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

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This paper is part of the A2Z rapid assessment of the nutrition situation in Southern Sudan commenced in August, 2007. The scope of this paper is limited to data available on the nutritional status of the population and its determinants. Ongoing policy development and assessments of programs are covered in other parts of the assessment report.

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## Summary

A consensus found among documents compiled by nutrition workers in Southern Sudan appears to exist that available nutrition data allow the following conclusions:

1) **The prevalence of acute malnutrition in preschool children is extraordinarily high in Southern Sudan – at around 22%, consistently and substantially higher than the WHO cut-off for nutrition emergencies of 15%.**
    a. This prevalence of acute malnutrition varies some with season and more substantially across regions.
    b. There is no indication that the prevalence of acute malnutrition has decreased since the signing of the Comprehensive Peace Agreement (CPA) in January 2005.
    c. There are very few data on the prevalence of deficiencies in vitamins and minerals, but given the dire situation with general malnutrition, such deficiencies are almost certainly widespread and severe. These deficiencies also bring extremely significant disadvantages to health, cognitive development and educational achievement, and ultimately affect the potential for economic development.

2) **Food insecurity is important, but the causes of the malnutrition are far broader than the availability of food. They include:**
    a. A high burden of infectious diseases including malaria, diarrhea, and pneumonia are more severe in malnourished children than in others, and these infections worsen the severity of malnutrition that already exists.
    b. Many traditional beliefs and customs regarding infant and young child feeding are detrimental to child nutrition – for example, discarding of colostrum, pre-lacteal feeds, lack of exclusive breastfeeding, inappropriate introduction of complementary foods (timing and type), and inequitable distribution of food within the household. Such practices disadvantage women and children and contribute substantially to the high prevalence of malnutrition.
    c. Gender roles and lack of education among women are both critically important indirect causes of malnutrition.

3) **The causes of malnutrition vary widely by area, ethnic group, livelihood/ecological zone, but there is some notable uniformity. Identifying and understanding these causes is clearly important to developing policies and programs to address them.**

4) **Important information gaps in the nutrition data exist. The most critical gaps to evidence-based policy and program development include, for each livelihood zone: the prevalence of micronutrient deficiencies, customs and beliefs related to infant and young child feeding, identification of specific nutrient dense foods, and health seeking behaviors.**

## Background Sudan

Southern Sudan encompasses approximately 640,000 square kilometers, with an estimated population of 7.5 million. The area includes sections of tropical and equatorial forests, wetlands, savannah and mountains. Culturally, geographically and religiously diverse, Southern Sudan is rich with natural resources, including water, wildlife, forest, oil and minerals[1].

Eluzai has described how Southern Sudan is now beginning to gain a foothold in the sectors of health and nutrition after emerging from decades of civil war and conflict[2]. The nascent Ministry of Health (MOH) and the Department of Nutrition at the national level are expanding at the state level with the goal of improving the status of nutrition throughout the region. Since health services and adequate infrastructure were almost completely lacking in Southern Sudan throughout the war, non-governmental organizations (NGOs) previously filled this role in regards to nutrition, and assisted in the establishment of assessment and treatment protocols for acute malnutrition. Those NGOs are now assisting in building capacity within the young government systems. Transitional governments without defined health policies and strategies, such the Government of Southern Sudan (GoSS), have unique challenges, including establishing effective systems that are able to meet the needs of the entire population[3].

## Nutrition Status – "A Chronic Emergency"

The status of nutrition throughout Southern Sudan has been severely impacted by decades of conflict. Rates of acute malnutrition (Table 1, Figure 1) have been consistently higher than any other country in sub-Saharan Africa, more than twice the average reported for countries in Sub-Saharan Africa[1]. Rates of stunting (Figure 2) and underweight (Figure 3) are similar to Ethiopia and represent the worst in the region. These rates have not shown signs of decreasing even since the signing of the peace agreement and cessation of conflict in 2005.

There appears to be a fairly solid consensus around three general findings regarding nutrition in the reports the A2Z team reviewed on the topic and in their discussions with staff of the MOH, UN agencies, donors, non-governmental organizations, and other stakeholders. These consensus findings are summarized below.

**Table 1: Southern Sudan Prevalence of Wasting, Stunting, Underweight**

| | W/H | H/A | W/A | W/A |
|---|---|---|---|---|
| | **GAM** | **Stunting** | **Underweight** | **Underweight, Severe** |
| **Southern Sudan** | 22 | 45 | 48 | 21 |
| **All Sudan** | 16 | 34 | 17 | 7 |
| **Uganda** | 4 | 39 | 23 | 5 |
| **Kenya** | 6 | 37 | 23 | 7 |
| **Ethiopia** | 11 | 52 | 47 | 16 |

[1] New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, "Toward a Baseline: Best Estimates of Social Indicators for Southern Sudan." In association with UNICEF (May 2004).
[2] Eluzai, Victoria, "Nutrition in Southern Sudan: Current Situation and Humanitarian Challenges". Unpublished August 2007.
[3] Gatchell, Valerie and Vivienne Forsythe, Paul-Rees Thomas. "The Sustainability of community-based therapeutic care (CTC) in non-emergency contexts", Food and Nutrition Bulletin, Vol. 27, No. 3, Supplement (2006).

| | | | | |
|---|---|---|---|---|
| **DRC** | 13 | 38 | 31 | 9 |
| **Sub-Saharan Africa** | 10 | 42 | 29 | |

Source: New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, "Toward a Baseline: Best Estimates of Social Indicators for Southern Sudan." In association with UNICEF (May 2004).

**Figure 1: GAM**

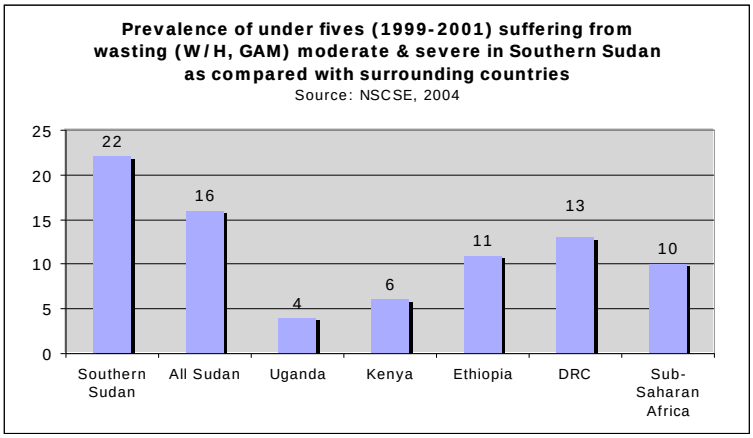



**Figure 2: Stunting**

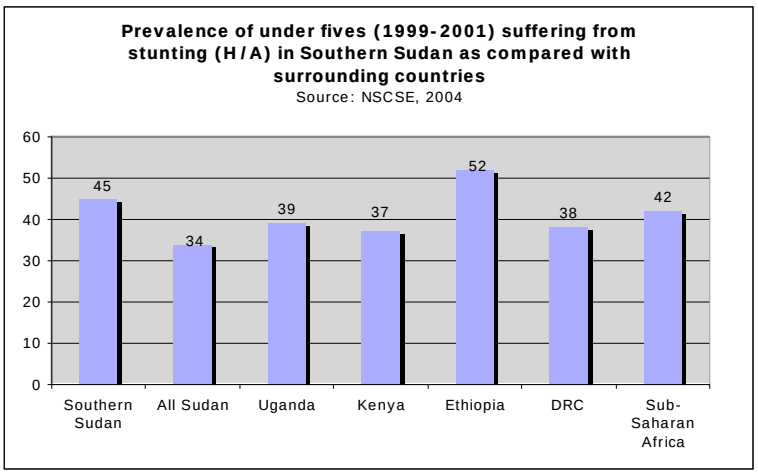
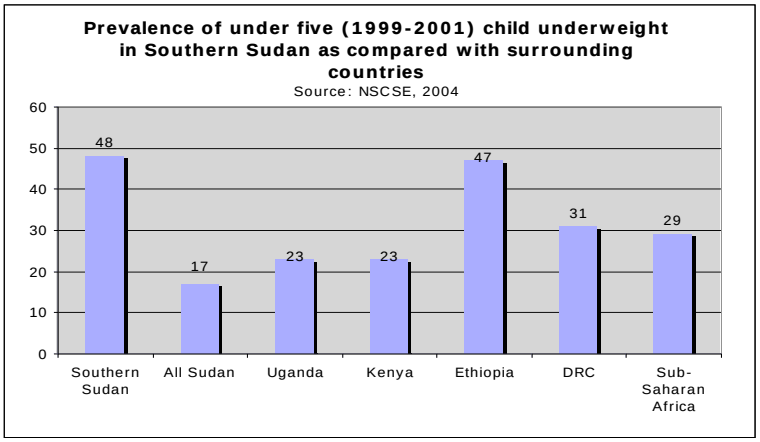



**Figure 3: Underweight**



***Consensus Finding 1. The prevalence of acute malnutrition in preschool children is extraordinarily high in Southern Sudan -- around 22%.***

The prevalence of children under five years with acute malnutrition in Southern Sudan is one of the highest in the world – approximately one out of every five children suffers from moderate to severe acute malnutrition (wasting). The prevalence of acute malnutrition among this age population in Southern Sudan is almost twice as high as in other parts of Sudan.

Much of the anthropometric data available on the population in Southern Sudan has been collected in the context of locating and monitoring emergency feeding programs. Global acute malnutrition (GAM) is the most commonly used indicator. The following definitions are obtained from the SPHERE Project's Humanitarian Charter and Minimum Standards in Disaster Response 2004 handbook[4].

**Global Acute Malnutrition (GAM)**, also identified as "total malnutrition", is classified as:

- Proportion of children aged 6-59 months whose weight-for-height z score falls below –2,
- Children who are less than 60% weight-for-height, and children with bilateral oedema.

**Severe Acute Malnutrition (SAM)**, which is even more serious though less common, includes the following classification;

- Children whose weight-for-height z score is less than –3.
- GAM includes children who also fall in the category of SAM.

In emergency or crisis situations, the weight-for-height Z score is the favored indicator for reporting anthropometric survey results, and weight-for-height percentage of the median is favored to determine eligibility for treatment. There is no agreed upon cut-offs for acute malnutrition in infants below six months of age, apart from the presence of nutritional oedema. Stunting is usually not reported in crises situations, but when it is, the following definitions are used: "stunting" is defined in children whose height-for-age z score falls below –2 and "severe stunting" is defined as a height-for-age z score of less than –3.

Various agencies have attempted to standardize action plans for treating chronic malnutrition, although they still vary in percentages and vocabulary. Medecins Sans Frontieres (MSF) established a classification for malnutrition crises, including identifying 20% GAM in a population with the label of "serious crisis" and 40-50% GAM equating to "famine"[5]. Organizations commonly use terms such as "chronic emergency" to describe the malnutrition situation in Southern Sudan. The World Food Programme (WFP) uses the GAM prevalence rate of 15% and above as the threshold for implementing feeding programs. In Southern Sudan, the rates of GAM are staggeringly and persistently high. The average rate of Global Acute Malnutrition is 22%, corresponding to the approximately 500,000-child population at risk.

[4] SPHERE Project, "Humanitarian Charter and Minimum Standards in Disaster Response", (2004).
[5] Médecins Sans Frontières (MSF), "Nutrition Guidelines". 1st edition. Paris: MSF (1995).

- *Consensus Finding 1A:* The prevalence of acute malnutrition varies some with season and more substantially across regions of Southern Sudan.

When assessed at a state level, only one out of ten states stands in the global "safe" category, with reported GAM rates below 10% of the at-risk population. Only three states fall within the "safe" category with GAM rates below 15%[6].

State / County statistics:

- The reported prevalence of GAM ranges from approximately 8% in Kakokeji County to 39% in Southern Bor County.
- The highest rates of GAM have been reported in the livelihood zones of Western Flood Plains and Nile/Sobat and Eastern Flood Plains.
- Central Equatoria state is the only state where GAM rates have been reported below 10%.
- Western Equatoria, Central Equatoria, and Lakes States are the only states with reported GAM rates below 15%.

Although the data gathered from local surveys are not representative for the entire region of Southern Sudan, they do present a consistent picture. Much of the research of malnutrition in Southern Sudan has been associated with emergency feeding centers in the provinces with the historically highest rates of GAM and SAM. These two provinces include Northern Bahr-el-Ghazal, which contains the states of Warap and Northern Bahr-el-Ghazal, and Upper Nile, including the states of Unity, Jonglei and Upper Nile. CARE analyzed data collected from 195 anthropometric surveys during the period from 1998-2006 in these two provinces that lie near the border with northern Sudan, synthesizing comprehensive data regarding the trends in conflict and immediate post-conflict figures[7]. In 2004, Action Against Hunger-USA compiled results from 29 nutrition surveys in the same two regions, comparing those outcomes with one survey in the southeastern state of Eastern Equatoria. Due to the exceptionally high malnutrition rates, other NGOs including Tearfund, CONCERN Worldwide and MSF-CH have also focused efforts and programming in these regions.

- *Consensus Finding 1B:* There is no indication that the prevalence of acute malnutrition has decreased since the signing of the CPA in January, 2005.

Malnutrition rates are not only high throughout Southern Sudan, they are extremely persistent. Nutritional status has not improved in recent years despite the signing of the Comprehensive Peace Agreement, leading to increased access to markets, continued food aid and improved crop production. With over one million children under the age of five in the ten states, nearly all are at risk of malnutrition. The contributing factors include a lack of access to adequate health services and secure infrastructure, high disease burden, chronic food insecurity and extreme poverty due to the loss of livelihoods. Social and cultural factors also have a hand in the high rates of malnutrition, such as illiteracy, traditional beliefs and gender roles. Even malnutrition rates for children in the wealthiest segments are still high (estimated 10%), which indicates the negative

[6] Southern Sudan Sudan Centre for Census, Statistics and Evaluation (SSCCSE) and National Central Bureau for Statistics (CBS), "Sudan Household Health Survey (SHHS)", (2006).

[7] CARE, "South Sudan Anthropometric Surveys 1998 to 2006: Trends based on Conflict and Immediate Post Conflict Data" (2006).

effect on children across all socio-economic levels[8]. In terms of gender specific rates, boys are slightly more likely than girls to be malnourished, with estimated rates of 15% and 14% respectively. Particularly high rates in children aged 6-30 months can be attributed negative breastfeeding and complementary feeding practices, discussed later in this synthesis.

Since weight-for-height is the indicator most commonly reported, results will be influenced strongly by the age distribution of the particular sample. For example, weight-for-height is lower in children aged 6-24 months than in younger infants and older children. Difficulties exist in survey gathering, reporting and providing accurate data due to the lack of access, limited infrastructure and vast rural areas. Despite consistency in the results reported from surveys, the methods utilized have not been standardized, and this introduces some uncertainty in conclusions of population estimates and comparisons between surveys.

- *Consensus Finding 1C:* There is a **lack of data** on the prevalence and severity of **vitamin and mineral deficiencies** in Southern Sudan.

Dubbed a "silent and largely invisible emergency" by UNICEF, malnutrition, including micronutrient deficiencies, has adverse effects on physical health and cognitive development. There is a dearth of data regarding the prevalence of micronutrient deficiencies in Southern Sudan. Rates of vitamin A, iron, and iodine deficiencies are virtually unknown, although efforts by NGOs have increased in reaching at-risk populations for micronutrient supplementation.

Despite the absence of specific data on prevalence of micronutrient deficiencies, such deficiencies are almost certainly very widespread and severe. Given the dire situation with general malnutrition, these deficiencies result in significant disadvantages to the population in terms of health, cognitive development and educational achievement, human capital, and ultimately the potential for economic development.

Certain conclusions can be deduced from the following statistics on vitamin A supplementation and salt iodization, which could be leading to micronutrient deficiencies. According to SHHS data, more than 50% of the child population in six out of ten states has never received vitamin A supplementation. The entire country of Sudan (north and south) produces approximately 175,000 MT of salt per year, though only 3,000 MT is iodized, leading to consumption of iodized salt in only 1% of households.[9]

In addition to micronutrient deficiencies, malnutrition imposes other threats to child illnesses. According to UNICEF, malaria, diarrhea and acute respiratory infections in Southern Sudan are common and lasting[10]. Reported prevalence rates for children under five are as follows: malaria – 61%; diarrhea – 45%; and ARI – 30%. Malnourishment is compounded by the presence of such diseases endemic to Southern Sudan.

[8] Southern Sudan Sudan Centre for Census, Statistics and Evaluation (SSCCSE) and National Central Bureau for Statistics (CBS), "Sudan Household Health Survey (SHHS)", (2006).
[9] UN Standing Committee on Nutrition, "Working together to end child hunger and under-nutrition", Vol. 34 (2007). .
[10] UNICEF, "Update on the Nutrition Situation of Southern Sudan", (August 2003).

***<u>Consensus Finding 2</u>. Limited availability of food contributes to the very high prevalence of acute malnutrition, but the causes are far broader.***

UNICEF's conceptual framework on nutrition developed in 1990 identifies the underlying causes of malnutrition. The framework illustrates that the causes of malnutrition are multi-faceted and takes into account insufficient access to food, inadequate maternal and child care, and insufficient health services. Causes are categorized as immediate (disease and inadequate dietary intake), underlying (food, health and care) and basic (control and use of resources). In the context of Southern Sudan, **food** insecurity is a chronic problem, mostly owing to decades of conflict, though also due to floods and drought throughout the region. The **health**-specific issues are substantial, generally stemming from the lack of access for the vast majority of the population to decent health facilities, water and a clean and sanitary environment. Finally, **care** in Southern Sudan, referring to the practices taking place with caregivers and receivers of care, is hindered due to social, physical and economic reasons.

- *<u>Consensus Finding 2A</u>.* A high burden of infectious diseases including malaria, diarrhea, and pneumonia is more severe in malnourished children than in others, and these infections worsen the severity of malnutrition that already exists.

Malnutrition and infection combine to have destructive results on health. Diarrhea is one of the leading causes of death and stems from poor hygiene and sanitation, caused and aggravated by a number of factors. Problems include the lack of potable water, access to water supply systems and sanitation facilities, as well as contaminated water and food[11]. Specifically in Southern Sudan, only one quarter of the population has access to an improved water source and an estimated 15% has access to sanitation facilities. These levels are less than one fourth the level of access in the rest of Sudan[12].

- *<u>Consensus Finding 2B</u>.* Many traditional beliefs and customs regarding infant and young child feeding are detrimental to nutritional status.

Poor nutrition and feeding habits often result from customary beliefs and perceptions. In Southern Sudan, there is generally low awareness of health related issues, due to various reasons including the lack of, or very low levels, of education. A large portion of the underlying causes of malnutrition are related to inadequate feeding and childcare practices including discarding colostrum, pre-lacteal feeds, lack of exclusive breastfeeding, inappropriate introduction of complementary feeding (timing and type), and distribution of food within the household contribute substantially to the high prevalence of malnutrition. For example, the majority of mothers in Southern Sudan believe that colostrum is considered dirty because of the difference in appearance to usual breast milk. Poor hygiene and health seeking behaviors contribute further to worsening malnutrition.

[11] Caulfield, Laura, and Mercedes de Onis, Monika Blossner, Robert E. Black. "Under-nutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles", American Journal of Clinical Nutrition, (July 2004).
[12] New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, "Toward a Baseline: Best Estimates of Social Indicators for Southern Sudan." In association with UNICEF (May 2004).

The 2004 Multiple Indicator Cluster Survey in Southern Sudan revealed that only approximately 30% of infants under six months are exclusively breastfed[13]. Mothers report difficulty in exclusively breastfeeding due to workload inside and outside the home. Additionally, reports show that often inappropriate complementary foods are introduced to infants either too early or too late. Even older children in Southern Sudan often eat only two meals a day, with an imbalanced diet lacking in vitamins and micronutrients. Inappropriate, and inadequate, introduction of complementary foods increase vulnerability to infections and can lead to growth failure. Often water and cow's milk are introduced to infants between the first and fourth months. Conversely, solid foods are introduced very late, often after twelve months of age. Porridge made of sorghum with milk, known as madida, is most commonly given as the first solid food, prepared with a thickness that leads to children feeling full when they have not eaten the proper quantity. Once a child is no longer breastfed, food intake remains problematic. The food intake of children under five is affected by the food insecurity in the region. The Southern Sudanese diet in general lacks sufficient fruits and vegetables. Women's heavy workload also negatively affects the availability of mothers for childcare and frequency of feeding[14].

- *Consensus Finding 2C*. Inequitable distributions of food within the house and gender roles have adverse effects on nutrition of young children.

Similar to other sub-Saharan African countries, women in Southern Sudan carry the burden of a heavy workload, early marriages, and bride prices. Gender roles and stereotypes add to the unequal distribution of resources. Women spend the majority of their time doing domestic chores such as fetching water, manually grinding sorghum and maize, and cooking food, all of which give little time for other activities. The patriarchal culture imposes restraints on women's interaction with men who are not relatives and defines what roles women carry out[15].

Female children, women of reproductive age and elderly women have a different, often lower, status in society than boys and men. Southern Sudan has the lowest ratio of female to male school enrollment in the world, with only one of every five school-aged children reported to be attending school, and three times as many boys as girls reported to be in school[16]. Disparities continue to adulthood as well; only 12% of adult women are literate as compared with 37% of adult men[17]. Early marriages, a common practice, can have harmful consequences for girls, including health problems, spousal abuse and the denial of education.

Women's health is negatively impacted as a result of gender bias. Even despite the impact of war on the male population, Southern Sudan is inconsistently experiencing a demographic phenomenon, with a higher population of elderly men than women. This is a result of poor women's health coverage and a high maternal mortality rate. The lifetime risk of dying in

[13] Ibid.
[14] Action Against Hunger (AAH / ACF), "The underlying causes of malnutrition in Old Fangak Payam: Central Upper Nile, Southern Sudan", (February 2004).
[15] International Republican Institute (IRI), "Women's Leadership Capacity in Southern Sudan: An Assessment by the International Republican Institute", (December 2003).
[16] New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, "Toward a Baseline: Best Estimates of Social Indicators for Southern Sudan." In association with UNICEF (May 2004).
[17] World Bank, "Sudan Health Status Report", (August 2003).

pregnancy or childbirth – one in nine – is almost four times the rest of Sudan[18]. The gender gap also affects the distribution of food in the household since women bear the burden of work at home and often outside of the home and do not have equal access to food.

***<u>Consensus Finding 3.</u> Causes of high rates of malnutrition vary widely by area, ethnic group, and livelihood/ecological zone, but there is some notable uniformity.***

Southern Sudan is comprised of seven major ecological zones, each with varying land formation, environmental distinctions, harvest periods, crop production, livestock grazing behaviors, income generation activities, and food vulnerabilities. The climate and geography of the region, and Sudan as a whole, is diverse. Southern Sudan differs almost completely from the hyper-arid deserts of the north. Within the massive land area in the south, the southern states show significant similarities and differences. Characteristics of ecological zones are included in the attached Annexes.

**Rural Livelihood Zones of Southern Sudan:**

- Green belt
- Ironstone plateau
- Hills and mountains
- Arid / pastoral
- Nile / Sobat rivers
- Western flood plains
- Eastern flood plains.

Muchomba and Sharp (2006) have presented a comprehensive description of livelihood zones in a report of the Southern Sudan Centre for Census, Statistics and Evaluation (SSCCSE) and Save the Children UK[19]. They describe how households in Southern Sudan rely on a mixture of agriculture, wild food gathering, and hunting, fishing, livestock keeping and bartering and exchanging as the basis for their livelihoods. Availability and access to food differs according to livelihood zone, wealth, and season. Annex 1 shows the contributions of different food sources in each livelihood zone from 1999-2002, divided by three wealth groups. Annex 2 exhibits the seasonal calendar for Southern Sudan in 2007, showing periods of harvest and rainfall. The Famine Early Warning Systems Network (FEWSNET) from June-August 2007 in Annex 3 also provides a good picture of the current food security situation in Southern Sudan[20]. Finally, Annex 4 lays out detailed characteristics and descriptions of each livelihood zone.

The quality of the diet in Southern Sudan is generally poor. The majority of the population rely on sorghum or maize and either cow or goat milk. These staple foods are usually consumed throughout the year, with seasonal disparities. To a lesser extent, the following foods are also eaten depending upon ecological zone and seasonal availability: fish, meat (cow, sheep and goat), pumpkin, sesame (or simsim), okra, and wild foods such as fruits, leaves and roots. The availability of the non-staple foods varies greatly throughout Southern Sudan, but the majority of diets are not sufficiently diversified. Nutrition surveys have also presented higher rates of malnutrition during specific periods of the year, including the "hunger period" of March through

[18] New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, "Toward a Baseline: Best Estimates of Social Indicators for Southern Sudan." In association with UNICEF (May 2004).
[19] Muchomba, E. and B. Sharp. Southern Sudan Centre for Census, Statistics and Evaluation (SSCCSE), "Southern Sudan Livelihood Profiles: A Guide for Humanitarian and Development Planning." ECHO, FEWS NET, Save the Children UK (2006).
[20] Famine Early Warning Systems Network (FEWS NET), "South Sudan Food Security Outlook and July Food Security Update", (June to August 2007).

September[21]. During seasonal peaks, the prevalence of GAM is often double the WHO cut-off for emergencies of 15%.

The consensus findings presented in this report conclude that malnutrition affects households throughout the entire region of Southern Sudan and has not shown any sign of improvement over the past years. Causes point to the lack of proper nutrition, micronutrient deficiencies, poor hygiene and sanitation, customs and beliefs leading to negative infant and young child feeding practices, inequitable distribution of food, and finally, seasonal climate.

***Consensus Finding 4. Important information gaps in the nutrition data exist.***

In addition to the MOH assessment of programs proposed in 2007, developing evidence-based nutrition policy and programs will require information on:

1) Prevalence of micronutrient deficiencies.
2) Customs, beliefs, and behaviors that affect nutrition in each livelihood zone, including food consumption patterns in different states.
3) Further detailed information on the availability of micronutrient-dense foods.

This information can be used to support the Ministry of Health, develop appropriate target-specific behavior change and communication activities and make a more sustainable impact in the area of nutrition in Southern Sudan.

[21] Famine Early Warning Systems Network (FEWS NET), "South Sudan Food Security Outlook and July Food Security Update", (June to August 2007).

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**ANNEX 1:**

1) Nutrition Indicators for Southern Sudan, Sudan and Peer Group

| | Nutrition | | | | | | |
|---|---|---|---|---|---|---|---|
| **INDICATOR** | % of under fives (1995-2001) suffering from wasting (w/h) moderate & severe | Prevalence of under five child malnutrition, underweight, weight/age, 1995-2001 | % of under fives (1995-2001) suffering from underweight (weight/age), severe | Prevalence of under five child malnutrition, stunting, height/age, 1995-2001 | Exclusive breastfeeding, % children under 6 months, 1995-2001 | Consumption of iodized salt, % households, 1987-2002 | Vitamin A supplementation, % of children 6-59 months, 2000 |
| **SOSUS** | 21.5 | 48 | 21 | 45 | >30 | 40 | 16 |
| **Sudan** | xx | 17 | 7 | 34 | 13 | 1 | 99 |
| **Chad** | 12 | 28 | 10 | 28 | 10 | 58 | 99 |
| **C.A.R** | 9 | 24 | 6 | 39 | 17 | 87 | 100 |
| **D. R. Congo** | 13 | 31 | 9 | 38 | 24 | 72 | 93 |
| **Uganda** | 4 | 23 | 5 | 39 | 65 | 95 | 42 |
| **Kenya** | 6 | 23 | 7 | 37 | 5 | 91 | 90 |
| **Ethiopia** | 11 | 47 | 16 | 52 | 55 | 28 | 65 |
| **Niger** | 14 | 40 | 14 | 40 | 1 | 44 | 92 |
| **Afghanistan** | 25 | 48 | xx | 52 | xx | xx | 70 |
| **Extreme** value (non SOSUS) | 25 | 60 | 18 | 60 | 1 | 0 | 7 |
| **Extreme** Country | Afghanistan | DPR of Korea | India | DPR of Korea | Niger | Cuba | Syria |
| **Worst of all** | Second | Second | SOSUS | | | | |
| **MAIN SOURCE** | SOWC | SOWC/ HDR2003 | SOWC | SOWC/ HDR2003 | SOWC/ WDI | WDI | WDI |

*Source: New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, May 2004

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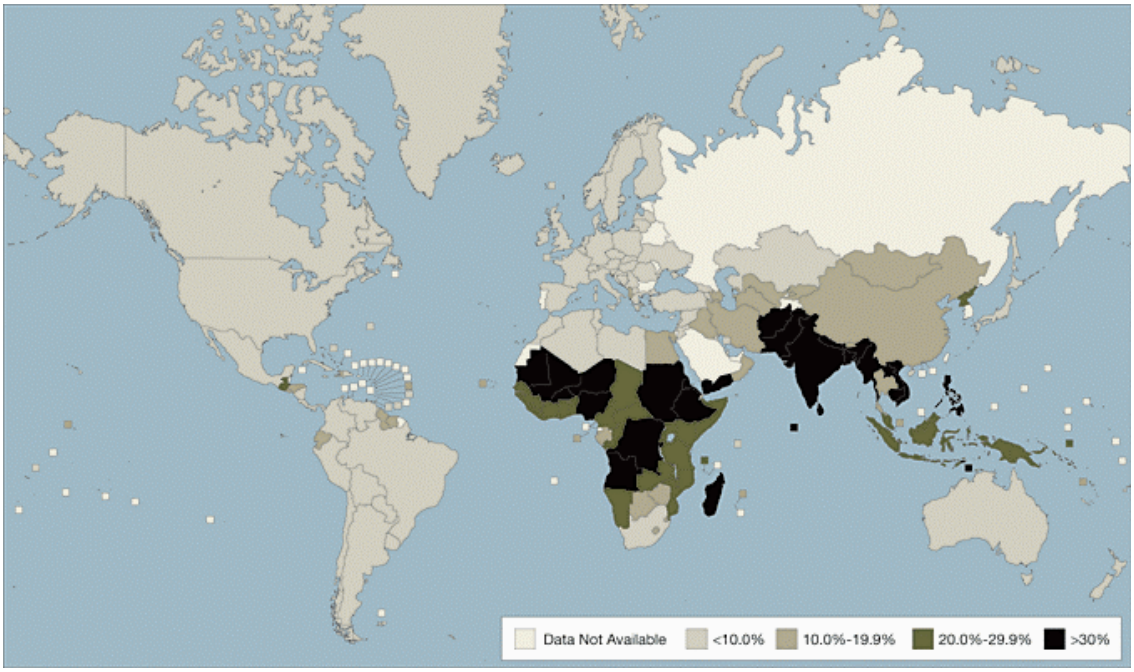
2) Geographical Pattern of Underweight in Children Younger Than 5 Years




*Source: New Sudan Centre for Statistics and Evaluation (NSCSE) Series Paper, May 2004