to humanitarian evidence

is likely to reflect the ongoing instability of South Sudan. Development programmes may be developed as the situation in the country stabilises.

An alternative helpdesk methodology was employed to try to bolster the evidence included. This involved identifying circa 40 non-government organisations, international bodies and other stakeholders that were known to have an interest in improving nutrition in South Sudan. The websites and publication repositories of each of these organisations were searched using key words. The results are limited. However, it is acknowledged that this type of planning documentation may be internally published and available on request. One possible next step could be to compile a list detailing experts working on nutrition in South Sudan, including email addresses and phone numbers. Depending on time available and existing commitments, it may be possible for HEART to compile this list and contact the experts and document their contributions.

It is important to consider the impact of conflict when assessing the impact of seasonality on food security in South Sudan. The dry season improves access both for trade and fighting forces. Hostilities may increase during the dry season (Ali 2015). This must be considered when conducting seasonality planning for nutrition in South Sudan.

The evidence that was identified shows that periods when people were facing increasing levels of hunger may be made worse by irregular funding and a lack of the inclusion of seasonality in planning. It is recommended that a strategic model is developed that can target assistance in a sustained way. This model would need to include a risk analysis, scenario planning and consider how seasonality would impact on delivery and progress (Oxfam 2014). An estimated US\$600 million is needed to improve food security in the region. Some of this figure needs to be spent pre-positioning supplies ahead of the rainy season (European Commission Humanitarian Aid department 2014). UNICEF alone has requested US\$165 million in 2015. UNICEF are aware that various interventions, including the preposition supplies and the rehabilitation/construction of WASH facilities, should be made during the dry season (UNICEF 2015).

The Logistics Cluster, which is responsible for coordination, information management and logistics service provision have recently committed resources to support season-affected planning (Logistics Cluster 2015).

Concern Worldwide's 2014 programme plans for South Sudan do mention that the seasons have an impact on the areas where they work. They detail how their Food, Income and Markets (FIM) programmes aim to improve dry season food production and utilisation and reduce vulnerability through Cash for Work and unconditional cash transfers (Concern 2014).

Although Welt Hunger Hilfe's orientation framework does not specifically focus on South Sudan, it does include some relevant information on resilience and shock resistance. It recommends producing a multi-sectoral seasonal calendar to assist with visualising nutrition insecurity peaks and/or their interaction with other factors, during the year. Participatory risk assessment is recommended to identify areas under high risk. Information on the type, scope and frequency of natural disasters in the past, helps to analyse trends for the future. Safety nets can bridge temporal food shortages. Cash transfers and Cash for Work measures may reactivate local agricultural production and prove useful if sufficient food in the region can be purchased at an adequate price. Developing an understanding of seasonality and seasonal migration patterns will be critical for agricultural and pastoral production interventions. Securing food availability in off-seasons can increase income and facilitate steadier income flow. Where possible development programming should factor in uncertainty and volatility and humanitarian programming that works towards sustainable development, such as flexible seasonal 'safety net' programmes. These safety nets strengthen resilience and reduce risks related to recurring cyclical weather events and their effects (Welt Hunger Hilfe 2015).



### 3. Reports of seasonal impact in South Sudan

#### **South Sudan. Seasonal Monitor. Ongoing flooding to impact main harvests in some areas.**

FEWS NET (2014) Website

[http://www.fews.net/sites/default/files/documents/reports/South\\_Sudan\\_Seasonal\\_Monitor\\_2014\\_10\\_13.pdf](http://www.fews.net/sites/default/files/documents/reports/South_Sudan_Seasonal_Monitor_2014_10_13.pdf)

Heavy, and well above-average rainfall continued across much of the country in late September/ early October, exacerbating flooding and compromising crop performance in some areas.

Heavy rains in Rubkona County, Unity State since the end of September worsened flooding in the Bentiu Protection of Civilians (POC) area. Flooding in Panyijiar County also continued to destroy sorghum crops. Field reports suggest that nearly 40 percent of farmers in Nyal and Ganyiel have suffered crop losses from excessive flooding since mid-July.

Heavy rains displaced some households in low-lying areas of Twic East County, Jonglei State and cut off the road between Panyagor and Bor town. The main route between Juba and Bor also remains impassable due to heavy rainfall.

Favourable rains continued in Renk County, Upper Nile State through early October. Reports suggest that crops are performing better this year compared to last year, particularly in mechanized farming areas, but below-average production is still expected due to an estimated 40 percent reduction in area planted.

Short-cycle sorghum harvests have concluded in Maiwut and Longochuk in Upper Nile. In Nasir and Ulang, main harvests have not yet begun due to delays in planting related to insecurity in these counties. Heavy rains in the last dekad (10 days) of September and first dekad of October caused mass displacement and inundated long-cycle sorghum crops which are at maturity stage.

Continued flooding in Akobo County in late September/ early October has affected trade flow with Ethiopia, particularly of livestock. Grazing areas near homesteads are also inundated, reducing livestock access to pasture.

GFS (Global Forecast System) forecasts indicate continued moderate to heavy rains over South Sudan in the coming week.

#### **Food Security Outlook - 3.5 million people will require emergency humanitarian assistance by June - January 2015 to September 2015**

FEWS NET. 2015. Website

<http://www.fews.net/east-africa/south-sudan>

Food security in January was better than expected given lower than anticipated levels of conflict and improved trade flows. However, the number of people facing Crisis (IPC (Integrated Food Security Phase Classification), Phase 3) and Emergency (IPC Phase 4) still increased by roughly 30 percent between December and January.

A significant deterioration in food security is likely in the coming months and the size of the food insecure population (IPC Phase 3 or higher) is likely to be almost double by June. The South Sudan National IPC estimates that 2.5 million people will face Crisis and Emergency food insecurity between January and March. Needs will peak between May and June when

FEWS NET estimates that more than 3.5 million people will face Crisis (IPC Phase 3) and Emergency (IPC Phase 4) and 2 million people will face Stressed (IPC Phase 2) food insecurity, nearly half the national population.

Humanitarian assistance delivery to Greater Upper Nile (GUN) in 2015 is likely to be better than last year due to increased overland transport access, stronger logistics capacity, and improved prepositioning ahead of the rainy season. FEWS NET estimates that emergency assistance is likely to have a significant impact on food security outcomes among worst-off households in over a dozen counties from January to June mitigating deterioration in these areas. However, insecurity and humanitarian access restrictions will continue to constrain assistance delivery, particularly in frontline areas.

**Sudan Nutrition Update. Covering CMAM, surveillance and routine indicators. Issue 3: Q3 – July, August and September 2012**

National Nutrition Directorate of the Federal Ministry of Health (NND) and UNICEF. 2012a. UNICEF, Paris.

[http://www.unicef.org/sudan/Sudan\\_Nutrition\\_Update\\_Issue3\\_Q3\\_2012\\_FINAL.pdf](http://www.unicef.org/sudan/Sudan_Nutrition_Update_Issue3_Q3_2012_FINAL.pdf)

The end of the quarter July, August and September 2012 marks the end of the lean season in Sudan, with the early harvest starting in the coming weeks. Access to food is likely to improve during the October to December period throughout the country due to improved food availability, as a result of the projected above-average harvest and income from cash crop sales, along with decreasing cereal prices.

2012 has seen above average rainfall (as predicted). Rainfall caused flash flooding in many states, however they have generated good pasture conditions and water availability for animals and supported crop production. The water levels of the main rivers (e.g. White Nile and Blue Nile) have started declining since the second week of September, in line with seasonal trends. Maximum temperatures have reduced slightly on the Red Sea Coast and in northern and western states due to seasonal winds.

The number of admissions into supplementary feeding programs in Darfur has remained nearly static over the course of 2012 and has not shown the usual seasonal increase.

**Sudan Nutrition Update. Covering CMAM, surveillance and routine indicators. Issue 2: Q2 – April, May and June 2012**

NND and UNICEF. 2012b. UNICEF, Paris.

[http://www.unicef.org/sudan/Sudan\\_Nutrition\\_Update\\_Issue2\\_Q2\\_2012\\_FINAL2.pdf](http://www.unicef.org/sudan/Sudan_Nutrition_Update_Issue2_Q2_2012_FINAL2.pdf)

In Sudan, numbers of children treated for SAM increased in April, May and June 2012, both in comparison to last quarter (reflecting usual seasonal variations) and in comparison to the same quarter last year (reflecting improving geographical coverage with CMAM).

By the end of April, May and June 2012, the rainy season has started well across the country with no prolonged dry spells recorded and planting has been successfully completed in many locations. In Blue Nile insecurity has remained the barrier to cultivating. In South Kordofan the State (MoA) started distribution of seeds to small scale farmers and cash to large scale farmers. FAO also distributed seeds to farmers through implementing partners (NGOs). The total targeted area by SMOA to be cultivated in South Kordofan this year is 4,120,000 feddan, including 2,000,000 feddan under mechanised farming. However, as of June 2012, about 4.7 million people in Sudan face Stressed (IPC Phase 2), Crisis (IPC Phase 3), and Emergency (IPC Phase 4) levels of food insecurity.

Food insecurity is driven principally by conflict in parts of South Kordofan, Blue Nile, and Darfur, food shortages due to the poor 2011/12 harvest, high inflation, above-average food prices, and the impact of reduced oil revenues. Cereal prices remained at a record high across the country and particularly in Darfur, and the cost of the minimum monthly food basket continued to increase this quarter as compared to last and as compared to the 5 year average. High food prices in Darfur are due to significant shortfalls in supply caused by poor local production and disrupted trade flows from central Sudan. Markets in Darfur have reported the highest grain prices in Sudan for the last two months. The Greater Horn of Africa Climate Outlook forecast for the June – September season states that average to above-average rains are likely for most parts of Sudan, bringing the risk of flooding for many areas along the Blue Nile, the White Nile and its tributaries.

### **South Sudan Humanitarian Response Plan 2015**

OCHA South Sudan. 2014. UN.

[http://www.humanitarianresponse.info/system/files/documents/files/SOUTH%20SUDAN%20HRP%202015\\_FINAL\\_WEB\\_r.pdf](http://www.humanitarianresponse.info/system/files/documents/files/SOUTH%20SUDAN%20HRP%202015_FINAL_WEB_r.pdf)

The conflict that began in December 2013 in South Sudan continues to affect the lives of millions of people. It has been marked by brutal violence against civilians and deepening suffering across the country. Insecurity and active hostilities constrain civilians' freedom of movement. The major humanitarian consequences are widespread displacement due to the violence; high rates of death, disease, and injuries, severe food insecurity and disrupted livelihoods, and a major malnutrition crisis.

Some 5.8 million people are estimated to be in some degree of food insecurity as of September 2014. This number is projected to increase to 6.4 million during the first quarter of 2015. These numbers are based on the Integrated Phase Classification analysis conducted by a technical working group that includes the Government of The Republic of South Sudan. Despite seasonal food insecurity, South Sudanese communities are resilient and used to managing seasonal changes in food access and availability, and many people move in line with the seasons. However, after nearly a year of conflict many people are uprooted from their homes – or are hosting displaced people themselves – and are under severe stress in terms of food access and availability, access to markets and livelihoods, basic services, and social mechanisms that they would otherwise rely on. Moreover, oil production and revenue, the backbone of the formal South Sudanese economy, has been disrupted by the crisis. South Sudan was already fragile before the current crisis, and other parts of the country continue to be affected by food insecurity, disease outbreaks, malnutrition and other threats to lives, livelihoods and well-being. Central and Eastern Equatoria states, for example, have been heavily affected by an unprecedented cholera outbreak. Women, young boys and girls and elderly men and women are particularly vulnerable, as are people who have had to flee their homes due to the conflict.

Many South Sudanese rely on livestock and agriculture for their livelihoods. Those who have been displaced from their homes have been less able to plant or care for their animals. Most of those whose income sources are unreliable or unsustainable are women. Infrastructure is severely underdeveloped. About 60 percent of roads are impassable in the rainy season, which lasts about 5-6 months. In addition, basic services such as health, social welfare, water and sanitation, nutrition, and education, have low coverage.

### **Central Darfur, Sudan - Food Security Monitoring, May 2014**

WFP. 2014 a. WFP, Rome

<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp269949.pdf>

WFP carried out data collection jointly with the MoA in April and May, which marked the beginning of the lean season. Reflecting the poor harvest in the 2013/14 agricultural season,

food security had deteriorated substantially compared to May 2013 for households in all types of communities: IDP, mixed and resident. All three were found to have been seriously affected and the proportion of food secure households has decreased by 30 percent for IDPs, 35 percent for mixed communities and 26 percent for resident communities.

The sorghum prices remained very high in 2014, with average prices of sorghum in May being 29 percent higher than the previous year and 70 percent higher than the five-year average. This was partly due to poor harvest followed by poor rainfall, and high inflation. However, May sorghum prices had dropped a bit after the peaks in March and April 2014.

Wage labour continued to be the most important livelihood activity for IDPs, accounting for 38 percent of the total. This was followed by small business or petty trade (30 percent), and sale of crops (17 percent of households).

Food accounted for 51 percent of the total monthly expenditures. This share (used as an indicator of economic stress) had increased compared to the same time last year. The proportion of households who allocate more than half of the monthly share of expenditure for food, making them more vulnerable to price increases and income shocks, had increased considerably from the same time last year. Medical expenses and milling continued account for a large share of monthly expenditure, accounting for 13 percent and 7 percent respectively.

The cost of the local food basket (LFB) was SDG 6.34 (per person per day), an increase by 60 percent compared to May 2013 (SDG 3.97). Purchasing power in May 2014 was found to be weak and below last year's level for all community types. Households in Mixed and Resident communities displayed similar results as May 2013, with 29 percent and 28 percent, respectively, not being able to afford at least one LFB. The situation for IDPs was considerably worse, with nearly half of households not being able to afford even one LFB.

Household food consumption had improved for IDPs and Residents compared to the previous year with an increase in the share of households with acceptable food consumption to 66 and 74 percent, respectively. The situation for mixed communities had remained unchanged from the previous year despite the poor harvest. Households across the three community types had similar food consumption and overall food intake was not found to be alarming.

The findings show that 86 percent of IDP households reported to have received food assistance in the last six months prior to data collection. As a result of WFP's targeting of its limited resources, 55 percent of households in mixed communities and 26 percent of Residents reported to have received food assistance.

The proportion of households that reported experiencing food challenges in getting enough food for their needs had decreased from May 2013 and was 66 percent for IDPs, 76 for Mixed and 67 percent for communities, respectively. The improvement was unexpected, given increased food prices and lower production this year.

The Middle Upper Arm Circumference (MUAC) was measured on 530 children (aged 6-59 months) within the 20 visited locations in Central Darfur. MUAC measurements improved from the same time last year, to a relatively acceptable level. Only 4 percent of children measured from IDP communities had low MUAC (a proxy indicator for acute malnutrition, compared to 2 percent of children from mixed communities and 6 percent from Resident communities).

<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp269950.pdf>

Data collection for Round 17 of the Food Security Monitoring System (FSMS) was carried out in May 2014 which typically marks the onset of the lean season according to the seasonal calendar of East Darfur state. The proportion of children with very low or moderately low mid-upper arm circumference (MUAC) measurements (a proxy indicator for malnutrition) has increased amongst children in mixed communities. The increase is from 8 percent to 40 percent for mixed communities and from 6 percent to 15 percent for children in Resident communities. Results for IDP are relatively stable and better than the other two community types. In-depth assessments are required to verify these preliminary findings.

A large proportion of surveyed households are food secure with little difference between households in IDP camps, Mixed or Resident communities. Compared to May 2013, the proportion of surveyed households found to be food secure increased for households in IDP communities (from 79 to 88 percent) and Residents (from 67 to 87 percent). A moderate decline in food security is seen among households in mixed communities (from 94 to 85 percent).

The frequency and diversity of food consumption for most households, across the community types, is acceptable. Only 7 percent of the IDP households had poor food consumption, compared to 9 percent in May 2013. Generally, a greater proportion of households had acceptable food consumption compared to May 2013, especially among the IDP and Resident communities. The cost of the local food basket (LFB) in May 2014 is 4.00 SDG (per person per day), a decrease from 4.65 compared to May 2013. The decrease in the cost of the food basket is a result of lower prices of fresh milk, beef and onion. However, the price of sorghum feterita in Ed Daein market has increased sharply compared to the same period last year and remains above the five years average.

The purchasing power for households from all community types has improved, but 29 percent of IDP households can still not afford one minimum food basket. Despite improvements on many food security related indicators, the proportion of households who report that they face challenges accessing enough food is 45 percent for IDPs, 71 percent for mixed and 60 percent for Resident communities. Food shortage, and the severity of the strategies households use to cope with shortage, has deteriorated for households in Mixed and Resident communities compared the same period last year.

The main livelihood activities for IDPs in camps are crop sales, wage labour, transfers, small business and salaried work, in a pattern similar to that of May 2013. IDPs report having more diversified income sources compared to households in other communities. Sale of crops, wage labour and salaried work continue to be the main livelihood activities for households in mixed communities. For Resident households the main livelihood activity is crop sales, followed by wage labour and small business.

### **North Darfur, Sudan - Food Security Monitoring, May 2014**

WFP. 2014 c. WFP, Rome

<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp269951.pdf>

The post-harvest survey of the 2013/14 agricultural season revealed low crop production in North Darfur State and estimated the cereal deficit to be approximately 142,000 MT. Early this year, the State authorities, acknowledging the harvest results, proposed steps to bridge the gap, including an increase in the wheat flour quota and procurement of cereals from the Strategic Reserve which would be made available at a subsidized price. By May little had materialized in terms of wheat flour and no market interventions had been made.

In March 2014, increased conflict between GoS force and rebel factions resulted in an upsurge of displacement in Al La'ait, El Tewaisha, Fasher, Tawila, Korma, Mellit and Kutum. Consequently WFP advanced its seasonal support by 1-2 months ahead of schedule in Malha and Kutum localities to respond to increased displacement and loss of food stocks due to conflict and the absence of a Government response to the cereal gap.

In May 2014 the proportion of food insecure households had increased slightly for all community types compared to the same period of last year. Given the exceptionally low crop production, very high food prices and increased conflict, the current food security situation was better than expected, possibly as a result of increased food assistance helping to stabilize the situation.

The proportions of households with acceptable food consumption in IDP camps, mixed and resident locations were 58, 83 and 70 percent, respectively. Results were similar to or slightly worse compared to May last year.

The cost of a local food basket (LFB) in May was 4.3 SDG per person per day, the highest on record. The current price was 41 percent above the May 2013 level, almost 150 percent above the May 2012 level, and 250 percent above the May 2011 level. Price increases continued in all markets of North Darfur, however the rate of increase in sorghum prices slowed after the resumption of the seasonal food assistance by WFP.

More than half of households in resident and IDP locations could not afford the local food basket. Purchasing power in surveyed mixed communities were better. Results for all groups were comparable to the May rounds in 2011, 2012, and 2013.

Wage labour continue to be the main income source for IDPs in camps and households in mixed communities. In May, two-fifths of the income of camp IPDs and one-third of the income of households in mixed communities was generated from wage labour. Only 1 percent of children had very low MUAC (proxy SAM). Results were comparable to those from same time last year.

### **WFP Food Security Monitoring System (FSMS) Round 17 – May 2014, South Darfur State**

WFP. 2014 d. WFP, Rome

<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp269952.pdf>

Data collection for Round 17 of the Food Security Monitoring System was carried out in May 2014, which marks the onset of the lean season in South Darfur state. Twenty-two sentinel sites were covered. Food consumption was worse for IDP communities compared to mixed and resident communities (68, 78, and 100 percent have acceptable food consumption, respectively). Food consumption deteriorated moderately for mixed communities and remained largely unchanged for IDP and resident communities.

Sorghum price average in Nyala market had increased significantly compared to the same period last year and remained extremely high, also compared to the five years average due to poor harvest last year and general inflation at the macro level. The cost of the minimum food basket (MFB) in May 2014 was 4.91 SDG (per person, per day), an increase compared to May 2013 when it was 4.15 SDG. The increase was a result of rising prices of many important food items, particularly sorghum, groundnut oil, dry tomatoes, milk and sugar.

Purchasing power was very weak, partly due to high food prices, with 44-69 percent of households not being able to afford even one MFB. The purchasing power has deteriorated moderately for mixed communities and Resident communities and remained unchanged for IDP communities.

The main income sources for IDPs were wage labour, business, transfers, livestock and salaried work. Wage labour, business, crops, firewood/charcoal, salaried work and transfers continued to be among the major sources of income for mixed communities. For resident communities the main income sources were wage labour and small business followed by livestock, transfers and salaried work. Households in Mixed communities had access to more diverse income opportunities compared to households in IDP and Resident communities.

Only 4 percent of children in IDP communities had low or very low mid-upper arm circumference (MUAC) (a proxy measurement of global acute malnutrition). The rates were lower still for resident and mixed communities, indicating a generally acceptable malnutrition situation.

#### 4. The impact of seasonal variation on nutrition

##### **SOUTH SUDAN Nutrition Surveys. Final\_27012015\_SSD SMART Survey Summary Matrix**

Humanitarian Response (2015)

<http://www.humanitarianresponse.info/en/operations/south-sudan/document/final27012015ssd-smart-survey-summary-matrix>

Data for different counties are available for 2014. Only three counties have GAM measurements both pre- and post-harvest from 2014, Akobo East, Pochalla and Uror. Data from two counties have pre- and post-harvest data from 2013, Gogrial East and Tonj North. These data are extracted in the table below.

County	GAM pre-harvest (CI)	GAM post-harvest (CI)	% change
Akobo East	31.8 (26.3-38.0)	18.4 (14.3-23.4)	-42%
Pochalla	6.2 (4.1-9.3)	6 (4.2-8.6)	-3%
Uror	27 (22.7-31.6)	14.5 (11.1-18.7)	-46%
Gogrial East	35.6 (29.6-42.1)	10.5 (8.0-13.6)	-62%
Tonj North	20.5 (17.3-24.1)	12.4 (9.5-15.9)	-22%

Akobo East and Uror, both in Jonglei state, show 42% and 46% decrease in GAM post-harvest. However, Pochalla also in Jonglei, shows little or no change. Gogrial East, in Warrap state, shows the biggest change with a decrease in 61%. Tonj North, also in Warrap, shows a 22% decrease.

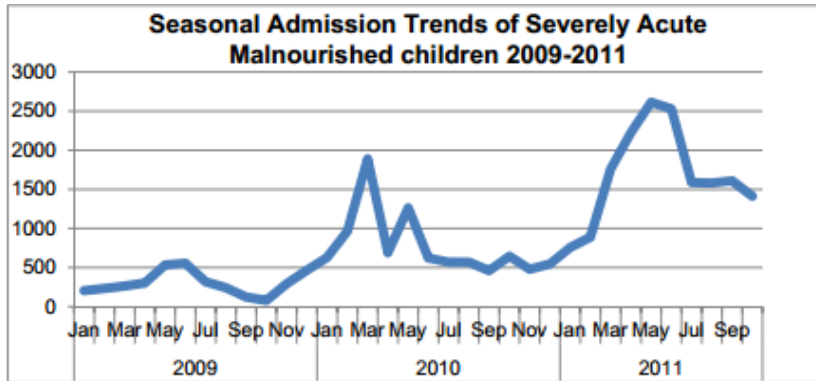
##### **An Evaluation of ACF Operational Approach and Strategy in Warrap and Northern Bar el Ghazal States, South Sudan**

Andrey P. 2011. ACF International.

<http://www.alnap.org/pool/files/evaluation-of-acf-operational-approach-and-strategy-in-south-sudan-2011-0.pdf>

This evaluation report included findings on seasonal factors of malnutrition. Malnutrition in South Sudan is caused by different factors but there are also important variations depending on seasonal factors as shown in below graph on Action Against Hunger (ACF) admission trends.

*ACF Seasonal Admission Trends in OTPs and SCs – 2009-2011*



The peak of malnutrition occurs every year between April and June which coincides with the dry season and diminishes with the coming of the rains. This would tend to indicate that the correlation between peaks of malnutrition and food security is weaker than generally thought since the hunger gap would last until August.

There are however a couple of issues to consider which could explain the lower attendance at the most critical period of the hunger gap and which would need to be further assessed in order to potentially adapt the programming during this critical period:

- Caretakers may prioritise the most needed agricultural labour during this period over the need to bring their children to attend a nutrition programme.
- Access can be severely constrained during the rainy season both for caretakers to reach ACF nutrition centres and for ACF teams to develop outreach activities – there are areas which are not accessible at all during the entire rainy season.

In any case, it is during that period that the population has the lowest water and food availability / accessibility. In the wet season, there are more water sources closer to the homestead. In the dry season, water sources are significantly depleted, and water points get congested and contaminated and local communities will easily resort to unsafe water from contaminated water points. Not surprisingly therefore, peaks in acute malnutrition will coincide especially with high diarrhoeal disease and reduced food accessibility and availability.

Northern Bahr el Gazal and Warrap States will experience the lowest availability of staple food from April to August. The severity and duration of lack of food can increase in the event of a poor harvest caused by climatic hazards during the previous year. Food accessibility will be constrained during the same period of April to August as limited food availability will naturally have an impact on increasing food prices. This will be worse if there were limited harvests in the previous year.

In border areas, which are normally relying on food supplies from North Sudan, food access will be heavily affected if trade between Northern Sudan and South Sudan remains constrained by the political agenda. In addition, the influx of returnees and IDPs has increased the number of people feeding while the local production has certainly not increased to the same extent. It is likely that this will aggravate food intakes and consequently the nutrition situation for those already at risk.

One of the weaknesses hindering the Food Security and Livelihood (FSL) capacity to have impact on beneficiaries is that programmes are based on a yearly cycle which means that the support provided to targeted households will never extend one agricultural season. Although such an approach can be justified from a strictly humanitarian perspective, the level of vulnerability of targeted households will hardly allow an impact beyond the concerned



agricultural season and households might fall back to their initial vulnerability if they are not supported otherwise.

In terms of activities to be implemented and given the key determinants of acute malnutrition during seasonal peaks of malnutrition, the following ones should be prioritised:

- Target the most vulnerable households through a water harvesting programme allowing cultivation of vegetable seeds during the dry season through a cash transfer scheme (CFW). Cash transfer should allow accessing food and reducing the workload of caretakers while vegetables would aim at improving diet diversity before and during the peak of malnutrition.
- Blanket Supplementary Feeding Programme (BSFP) starting in March and targeting in priority 6-29 months children during 4 to 6 months. This would allow an improved food intake during the peak of malnutrition.
- Take the opportunity of the BSFP to provide to all targeted households joint health, nutrition and hygiene education sessions animated by women and targeting in particular risks related to seasonal malnutrition. This would imply the development of standard messages that could be rolled out across all sectors.
- Prioritise water points rehabilitation and if necessary and relevant build another water points in the targeted areas to allow access to safe water during the dry season.

#### **Nutrition Status and its Determinants in Southern Sudan: A Summary of Available Data**

Harvey P & Rogers-Witte B. 2007. USAID

[http://www.a2zproject.org/pdf/A2Z\\_SouthSudan\\_Doc\\_MEH\\_Edits\\_092308.pdf](http://www.a2zproject.org/pdf/A2Z_SouthSudan_Doc_MEH_Edits_092308.pdf)

Nutrition surveys have presented higher rates of malnutrition during specific periods of the year, including the “hunger period” of March through September. During seasonal peaks, the prevalence of GAM is often double the WHO cut-off for emergencies of 15 percent.

#### **Annual needs and livelihoods analysis 2012/2013 South Sudan**

Republic of South Sudan Ministries & UN agencies. 2013. WFP

<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp256400.pdf>

The Food Security Monitoring System Mid-Upper Arm Circumference (FSMS MUAC)-based nutrition monitoring shows high risk of malnutrition peaking during the ‘lean’ season, when food availability is at its lowest, childhood illnesses are prevalent and there is increased demand on care takers to attend to farming activities.

In April 2012, the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC) predicted a likelihood of normal to above normal rainfall over South Sudan during May 2012 except for the border areas between Sudan and South Sudan. This was seen as a good prospect for increased agricultural production. ICPAC also predicted occurrence of crop diseases outbreak inflicted by weather parameters and flooding of homesteads in flood prone areas of South Sudan. By June 2012, the seasonal rainfall in South Sudan had mixed trend. Generally, rainfall had started by June in Greater Equatoria and most parts of Western Bahr el Ghazal, Lakes and Warrap while states like Jonglei, Unity and Upper Nile only received some showers in the last dekad of April and first dekad of May. However, by September 2012, heavy rains had caused destructions in the northern Bahr el Ghazal, Warrap, and Jonglei states of South Sudan.

South Sudan typically has varied onset, cessation, intensity and distribution of seasonal rainfall depending on locality. There are areas within the unimodal as well as those in the bimodal rainfall zones (see Table 1). In the greater Equatoria, March to May rainfall contributes significantly especially during the first cropping season particularly in the south-western part of the country where the Greenbelt lies, while May to October rains are more significant across the South Sudan. The Equatoria region exhibits bimodal season and

rainfall starts in April, whereas unimodal season exist in Bahr el Ghazal and Upper Nile regions with rainfall running from May through October. Land preparation normally begins in March in Equatoria except the Arid/pastoral zone and April in other parts of the country. Since the country relies on rain fed agriculture, the seasonal rainfall patterns dictate the agricultural activities.

### Seasonal agricultural calendar in South Sudan

		Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	
<b>Unimodal rainfall zone</b>	Rainfall	Dry season			Wet season						Dry season			
	Main crop		Land preparation and planting	Growing season				Harvest						
	Long-cycle crops			Growing season						Harvest				
<b>Bimodal rainfall zone</b>	Rainfall	Dry season	Wet season								Dry season			
	First crop	Land preparation and planting	Growing season				Harvest							
	Second crop						Land preparation and planting	Growing season		Harvest				

In 2012 agricultural season, cultivation started as usual in April in Western Equatoria and in Bahr el Ghazal and Upper Nile, cultivation commenced in May. However, above average rainfall received between July and September resulted in localized flooding which inundated cropped areas in Warrap, Lakes, Northern Bahr el Ghazal, Unity, Jonglei and Upper Nile states.

In 2012, rainfall was normal to above normal and favoured crop performance in Equatoria (though with pockets of exemptions especially around the Kapoeta Counties in Eastern Equatoria State) region and Raja County of Western Bahr el Ghazal. The rains were generally good though period of dry spell was reported in June where rains started early, and this affected crop performances. The March to May rainfall played a crucial role in improving pasture conditions and water availability. It rejuvenated pastures and improved livestock productivity and more importantly triggered the early return of livestock to homesteads. This is expected to retain livestock near homesteads for a longer period enabling access to livestock products such as meat and milk at least during the January/February period.

Generally, average to above average rainfall was received in South Sudan in 2012. While central part of the country received 120-160 percent of annual rainfall, parts of Jonglei, Upper Nile, and Western Bahr el Ghazal received near average (80-120 percent) rainfall. In Kapoeta rainfall amount was exceptionally above average (above 160 percent).

Overall, there was normal rainfall season in most parts of the country but also localized heavy rains that led to flooding and improved pasture and water conditions and could delay seasonal migration to dry season grazing areas. According to the Crop and Food Security Assessment (CSFAM) 2012, the area under cultivation increased from 860,000 ha in 2011 to 1,100,000 ha in 2012. The average yields have increased the same from 0.82 t/ha to 0.88 t/ha resulting in increased net cereal production from 563,000 tonnes to 761,000 tonnes. Therefore a deficit in cereal production of 371,000 tonnes is expected in 2013 compared to 473,700 tonnes in 2012.

In 2012/3, about 40 percent of the population of South Sudan will be moderately to severely food insecure. This is a decrease from the 47 percent registered in 2011/12 that resulted from the low levels of crop production, high food prices and unfavourable market conditions that prevailed that year. However, it is still higher than the October 2010 levels (the most recent favourable season). The decrease is due entirely to a change in the prevalence of moderately food insecure population (to food secure) – in South Sudan there seems to be a fairly fixed

proportion of the population in the severely food insecure category which has remained stable in the last 3 years at around 10 percent during the post-harvest period, and was even marginally higher in the bumper crop season of 2008.

Seasonal feed and water availability and quality is noted as a factor for affecting livestock.

Fish is a seasonally important source of food in many parts of the country, and throughout the year in the Nile- Sobat corridor and other areas with permanent water bodies. All the states have important natural fishing grounds which are easily accessed during the year. With the expansive Sudd (stretching about 100,000 hectare of swamps), the fishing potential is huge and the seasonal flooding that occurs in some areas further provides longer fishing opportunities for communities.

One of the challenges for the fishing sector is insufficient dissemination of the effective post-harvest fish management system leading to high post-harvest losses. Post-harvest losses are caused mainly by infestation with fly- maggots and hide beetles during processing and storage especially during the humid periods of the year. Post-harvest spoilage of 40 percent is not uncommon more especially during the rainy season.

According to the FSMS over a half of households in South Sudan obtain their cereal from markets during hunger season. High food prices constitute one of the most commonly reported shocks amongst South Sudanese households. Even rural farming households report high reliance on markets due to seasonal deficits in local production.

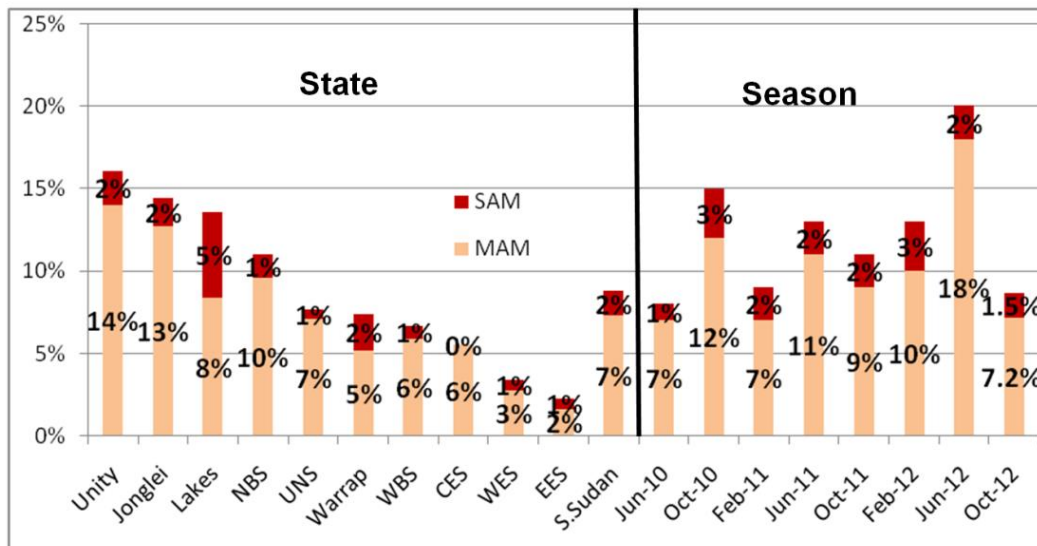
Livestock is an integral part of South Sudanese livelihood systems and sales of small ruminants represents a principal source of income that largely determines pastoralists' food purchasing power. Goat prices (male medium size) followed a normal declining trend in most markets at the beginning of 2012 as the number of animals on sale traditionally increases during the dry season and animal body conditions worsen. As seasonal rains started to gradually improve pasture and water availability in May/June, goat prices have positively reacted displaying an increasing trend and are generally at higher price levels than in the previous year across the country.

Border closure affected trade flows between Sudan and South Sudan. Road density in South Sudan is among the lowest in Africa and roads conditions are often patchy, especially during the rainy season (May-October) forcing trucks to carry small loads over long distances resulting in increased average unit cost of transportation.

While accessibility will improve during the dry season to allow for transportation of supplies from East Africa, prices are likely to remain high as the other impediments like the informal check-points exist, lack of large organized importers that can source in bulk.

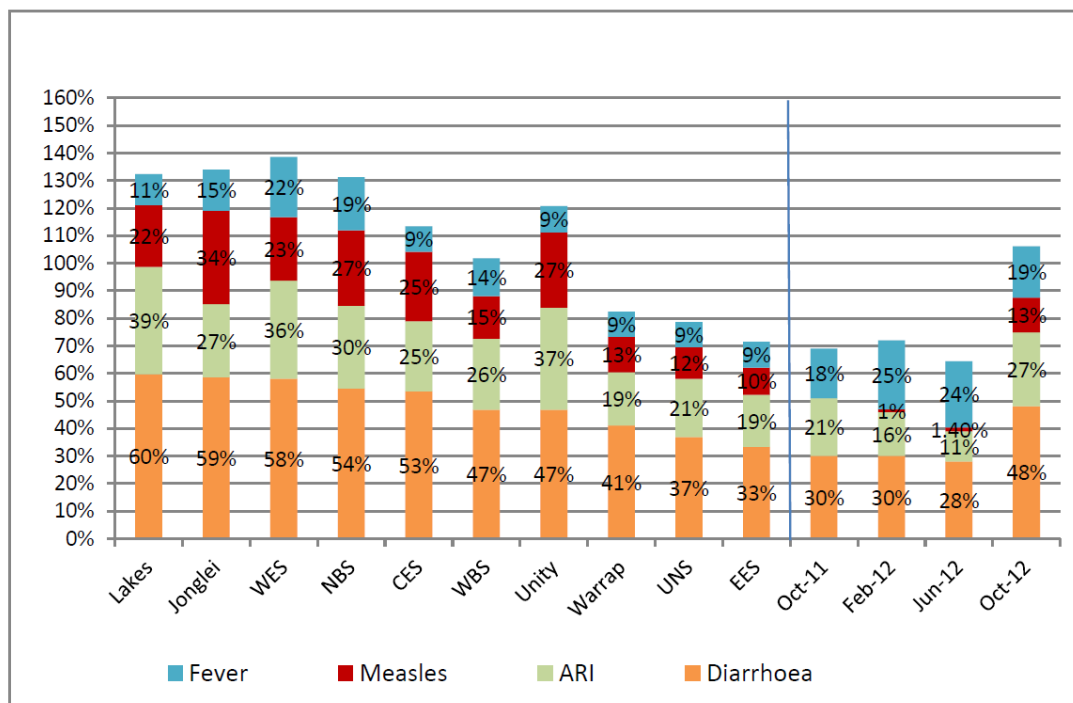
Seasonal nutrition trends from FSMS Acute malnutrition rates using MUAC assessments during the FSMS reveals that GAM (using MUAC thresholds of < 115mm) was consistently around 2 percent. Between 2010 and 2012 the variations in acute malnutrition observed in the FSMS have been mainly explained by changes in the proportions of moderate acute malnutrition. While SAM has been highly correlated to morbidity, moderate malnutrition tends to be explained more by food consumption patterns. Among the states, the highest prevalence of acute malnutrition (based on MUAC) is seen in Unity, Jonglei, Lakes and Northern Bahr el Ghazal in that order while the lowest prevalence is recorded in the Greater Equatoria, at just about 5 percent or less.

*Acute malnutrition rates in October 2012 by State and seasonal trends from 2010 (based on FSMS MUAC)*



A high disease burden among children was apparent throughout 2012 (FSMS findings) and as expected, there are indications of deterioration in nutritional status attributed to diseases. About a half of the children aged under 2 years suffered from illness in the two weeks preceding any of the seasonal assessments. For example, some 52- 80 percent of the children under 2 years old suffered from at least an illness in the two weeks preceding the June assessment, presumably the period with highest incidences of childhood illnesses due to unfavourable weather conditions during the wet season while it was 46 percent in October 2012. FSMS is conducted seasonally three times in a year (February, June and October).

*Child Morbidity in October 2012 and seasonal trends over 1 year.*



Seasonal analysis of the incidents shows that more than 63 percent of the conflicts in 2012 occurred between January and May (Figure 12), coinciding with the dry period when households experience depleted food stocks and have to rely on the market to meet their food needs. It is also when competition for water and pasture is highest, which act as a trigger for unresolved inter-communal conflicts. However the incidences are lowest during the rainy season (June –August when movements are constrained due to poor road network).

### **Nutrition causal analysis Report, Aweil East County, Northern Bahr el Ghazal State, South Sudan**

Woldetsadik T. 2011. Action Against Hunger

[http://www.actionagainsthunger.org/sites/default/files/publications/NCA\\_final\\_report\\_2.pdf](http://www.actionagainsthunger.org/sites/default/files/publications/NCA_final_report_2.pdf)

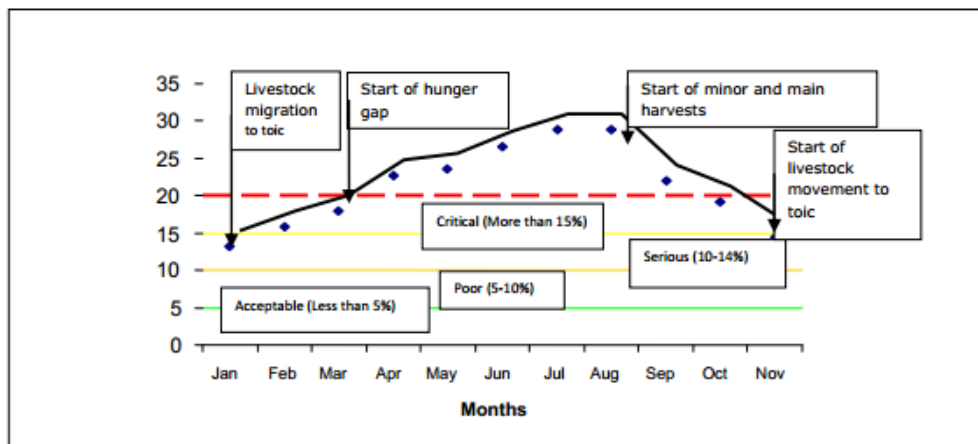
The objective of the study was to assess the magnitude of acute malnutrition in children aged 6 - 59 months as well as to establish the association between magnitude of malnutrition and contextual variables , to analyse secondary data and develop hypothetical causal model to inform preliminary understanding of causality, to explore the seasonality of malnutrition and long-term trends, to identify and prioritise the major risk factors of acute malnutrition from the logistic regression analysis and establish causality path way based on the statistical association between malnutrition status of children and the set of risk factors (socio-economic, dietary related, WASH related, environmental and health determinants) as well as to test the defined hypotheses. The focus was on Aweil East County.

Aweil East lies on the western flood plains agro-ecological zone of South Sudan. It has fertile black clay soil in the lowlands and less fertile sandier soil in the highlands. Rivers within the County are merely seasonal and low land areas are usually cut off from the main road for couple of months due to river over flooding or stagnant rain water. During the rainy season (April-September), seasonal flooding in the low-lying areas (toics) from tributaries of the Nile allows for the predominant production system of agro-pastoralism as well as very small fishing activities. The late onset of the rainfall in almost all the areas of the Republic of South Sudan in 2011 has serious implication on agricultural production (a minimum cereal loss of 30 – 40 percent of last year's harvest is expected).

Concerning food security, among sampled households, food purchase from the local market was the main source of food items for 100 (17.5 percent) households during lean season and for 82 (14.3 percent) of them in harvest period. This indicates that quite significant proportions of households (363 (63.3 percent) use their own food product during harvest season while 283 (49.5 percent) used own production as source of food during lean season. 86 (15 percent) households reported food assistance or donations as their main source of food throughout the year. A small number of households 66 (11.6 percent) were involved in fishery during the rainy season.

There is evidence of growing awareness of the significant pre-rainy season lean season and its implications on both food production as well as the hygienic and sanitation environment. In the months preceding the rains both fish and milk, major components of the diet, are at an annual low. The cattle are grazing in the distant 'toic' (lowlands) and as the rivers and pools dry up, fish no longer supplements the diet. Therefore as crop stocks continue to be eaten the population becomes increasingly vulnerable to food shortages. The situation is further compounded by the lack of water available at this time of the year. With pools and rivers increasingly drying up the population are forced to share the dirtier water used by cattle with other household uses. Morbidity data confirmed that this season sees a peak in diarrheal diseases. Given this annual pattern, a timely nutrition response necessitates early deployment before the rainy season in order to reduce the severity of malnutrition.

*Monthly trends of global acute malnutrition prevalence in NBEG*



Every year, the rate of acute malnutrition peaks between April and June. Reports indicated the acute malnutrition peak roughly coincides with the dry season and diminishes with the coming of the rains. Acute malnutrition usually coincides especially with high diarrhoeal disease incidence and to some degree with livestock and population movements.

Health and nutrition knowledge & practice remains poor. Malnutrition is not seen as a condition that requires serious attention, most children are seen when the nutritional status has deteriorated and AWD outbreaks are seasonal and flooded areas are more prone to outbreaks than others. Outbreaks of measles, which aggravates malnutrition in children under 5, are less seasonal and more related to low vaccination coverage and crowding.

### Situation Analysis of Nutrition in Southern Sudan: Analysis Based on June 2009 Assessment

Ververs M. 2009. Food and Nutrition Technical Assistance II Project (FANTA-2) USAID. <http://www.cmamforum.org/Pool/Resources/SouthSudan-Nutrition-Situation-Analysis-FANTA-2-2010.pdf>

Malnutrition in Southern Sudan is caused by various factors, some of which change seasonally and some of which affect different population groups. Coping mechanisms might not always be effective enough to prevent seasonal increase of malnutrition incidence rates. Food insecurity—inadequate food availability, access, and utilisation/consumption—is a problem for most communities in Southern Sudan. People affected by political and social insecurity and/or natural disasters are at a higher risk of food insecurity. For example, IDPs and returnees depend heavily on casual labour for their livelihood, and female-headed households face uncertain livelihood conditions. In addition, a general lack of dietary diversity is a substantial contributing factor to malnutrition in Southern Sudan.

Children facing food insecurity and care practice problems in the home are at a high risk of developing acute malnutrition, are vulnerable to disease, and are at increased risk of death. In the past 5 years, the trends in prevalence of acute malnutrition among children under 5 fluctuated around 19 percent, of which about 3 percent of cases were severe. This level of acute malnutrition surpasses the World Health Organization (WHO) emergency threshold of 15 percent. The prevalence varies seasonally and across regions. There is no indication of decreased prevalence of acute malnutrition since the signing of the 2005 Comprehensive Peace Agreement (CPA).

Every year in Southern Sudan, the rate of acute malnutrition peaks between April and June. The acute malnutrition peak roughly coincides with the dry season and diminishes with the

coming of the rains. Acute malnutrition coincides especially with high diarrhoeal disease incidence and to some degree with livestock and population movements.

The sources and quality of drinking water vary according to season, location, and community. In the wet season, there are more water sources closer to the homestead. In the dry season, water sources are significantly depleted, and water points get congested and contaminated. At the same time, there is an insufficient quantity of water to ensure hygiene, and outbreaks of diarrhoeal disease are likely.

The different components of food security—availability, access, and utilisation/consumption—are affected in varying degrees depending on the time of the year.

### **Food Availability**

Most parts of Southern Sudan experience the lowest availability of food staples from May to August. The severity and duration of food deficits can increase in the event of drought or flooding during the preceding year.

### **Food Access**

Households have food access challenges from May to August due to increased food prices related to shortages before harvesting. This can occur earlier, if there were limited harvests in the previous year, or later (July to October), if there was reduced physical access resulting from floods. If there is serious tribal fighting during periods of animal movements in search for pasture, high food prices and limited access can occur from January to April. Food access is heavily affected by food prices, especially of the main staples. Food prices in Southern Sudan have increased constantly since 2006, with the exception of a slight reduction mid-August 2008, and generally remain high. The causes of high food prices are associated with relatively high transaction costs, which are caused by poor market systems and underdeveloped infrastructure, the global food crisis, and the increased demand as people return to Southern Sudan. No data were available on the impact of the high food prices on food consumption patterns or malnutrition rates. It is that large and erratic shifts in food prices aggravate food access, intake, and, thus, the nutrition situation for those already at risk.

### **Food Utilisation/Consumption**

The main limitation to food utilisation/consumption in Southern Sudan might be related to disease due to diarrhoeal outbreaks, mainly from February to May, and to malaria and diarrhoea, mainly from July to September.

## **Sudan - Darfur: Comprehensive Food Security Assessment, December 2013**

WFP. 2013. WFP, Rome.

<https://www.wfp.org/content/sudan-darfur-comprehensive-food-security-assessment-december-2013>

The 2012/13 comprehensive food security assessment was conducted in December 2012. The primary objectives of the assessment are to update food security and vulnerability situation of the Darfur population, to assess risk factors for food insecurity and vulnerability, and to identify pockets of vulnerability where assistance and targeting may be required in the future programmes.

Insecurity, fluctuations in agricultural outputs, and increases in food prices are identified as the major risk factors. Market prices of food items have significantly increased over the past four years. Insecurity limits households' access to food, causing insufficient and unstable food supply to markets and price increases. Agricultural production in Darfur fluctuates by season, depending on the quantity and distribution of rainfall. The recent increases in the cost of production and fuel prices may affect the agricultural production negatively in the

future. Most of the food insecure households rely on market purchases for their food needs and are therefore vulnerable to increases in food prices.

### **Seasonality: The missing piece of the undernutrition puzzle**

Kahmann C. 2013. Action Against Hunger Blog.

<http://www.actionagainsthunger.org.uk/blog/seasonality-missing-piece-undernutrition-puzzle>

Every year, seasonal hunger cycles – some driven by climatic patterns, others by different forms of economic, political and social fragility – keep hundreds of millions of families in the world trapped in poverty and hunger. And because they occur with numbing regularity, they rarely capture the world's attention with the same intensity as catastrophic natural disasters and epidemic disease.

The link between seasonal hunger and child undernutrition is often striking. Why? All of the underlying causes of undernutrition (inadequate care practices, poor public health and food insecurity) are subject to seasonal variation. For rural households, seasonal hunger peaks when food stocks have been depleted and the current harvest has yet to be brought in from the fields. At the same time food prices rise due to limited availability further impeding access to food for many households who are reliant on the market to cover at least some of their food needs. This hunger period coincides with the rainy season, when disease, particularly diarrhoea, strikes hardest. The combined effect of heightened food insecurity and increased risk of disease can lead to seasonal peaks in child undernutrition.

How can the cycle of seasonal hunger be broken? With high level political leadership, seasonal hunger can, and must, become ancient history. At minimum governments need to build a seasonal perspective into poverty reduction strategies and resilience building programmes; programmes must be tailored to the local seasonal context. Governments need to scale up seasonal social protection programmes such as cash for work, warrantage, destocking/restocking and health gardens.

Health and nutrition stocks should be pre-positioned in risk prone areas well before the onset of the lean season. Support needs to be given to income diversification for poor households, including support to rural–urban linkages. Off-farm income earning work is one of the best buffers against seasonal stress. Investment in training schemes to build peoples' skill sets is needed. This will boost their income generating potential. Governments must also ensure that appropriate indicators are developed to enable seasonal analysis to inform existing early warning systems. In particular, market price indicators must be able to detect seasonal household level fluctuations in purchasing power. Donors, national governments and regional bodies must ensure that early warning is translated into early action.

At best, interventions which address immediate needs should be run in parallel with longer term programmes aiming to build communities' resilience.

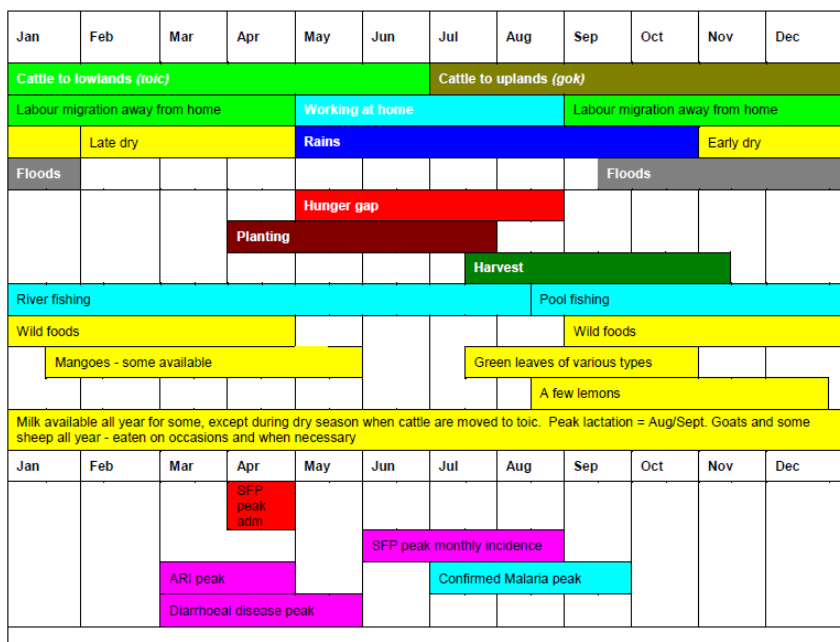
### **Summary of a report on the Underlying Causes of Malnutrition in Twic County, Warap State, South Sudan.**

Theuri T. 2007. South Sudan Medical Journal; 1 (3)

[http://www.southsudanmedicaljournal.com/assets/files/Journals/vol\\_1\\_iss\\_3\\_aug\\_08/Summary%20of%20a%20report%20on%20the%20Underlying%20Causes%20of%20Malnutrition%20in%20Twic%20County.pdf](http://www.southsudanmedicaljournal.com/assets/files/Journals/vol_1_iss_3_aug_08/Summary%20of%20a%20report%20on%20the%20Underlying%20Causes%20of%20Malnutrition%20in%20Twic%20County.pdf)

This figure shows the food availability, seasons and principal morbidities:





SFP = supplementary feeding programme

### South Sudan Anthropometric Surveys 1998 to 2006: Trends based on conflict and immediate post conflict data

McDowell S. 2006. Care International

Available on request from Steve McDowell ([mcdowell.stephen@gmail.com](mailto:mcdowell.stephen@gmail.com)), attached as Annex A and referred to here:

<http://www.enonline.net/fex/31/chronicmalnutrition>

GAM in the regions of northern Bahr el Ghazai and Upper Nile, South Sudan is regularly above 20 percent and at all times beyond the international emergency threshold of 15 percent. Global and SAM appear to have season peaks prior to the traditional hunger gap. The data does not indicate a significant change in malnutrition rates despite the cessation of hostilities in those regions for more than three years. Despite these levels of malnutrition, mortality data suggests crude mortality rates during periods of peace that are stable and well below emergency thresholds. The likely explanation for sustained, high levels of acute malnutrition is a continuation of a poor health environment and unhealthy behaviours or caring practises.

### DFID South Sudan nutrition country visit report

DFID. 2014. Sent by DFID advisor, attached as Annex B.

The implication of each combination of the following scenarios for malnutrition risk is illustrated below:

	Scenario					
	A/D	A/E	B/D	B/E	C/D	C/E
Level of malnutrition risk in December 2014 2014	Green	Green	Yellow	Yellow	Red	Red
Level of malnutrition risk in December 2014 2015	Green	Green	Yellow	Yellow	Yellow	Red

#### Malnutrition risk

- "Normal" for the season - minimal lean season spike
- Moderately high for the season - moderate lean season spike
- High for the season - high lean season spike

\*Effective BSFP will become particularly important for <2s and PLW

#### Scenarios

- A Improvement from September to December 2014
- B Stable from September to December 2014
- C Deterioration from September to December 2014
- D Stable from January to June / July 2015
- E Deterioration from January to June / July 2015

**Better-than-expected scenario: September to December**

- Food assistance is delivered to the affected areas consistently and with good coverage
- Basic health and nutrition services (including treatment for AM) are provided to affected populations
- Trade flows are re-established
- Further displacement is minimal
- Disease burden lowers with the end of the rainy season
- 2014 harvest was actually better than assessed by IPC for households

Although this is probably an unlikely scenario, it is important to keep track of whether the harvest is as limited as outlined in the current IPC analysis and whether trade routes re-establish as food availability increases.

**Stable scenario: September to December 2014**

- Food assistance is delivered to the affected areas consistently and with good coverage
- Basic health and nutrition services (including treatment for AM) are provided to affected populations
- Trade flows are re-established
- Further displacement is minimal
- Disease burden lowers with the end of the rainy season

This scenario will enable households to recover to some degree and should result in a reduction in acute malnutrition to 'normal' post-harvest levels by November / December (10 to 15 percent or even lower).

**Deteriorating scenario: September to December 2014**

- Resurgence of conflict leads to further displacement (including into neighbouring countries)
- Expansion of conflict into more areas
- Provision of food assistance is minimal / inconsistent
- Markets remain disrupted

This scenario will mean that households that are already vulnerable (displaced families that have lost assets, host communities with lower-than-normal harvests) will be under even more stress. It is likely that families will look to pick up normal livelihoods for the time of year but many of the options at this point rely heavily on functioning markets and the ability to move around. Further displacement into refugee camps will be likely. The prevalence of acute malnutrition might dip marginally in some areas as disease burden decreases but could remain high. In this scenario, extra focus must be given to getting nutritious foods to pregnant or lactating women and young children (i.e. SuperCereal+ or smaller dose supplements depending on availability). Expansion of conflict to other areas during this period could increase malnutrition risk in these communities if there is loss of food stocks / assets and displacement of families into areas that are currently 'phase 3' food insecure.

**Stable scenario: January to June / July**

- No resurgence in conflict enables families to return to their land to plant
- Provision of seeds, tools and other relevant assets arrives in time to support households normal planting
- Provision of food assistance doesn't act as a disincentive to farm
- Health and nutrition services are reliably available and the quality of treatment / preventative nutrition activities improves resulting in increased uptake
- Markets continue to function

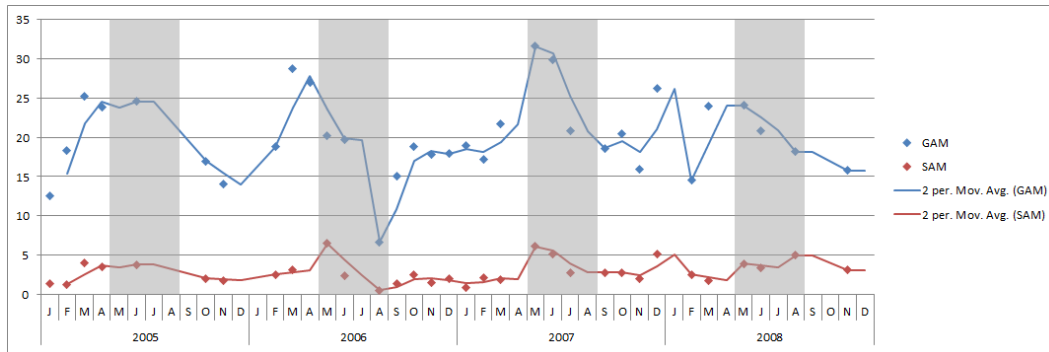
Households in the affected areas will need to get back to their land early in 2015 to start preparing it for sowing which will need to start as early as March. Enabling families to resume normal activities will reduce the likelihood of need for food assistance through to the end of 2015 and into 2016. Food assistance will still be required in 2015 given that 2014 stocks will be lower than normal. However, if there is reasonable stability, other modalities such as cash might be more appropriate. Even with this scenario there will likely still be a seasonal increase in acute malnutrition in May-August 2015.

**Deteriorating scenario: January to June / July**

- Families unable to return to land to plant due to conflict
- Expansion of conflict affects more areas of the country
- Rains arrive late or are less than normal disrupting harvests of those that were able to plant
- Rains are heavy resulting in flooding, loss of crops and disruption to market access
- Flooding increases disease burden
- Conflict and / or flooding disrupts delivery of food assistance and other essential services
- Funding gaps result in breaks in delivery of services
- Provision of seeds / tools is done too late or not at all

Disruption to the provision of assistance during this period will increase the likelihood that acute malnutrition will spike higher than normal at some point in 2015 (and potentially earlier than would normally be seen). Disruption to planting / rainfall / harvests for 2015 will set the scene for 2016 and will determine whether acute malnutrition drops to a lower level towards the end of 2015. In this scenario, extra focus must be given to getting nutritious foods to pregnant or lactating women and young children (i.e. SuperCereal+ or smaller dose supplements depending on availability). Even if other areas of the country remain unaffected by the conflict, poor rains will increase food insecurity in these areas and have knock-on impacts on food availability / prices across the country.

*Trend in the prevalence of global acute malnutrition and severe acute malnutrition across South Sudan since 2005 (based on average GAM and SAM prevalence from surveys undertaken across the country using WHO growth reference)*



## Causes of malnutrition in South Sudan pre-2014 crisis

### A confusing picture

In general we know that at the immediate level, malnutrition is the result of inadequate dietary intake and / or disease. Both are the result of a combination of food insecurity, sub-optimal caring practices, poor healthcare, unsanitary environments and poor access to clean water. These factors are certainly at play in South Sudan although associations in different regions at different points in time can be difficult to interpret. For example, livelihood zones that cut across Unity State have been traditionally viewed as some of the more food secure in the country and yet the prevalence of acute malnutrition in Unity is often higher than in other regions. Data on causal factors are rarely collected at the same time or in a way that makes comparison straightforward. Confounding factors (such as incidences of conflict) are not factored into analyses.

This means that when looking at survey data, there is no obvious clustering of causal factors in regions with the highest prevalence of wasting or indeed stunting. The prevalence of stunting is fairly uniform across the country (differences are probably only significant between the very highest prevalence areas – Unity, East Equatoria and Lakes and the lowest).

### Seasonal drivers

What is clear is that seasonal increases in acute malnutrition in South Sudan do coincide with (1) the pre-harvest hunger gap that affects households in all regions from approximately May to August and (2) the rainy season when diarrhoea and malaria incidence increase (spanning April/May to October/November). This at least provides some evidence that dietary intake and illness are contributing to the malnutrition problem in the country! In many areas, food security-related acute malnutrition is associated with crop production in the preceding year. Sorghum, other staples and vegetables start to be harvested from September onwards. A poor harvest means that families have less stock to carry into the following year and have a longer period where they are reliant on purchasing food (at potentially elevated prices) to meet needs before the next harvest. In these situations, acute malnutrition can start to increase earlier on in the year than normal. Children affected in this way will undoubtedly go into the rainy season in a less resilient condition to withstand illnesses such as diarrhoea and malaria that occur during this period.

A number of the areas affected by the current crisis include livelihood zones involving livestock and fishing, both of which follow a slightly different seasonal pattern. Livestock can produce milk from May onwards assuming the rains are good and pasture is accessible. However, sale of livestock tends to increase towards the end of the lean season (June / July) to release funds to buy grain. Fishing can be an almost year-round activity although this tends to drop off during May to July and can be heavily disrupted by flooding.

### **Acute malnutrition risk coming into 2014**

The 'peak' prevalence of acute malnutrition in 2013 (i.e. during the lean season) was high in some parts of South Sudan although broadly comparable with previous years. It is important

to note that the timing of surveys shown below is not known. Surveys done earlier on in the year are likely to reveal a lower prevalence of GAM than those done towards the end of the lean season.

Flooding, prolonged lean season, insecurity, border disputes with Sudan and population displacement were cited as reasons for higher levels of food insecurity. It is difficult to correlate food security data with nutrition data in this context. The timing of assessments is not always clear but also the nutritional situation during the lean season for many areas will be determined by harvest / productivity the previous year.

The proportion of households that lost assets, food stocks and savings following the onset of violence at the end of 2013 is difficult to determine. Data on food prices and market disruption in the most affected areas is not readily available for that period. This makes it difficult to assess how many households that were not displaced into the camps experienced the hunger gap earlier than normal. In most livelihood zones in the affected area of the country, purchase of food in 'normal' years starts fairly early into January / February as stocks deplete. The first few months of the year are important for families to earn cash through sale of livestock, wild foods, grass, firewood / charcoal and fish to help see them through to the next harvest. Disruption to normal activities and to markets was clearly a major problem and by May / June 2014, the food security situation was noticeably worse than the preceding year.

#### **Trends in malnutrition and mortality in Darfur, Sudan, between 2004 and 2008: a meta-analysis of publicly available surveys**

Nielsen J, Prudhon C & de Radigues X. 2011. International Journal of Epidemiology, 40 (4) <http://www.ncbi.nlm.nih.gov/pubmed/21296853>

The humanitarian response to the crisis in Darfur is the largest humanitarian operation in the world. To investigate the evolution of the conditions of the affected population, this research analysed trends in malnutrition and mortality, the most widely accepted indicators for assessing the degree of severity of a crisis.

Analysis found that through 2004 and 2005 GAM among IDPs and residents in North, South and West Darfur states fluctuated between 10 percent and 20 percent due to seasonality. GAM and SAM showed marked seasonal fluctuation, peaking around June–July. Overall, GAM fluctuated by 82 percent (relative effect (RE) = 1.82; 95 percent CI 1.68–1.97) and SAM by 145 percent (RE = 2.45; 95 percent CI 1.75–3.42). Seasonal fluctuation was homogeneous across populations and states.

In West Darfur, crude death rate (CDR) for IDPs was unaffected, whereas proportion of IDPs in the population had a significant negative effect among residents, relatively more pronounced compared with IDPs. The same pattern was observed for under-five death rate (U5DR). U5DR fluctuated by 54 percent (RE = 1.54; 95 percent CI 1.32–1.80) with season homogeneously across populations and states and was generally lower around the first quarter of the year. The same pattern of seasonal fluctuation was observed for CDR, the overall seasonal variation being 63 percent (RE = 1.63; 95 percent CI 1.48–1.80).

Seasonality played a major role on nutrition and mortality patterns among both IDPs and residents in all years investigated. Higher malnutrition and mortality were associated with the hunger-gap rainy season, when food insecurity and morbidity increased. This study suggested that humanitarian aid did not compensate for seasonal variations and could be more effective if aid was tailored to seasonality.

#### **5. Regional data which does not record seasonality**

### **Simple Spatial Surveying Method (S3M) survey in Sudan. Executive Summary.**

Sudan National S3M (2013) Federal Ministry of Health, Sudan. 2013.

[http://www.coverage-monitoring.org/wp-content/uploads/2014/12/Sudan\\_S3M-2013\\_FINAL-Endorsed-EXECUTIVE-SUMMARY\\_25Nov2014.pdf](http://www.coverage-monitoring.org/wp-content/uploads/2014/12/Sudan_S3M-2013_FINAL-Endorsed-EXECUTIVE-SUMMARY_25Nov2014.pdf)

This is the report of a survey carried out in all 18 states of Sudan by the Federal Ministry of Health and UNICEF with technical support from Valid International and funding from DFID. Data collection took place during June / July 2013 for 14 states and in November 2013 for the remaining 4 states (Khartoum, Red Sea, South and West Kordofan).

The survey used the Simple Spatial Survey Method (S3M), an area based sampling methodology that uses maps for selection of sample points.

The advantage of the Sudan S3M is that it measured a range of indicators (health, WASH and nutrition) over small geographical areas, giving results at locality level and lower. It has identified where the children who are most in need in Sudan are living ensuring evidence based equity programming in Sudan.

Prevalence of GAM in many areas across the country is classified as critical, which is above 15% as per the WHO threshold for assessing severity of malnutrition, adopted in the national nutrition survey guidelines for Sudan 2012. The map shows that acute malnutrition is a widespread public health problem affecting every state, with a concentration in the East (particularly Red Sea), Blue Nile, Central and North Darfur. Red Sea state recorded the highest prevalence's of malnutrition with all but one locality well above the 15% threshold for a critical situation.

Distribution of GAM prevalence based on MUAC follows a similar pattern to WHZ, and areas with high GAM by MUAC include Red Sea, Kassala, North Darfur and South Kordofan as well as large pockets in South and East Darfur, Blue Nile and Gedaref states. MUAC is known to be a better predictor of risk of mortality than weight for height z score (WHZ), and a better case detection method for severe acute malnutrition in terms of accuracy, precision, sensitivity and specificity, identifying those children at higher risk of near-term mortality. Red Sea State recorded GAM by MUAC up to 47% and SAM up to 19% in Tokar locality. This is a clear indicator of the urgency of the situation in the state.

## **6. Seasonal Humanitarian and development interventions for malnutrition**

### **South Sudan Updated Nutrition Cluster Response Plan – August 2014**

Nutrition Cluster. 2014. Humanitarian Response

<http://www.humanitarianresponse.info/system/files/documents/files/SSudan%20Updated%20Nutrition%20Cluster%20Response%20Plan%20-%20Final%20Draft%201%20Sep.doc>

Prior to the crisis, acute malnutrition was already extremely prevalent among boys and girls under-five and pregnant and lactating women in South Sudan. Results of 24 pre-harvest SMART nutrition surveys conducted in 23 counties of seven states during the pre-harvest season of 2013, showed levels of GAM that ranged from 5.4 percent in Wulu County (Lakes State) to 35.6 percent in Gogrial East County (Warrap state). The prevalence of SAM ranged from 0.6 percent in Wulu to 13.4 percent in Gogrial East. The prevalence of acute malnutrition has seasonal variations in South Sudan. Seven post-harvest SMART nutrition survey were conducted in South Sudan in 2013, showing levels of acute malnutrition that ranged from 10.3 percent in Koch County (Unity State) to 16.0 percent in Mayendit County (Unity State).

For the past three years prior to the crisis, over 10 percent of the population was estimated to be severely food insecure. Another 30 percent was estimated to be moderately food insecure. Over the past three years, at least 1.2 million people have received seasonal food assistance.

The prevalence of acute malnutrition has seasonal variations in South Sudan. It is highest during the lean season (lasting from May up until August for some regions) before the harvest. The lean season occurs at the same time as the rainy season, when the incidence of malaria and diarrhoea increases. This creates a double burden of vulnerability for young children. The rainy season also brings logistical constraints to the implementation of nutrition activities, hampering communication and the transport of nutrition supplies.

With 60 percent of the country cut off from road travel during the rainy season, costly air transport is essential to maintaining humanitarian operations.

Due to the seasonality SMART surveys are conducted in the pre and post-harvest periods. Malnutrition rates have been generally high during the pre-harvest period hence more SMART surveys are conducted during this period.

The Nutrition cluster partners, including UNICEF, FAO and WFP have finalised discussion to include anthropometry indicators in the quarterly food security monitoring system (FSMS). This will improve availability of nutrition data and give a snapshot of seasonal nutrition trends in the country.

The cost of implementing the Nutrition Crisis Response Plan in 2014 comes to \$131 million. Of this, \$74 million is still needed. The new requirements reflect funds needed for the second half of the year, bearing in mind the increased costs of logistics during the rainy season.

### **Integrating severe acute malnutrition into the management of childhood diseases at community level in South Sudan**

Keane E. 2013. Malaria Consortium

<http://www.cmamforum.org/Pool/Resources/Integrating-SAM-into-management-of-childhood-diseases-South-Sudan-2013.pdf>

Health facility use is low in South Sudan. Outpatient visits are only 0.2 visits per person per year despite 44 percent of the population being settled within a five kilometre radius of a functional health facility. Even five kilometres can be an impossible journey in parts of the country, especially in the rainy season where floods and swollen rivers may make any access to services impossible.

In South Sudan there are seasonal trends in malnutrition patterns. There is a 'lean period' before the harvest, which generally runs from March to June in which malnutrition rates reach their peak. The 'post harvest' period is from October to December where malnutrition rates are generally expected to drop. Established outpatient therapeutic programmes (OTP) usually see this trend in admissions.

To avoid stock-outs of ready to use therapeutic foods (RUTF) in the programme the report suggests prepositioning supplies ahead of the rainy season. In South Sudan there are many challenges in reaching remote rural areas. The counties where Malaria Consortium operates experience extreme seasonal flooding for four to six months a year. Malaria Consortium used staff who had good local knowledge and local authorities to work in areas that were likely to be cut off by flooding. RUTF and other supplies were brought in to these areas ahead of the rainy season.

## **South Sudan Crisis Regional Impact - Situation Report #34**

Wood J. 2014. WFP, Rome.

<https://www.wfp.org/node/3192/3448/643179>

Heavy rainfall in South Sudan and insecurity along the transport routes, has resulted in a decrease in the arrival rates, especially into Uganda and Kenya. WFP requires US\$111 million for the next six months to meet the needs of new arrivals from South Sudan and existing refugees.

## **South Sudan Food Crisis: April 1 - June 2 2014. Start fund crisis response summary**

Start fund. 2014. Start fund, UK.

[http://www.start-network.org/wp-content/uploads/2014/07/CRS\\_SSD\\_final.pdf](http://www.start-network.org/wp-content/uploads/2014/07/CRS_SSD_final.pdf)

As of March 27, over one million South Sudanese had been displaced by the conflict which broke out on December 15, 2013, leaving an estimated 3.7 million people at acute or emergency risk of food insecurity. Start Fund grants allowed agencies to act fast before the rainy season and hunger gap period started, reaching 1 percent of the affected population with £283,198. During implementation, agencies sourced £3,087,312 from other donors for ongoing emergency response activities. At a similar rate, this will reach an estimated 371,524 people – over 10 percent of the affected population.

Agencies reported that Start Fund grants allowed them to show the feasibility of similar projects to other donors. Agencies implemented both linear (distribution of emergency aid) and non-linear (pre-positioning of stocks, nutrition data collection) projects. They described good coordination with cluster partners and other implementing local and international actors, including direct involvement of affected communities in needs assessments, selection of aid recipients, communication about aid and adapting plans during implementation. This coupled with pre-existing presence in the area of intervention contributed to an efficient and effective response.

Half of the projects integrated activities between nutrition, WaSH, shelter and health sectors, and the other half focused on nutrition. Over a third of all funds were channelled to local partners. Critical nutrition and WaSH distribution eased the pressure on IDP communities and promoted better hygiene practice. Previously non-existent nutrition data is helping the design of new nutrition projects, and pre-positioned supplies are allowing life-saving aid to continue in hard-to-reach places now that the rains are making access even harder.

### **Lessons from the Response:**

*Coordination between projects allowed agencies to share project updates and common challenges.*

- Two agencies learned that they were working through the same local partner in Melijo IDP camp and coordinated their response activities.
- One agency requested technical support with nutrition assessments through ACF's NET teams.

*All projects experienced significant logistical challenges and delays due to security and access issues.*

- Procurement took longer than expected. Although more costly, using national suppliers accelerated the clearance process required due to sourcing goods from neighbouring countries. Training staff on obtaining documentation increased capacity to intervene quickly to unblock bottlenecks.
- Some supplies never arrived or were confiscated by opposition forces. Working with local partners allowed projects to adapt or regain their supplies through negotiation to meet project deadlines.



- Frequent changes in control of certain areas did not allow for adequate planning. Continuous communication both with local authorities and the Start Fund allowed some flexibility.

*Partnering with affected communities also improved the assistance provided.*

- Communication with local authorities helped to mobilise local information networks.
- IDP committees comprised of both male and female community leaders helped to select the most vulnerable IDPs for receiving aid, including child-headed households and pregnant women.
- Sensitisation of community leaders improved relations between host communities and IDPs. In one case, the IDP community chose to allow vulnerable members of the host community to access 10 percent of the aid kits provided to show their gratitude for staying on the host community's land and maintain peaceful relations.

### **From crisis to catastrophe South Sudan's man-made crisis – and how the world must act now to prevent catastrophe in 2015**

Joint agency briefing note. 2014. Oxfam, UK.

[http://www.care-international.org/uploaddocument%5Cnews%5Cpublications%5Cenglish%5Csouth%20sudan\\_from%20crisis%20to%20catastrophe\\_october%202014.pdf](http://www.care-international.org/uploaddocument%5Cnews%5Cpublications%5Cenglish%5Csouth%20sudan_from%20crisis%20to%20catastrophe_october%202014.pdf)

More than two million people are facing severe food insecurity in South Sudan. Famine has been narrowly avoided in 2014. As the dry season begins, the brutal conflict that provoked this disaster is about to get worse. Without an end to the fighting – and unless more aid can be delivered to those who need it – famine remains a serious threat in 2015. By committing to more vigorous diplomacy and swift action, the world has the chance to prevent that.

The prospects for 2015 look grim. Both sides are fighting for military gains to influence political negotiations, and are willing to continue fighting for a long time to achieve these. Strategic towns in Unity, Upper Nile and Jonglei states have been taken and retaken, showing the tenacity of government and opposition forces alike. Reports are emerging that both sides have taken advantage of the rainy season – which lasts on average from April to October and closes nearly two-thirds of the country's roads and tracks to vehicles – to regroup and plan for renewed fighting. With the onset of the dry season from October onwards, fighting is likely to resume before next year's rainy season begins in April.

International aid has had a significant and measurable positive impact on people's lives. Food distributions have often made the difference in people being able to eat even one meal a day, while clean water has prevented more serious outbreaks of disease. However, around \$400m is still needed to support the current food security needs in South Sudan. Almost one-third of South Sudanese are in need of direct food aid, while almost two-thirds are in need of livelihoods support. The UN World Food Programme estimates that \$78m is needed to deliver assistance each month of the rainy season.

## **7. Experts comments**

### **Sophie Woodhead – Action Against Hunger**

*In coverage assessments we try to analyse the relationship between admissions and seasonality, to see the impact of it on the programme (i.e. to see if the programme is able to adequately respond to the changes in the season)*

All of our reports for south Sudan can be found on our website, in the resources section:

[www.coverage-monitoring.org](http://www.coverage-monitoring.org)

If you think the above info would be helpful for your response, please do look in to the reports on the website.

## 8. Additional information

### Authors

This query response was prepared by:

- Laura Bolton, Institute of Development Studies – [l.bolton@ids.ac.uk](mailto:l.bolton@ids.ac.uk)
- Stephen Thompson, Institute of Development Studies – [s.thompson@ids.ac.uk](mailto:s.thompson@ids.ac.uk)

### Contributors

The following experts commented or contributed to this response:

- Sophie Woodhead – Action Against Hunger
- Stephen Macdowell – Consultant

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