

# **An Epidemiological Analysis of Malnutrition, Morbidity and Mortality Rates in the Darfur Humanitarian Crisis, Sudan 2003-2005**

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I dedicate this thesis to the memory of my teen brother, Joseph Mwangi Muthee.  
Forever in my heart and in my thoughts.

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## **Definitions**

### **Complex humanitarian emergencies**

Complex humanitarian emergencies are defined as “situations in which mortality among the civilian population substantially increases above the population baseline, either as a result of the direct effects of war or indirectly through increased prevalence of malnutrition and/or transmission of communicable diseases, particularly if the latter result from deliberate political and military policies and strategies” (Salama *et al*, 2004)

### **Global Acute Malnutrition (GAM)**

Global acute malnutrition (GAM) is defined as either a weight-for-height of less than - 2 standard deviations below the mean of the CDC/NCHS/WHO reference population and/ or with bilateral oedema or a weight-for-height less than 80% of the reference population median and/ or with bilateral oedema.

### **Severe Acute Malnutrition (SAM)**

Severe acute malnutrition (SAM) is defined as weight-for-height more than 3 standard deviations below the reference mean (Z-score less than -3) or less than 70% of the reference median. All children with edema are classified as having severe acute malnutrition

### **Oedema**

The presence of excessive amounts of fluid in the intercellular tissue. It is the key clinical sign of kwashiorkor, a severe form of protein-energy malnutrition, carrying a very high mortality risk in young children.

### **Crude Mortality Rate (CMR)**

The rate of death in the entire population, including both sexes and all ages. The CMR can be expressed with different standard population denominators and for different time periods, e.g. deaths per 1,000 population per month or deaths per 1,000 per year, or per 10,000 per day

**Under-5 Mortality Rate (U5 MR)**

The rate of death among children below 5 years of age in the population. Express as the number of deaths per ten thousand children under five years old per day in an emergency setting.

**Cause-specific mortality rates**

The proportion of deaths attributable to a specific disease or cause

## List of Acronyms

ACF	Action Contre la Faim
AMIS	African Mission in Sudan (African Union)
ANA	Annual Needs Assessment
ARI	Acute Respiratory Infection
CMR	Crude Mortality Rates
CP	Cooperating Partner (WFP)
CPA	Comprehensive Peace Agreement
EMOP	Emergency Operation (WFP)
FAO	Food and Agriculture Organisation of the United Nations
FCND	Food Consumption and Nutrition Division (IFPRI)
FMOH	Federal Ministry of Health
FSNSP	Friedman School of Nutrition Science and Policy (Tufts University)
GAM	Global acute malnutrition
GNUS	Government of National Unity of the Sudan (since 2005)
GOS	Government of the Sudan (pre-2005)
HAS	Humanitarian Air Service (WFP)
IDP	internally Displaced Person
IFPRI	International Food Policy Research Institute
IOM	International Organization for Migration
IRIN	Integrated Regional Information Network
IRIN	Integrated Regional Information Networks
JEM	Justice and Equity Movement
MOH	Ministry of Health (GOS/GNUS)
NICS	Nutrition information in conflict situations
OLS	Operation Lifeline Sudan (a WFP EMOP for Sudan)
PPS	Population Proportional to Size
SAM	Severe acute malnutrition
SCN	Standing Committee on Nutrition of the UN system
SC-UK	Save the Children – United Kingdom
SC-US	Save the Children – United States
SLA	Sudan Liberation Army
SO	Special Operation (auxiliary to a WFP EMOP)
SPLA/M	Sudan People’s Liberation Army/Movement
U5MR	Under Five Mortality Rates
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children’s Fund
UNMIS	United Nations Mission in Sudan
UNOCHA	United Nations Office for the Coordination of Humanitarian affairs
UNSECORD	United Nations Security Coordinator
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization

## **Executive Summary**

This study was funded by the International Food Policy Research Institute through the USAID university linkage program and looked at mortality, morbidity and malnutrition rates in the Darfur conflict and how they were affected by the humanitarian intervention from 2003 through 2005. It also looked at how the intensity and type of humanitarian intervention affected vulnerability among displaced and affected residents as well as the various ways that relief services could have been made more effective in reducing vulnerability to food insecurity.

Although the mortality, morbidity and malnutrition surveys were not directly comparable due to differences size, they nevertheless offered an important understanding of the impact of the humanitarian intervention. It was found that global acute malnutrition rates mostly remained high and above emergency thresholds, but severe acute malnutrition rates remained mostly below the emergency threshold, which could have been due to deaths of the most vulnerable children or amelioration of their health (into the global acute malnutrition category or above) attributable to the humanitarian assistance.

Abu Shouk camp was studied to showcase the cyclical nature of malnutrition and mortality among children under five in Darfur. During the hunger periods in 2004 and 2005, the camp experienced remarkably high global acute malnutrition and under-five mortality rates, both of which “significantly” improved after the harvesting season. This was also consistent with the explanation that severely malnourished children either died during the hunger period or the health of surviving children was improved by both the humanitarian assistance and/or increased access to food during the harvesting season.

The study found evidence to suggest that the humanitarian assistance intervention was effective in decreasing malnutrition and mortality rates in Darfur once it got under way in February 2004 as there was a general reduction of global acute malnutrition, severe acute malnutrition, crude mortality rates and under-five mortality rates.



## Background of Conflicts in Sudan

Since independence from the British in 1956 Sudan has experienced numerous civil wars, insurrections and insurgencies in the East (Kassala), West (Darfur), Center (Nuba Mountains), and in the entire Southern sector. The grievances and reasons for armed rebellion have partly stemmed from marginalization of entire regions by the Khartoum government, making failure of governance a primary cause of armed conflict in Sudan. The largest and longest civil wars have been between the government of Sudan (GOS) and rebel movements in the South, notably the Sudan People's Liberation Army (SPLA). The first Sudanese civil war was fought between the North and South (1955 -1973) and ended with the signing of the Addis Ababa Agreement, which was followed by ten year peaceful hiatus. In 1983 president Jaffar Nimeiri abrogated the Addis Ababa Agreement, federated the Sudan and attempted to introduce Sharia Law in the South, which led to a mutiny in Bor County that was led by Colonel John Garang and which later spread to eventually become the longest civil war in the modern history of Africa. The conflict spawned the SPLA and resulted in the loss of more than 2 million lives before a peace treaty was signed on 9<sup>th</sup> January 2005 in Machakos, Kenya. Before the civil war ended, contemporaneous insurgences raged on in the West (Darfur) and in the East (Kassala), and have persisted to date.

The current political boundaries of Greater Darfur were carved out after the implementation of the federal system in Sudan in 1994. The region was split into three states: North, South and West Darfur, and each state was divided into jurisdictions called *Mhalia* which are led by the equivalent of a commissioner. The population of Greater Darfur is about 5.9 million people, with South Darfur being the most densely populated with about 2.8 million people followed by West Darfur and North Darfur with 1.6 and 1.5 million respectively.

The current conflict in Darfur begun in April 2003 when the Sudanese Liberation Army (SLA) attacked an airport in El Fasher, the capital of North Darfur, and took over the vital military outpost, destroying government military aircraft and killing around 100 government soldiers (Coalition for International Justice, 2006). This signaled to the

government that the SLA could no longer be considered an outfit of bandits, but rather had become a serious contender of political capital in Darfur.

## **Introduction**

The complex humanitarian emergency and crisis in Darfur has both been described as the worst humanitarian crisis in the world. In February 2004, the term “genocide” entered the international legal and political lexicon describing the Darfur crisis. The conflict is characterized by many facets that make it complex and multi-dimensional: with fighting going on between government forces and different rebel groups, among different rebel groups, between elements of the same rebel group (SLA/M), between different tribal elements, between nomads and sedentary tribes, between the notorious government allied militia (Janjaweed) and “African tribes” etc. Like many African conflicts, the root causes of the conflict could be traced as far back as the 19<sup>th</sup> century, and they include economic and political marginalization, an environment that produces ethnic and armed militia and manipulation of ethnic identities by the GOS which led to a collapse of institutions and development (Young *et al*, 2005)<sup>1</sup>.

Information on affected and displaced people from the Darfur Humanitarian profiles and other sources indicate that the insecurity and conflict was on the increase from the start of the conflict to the end of 2005. The number of displaced people increased from about 140,000 in 2003 (Guha-Sapir and Degomme, 2005)<sup>2</sup> to 1.8 million by 2005, while the affected population increased from about 500,000 to 1.8 million people from the end of 2003 to the end of 2005 (Darfur Humanitarian Profiles).

The humanitarian response in Darfur has been hampered by insecurity, travel restrictions for aid workers imposed by the GOS, denial of access to vulnerable people by rebel groups, poor infrastructure and lack of access to vulnerable people during the rainy season and killings of both humanitarian aid workers and peace keepers.

The WFP begun to deliver food in Darfur in 2002 under the pre-existing Operation Lifeline Sudan (OLS) and scaled its operations in June 2003. In April 2005, a

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<sup>1</sup> Young, H., Osman, A.M., Aklilu, Y., Dale, R., Badri, B. and Fuddle, A.J.A. (2005) Darfur – Livelihoods under Siege. Feinstein International Famine Center, Tufts University.

<sup>2</sup> Guha-Sapir and Degomme (2005), figures given for September 2003

specific Emergency Operation (EMOP 10339: "Food Assistance to Populations Affected by War in Greater Darfur") was launched and it continued to be one of the largest emergency operations in the agency's history. The EMOP is supported by several auxiliary Special Operations (SOs) – an air transport operation (HAS SO 10183.3) and logistic support (SO 10371). Delivering food to millions of displaced people in Darfur is a complex and costly task for the WFP and its partner organizations. As of 31<sup>st</sup> December 2005, WFP EMOP 10339 in Darfur had received and spent a total of US\$ 449 million and incurred an internal debt of US\$ 77 million borrowed against forecasted contributions to ensure food availability to beneficiaries.

In addition to reasons that hamper humanitarian response in Darfur, food delivery by the WFP was seriously hindered by lack of diesel and jet fuel during the annual shut down of the oil refinery in Khartoum for maintenance, lack of sufficient railway wagons, a disagreement with the Sheiku transport company over railway wagons, transporters reneging on contractual obligations, rising costs of primary transportation (from Port Sudan to delivery hubs in El Obeid etc), banditry, theft of relief food and delays in unloading food shipments in Port Sudan (WFP weekly situation reports, 2004, 2005). The WFP estimated that it took about two months to deliver food supplies to Darfur from Port Sudan and the intervening factors that hampered food deliveries put the operation at risk of pipeline breaks. To overcome this, a new supply route through Port Bengazi in Libya was negotiated to augment air and road deliveries and ensure more timely deliveries.

There is currently no end in sight to the on-going conflict in Darfur. Due to the destruction of both livelihoods and coping mechanisms, many of the currently displaced and vulnerable populations will continue to depend on relief food during a post-conflict or rehabilitation phase. A better understanding of the effects of the internal conflict on food security related issues is important to stakeholders in both the policy and humanitarian relief arenas in the following ways: to give an indication of the level of access to and availability of food for vulnerable people in Darfur, serve as an indicator of the extent to which social and human capital components of sustainable livelihoods have been destroyed or disrupted, give useful insights on project design in the current emergency and relief phase, and may possibly give an indication of the magnitude of

the response required in a reconstruction or development phase when the emergency comes to an end.

## **Scope and objectives of the study**

This study looked at the correlates between mortality, morbidity and malnutrition rates in Darfur from 2003 through 2005 and contemporary events, especially insecurity, and how they affected access to and availability of food for both internally displaced people (IDPs) and refugees. It also looks at how the intensity and type of humanitarian assistance and insecurity affected malnutrition, morbidity and mortality rates among vulnerable people in Darfur and investigates if the proper portfolio of interventions was applied to reduce vulnerability in the protracted conflict.

### **The specific objectives of the study are to:**

- Analyze Global Acute Malnutrition (GAM) and Severe Acute Malnutrition rates (SAM), Crude Mortality Rates (CMR) and under-five mortality rates in Darfur (April 2003 to December 2005), and correlate trends with contemporary events.
- Analyze humanitarian interventions carried out by the lead agency for food aid distributions, WFP to determine whether data from malnutrition, morbidity and mortality surveys was effectively used in the planning and design of humanitarian interventions in Darfur.
- Find out various ways that the humanitarian relief could have been made more effective in reducing the vulnerability of displaced and affected people in Darfur
- Attempt to determine the empirical effects of war and ethnic cleansing on food security in Darfur.

## **Methods**

A tentative list of surveys carried out in Darfur between 2003 and 2005 was obtained from the Nutrition Information in Crisis Situations (NICS) at the UN Standing Committee on Nutrition (SCN) website. Agencies that carried out the surveys were contacted with a request to share copies of the reports. A total of 82 survey reports were obtained either directly from the organizations or from websites where available.

Each survey report was screened to ensure that sound survey research and statistical methods were employed. The surveys were screened with the following considerations:

- Only surveys that employed random sampling that was representative of the parent population (or were exhaustive – including everyone in the parent population) were selected. Those that employed convenient samples or non-probabilistic sampling schemes were eliminated (thus all rapid assessment survey reports were eliminated)
- Reports that excluded confidence limits from reported statistics were excluded (some surveys reported confidence bands that contained zero and *still* reported a positive number for the statistic in question: such statistics were reported as zero to reflect an interpretation consistent with a confidence band that contains zero, i.e., no effect/difference)
- Reports were checked to ensure that the following indices were employed: weight for height index (expressed as z-scores or percentage median) as a composite measure of acute malnutrition (wasting), retrospective mortality rates with a specified mortality recall period and with the mortality rate expressed as the number deaths per 10,000 people per day (or convertible to the number of deaths per 10,000 people per day).
- Reports were also checked for use of a “proper” sampling scheme. Most reports rigorously employed the two-stage sampling cluster (30 by 30), which they referred to as a “standard”. However some surveys, like the WHO/MOH survey in Kalma (South Darfur, August 2004) and various surveys done by ACF, employed a systematic random sampling when it was more efficient to do so (e.g. when the population was not sufficiently spread out to allow a 30 by 30 two-stage cluster survey). For a two-stage cluster surveys the sample size was checked to ensure that it was above or close to the recommended 900 children (for nutrition surveys) and 450 for systematic random sampling (assuming a design effect of 2.0)

Sixty-four survey reports remained after screening and the following information was obtained from each: Location of survey, date of data collection, agency undertaking the survey, sample size, number of clusters, if sampling method was probabilistic, use

of population proportional to size (PPS), GAM and SAM rates for both children between 6-59 months and 6-29 months, mortality recall period, CMR, under five mortality rates, measles vaccination coverage for children under five, prevalence of diarrhea and Acute Respiratory Infections (ARI) and if the survey respondents were displaced people, residents or both.

These variables were then analyzed in view of the historical events<sup>3</sup> that affected access to and availability of food for affected residents and displaced people in Darfur.

### *Historical narrative of events in Darfur (2003-2005)*

Information on the historical narrative in Darfur was obtained from the following sources: WFP Darfur weekly situation reports (2004 through 2005), UN Darfur situational reports, news items from Reuters, Associated Press, African Union news highlights, British Broadcasting Corporation (BBC), PANA Press, UN News Center, IRIN etc. Information on the estimated number of displaced people and affected residents in Darfur and gaps in food, sanitation and clean water were abstracted from the Darfur Humanitarian Profiles (Office of the United Nations Resident and Humanitarian Coordinator for the Sudan).

## **Study limitations**

- Mortality, morbidity and nutrition surveys employed in this study had different sampling frames. Some covered the entire of Greater Darfur, while others covered an entire state within Darfur while some covered individual IDP camps, making it difficult to directly compare them.
- The validity (extent to which a variable measures what it is meant to measure) of mortality, morbidity and nutrition surveys was not rigorously established, as in, say, Prudhon and Spiegel (2007). Such an exercise was outside the scope of the study, and as such, survey statistics were assumed to be valid.
- Several agencies sent surveys that they said had not been internally validated. Such surveys were screened in the same manner as the all others.

- Some organizations did not respond favorably to requests to share their survey reports, leaving some surveys missing from the analysis. It is also plausible that some organizations did surveys that were not publicized and whose existence was unknown. These too were not part of the study.
- The study used data and information from the UN Sudan Humanitarian Profiles which could be rough estimates rather than precise data. It is plausible that figures given in the profiles were of a different consistency as expertise of data collectors improved with time. The humanitarian profiles as provided online contained many inconsistencies in the way gaps in the provision of food, clean water or sanitation were calculated from month to month, but the study was consistent, which may lead to some deviations from what is reported in the humanitarian profiles.

## Results and discussion

### *Epidemiological Surveys in Complex Emergencies: Role and Evolution*

The essence of a humanitarian relief response is to save lives, decrease vulnerability (to insecurity, disease and hunger) among the affected populations and to prevent further degradation of public health through provision of food, basic shelter, clothing, creation/ management of camps, etc. Surveys are instrumental in measuring the public health concerns that are directly and indirectly targeted by humanitarian aid agencies. Nutritional status and mortality rates are now widely used as essential indicators to assess the degree of severity of a crisis, to follow trends, and to guide decision making, which includes the allocation of funds (Prudhon and Spiegel, 2007). Bostoen *et al* (2007) aptly describe health surveys as “the stethoscope, thermometer and pressure gauge of global health”.

Both malnutrition and morbidity rates are easily defined and are important outcomes of public health concerns in an emergency setting. Elevated malnutrition, morbidity and mortality rates are important to public health policy makers as they

provide a general picture of the health status of the population and could indicate underlying public health problems.

Cross sectional, population-based surveys are often the most appropriate methods for collecting representative data, such as prevalence of acute malnutrition, immunization coverage, and retrospective mortality rates of populations during complex emergencies (Spiegel and Salama, 2004). With a few exceptions, mainly by Action Contre la Faim (ACF) and for good reasons, most of the surveys analyzed in this study used cluster surveys: which are commonly used in humanitarian emergencies because of their “purported simplicity, reasonable validity, and precision” (*Ibid*, Spiegel, 2007). They require only approximate estimates of the relative sizes of the population units (e.g., villages) sampled and no lists of individuals or households are necessary as required with simple random or systematic sampling. Cluster sampling has also been validated for estimating immunization coverage and nutritional status (*ibid*).

“Principles of epidemiology and public health began to be systematically applied in complex emergencies only in the late 1970s, coinciding with the flight of millions of refugees from Afghanistan to Pakistan and from Cambodia to Thailand” (Salama *et al*, 2004<sup>4</sup>). A lot has been learned in reducing morbidity and case fatality rates in complex emergencies since that time, and the most effective measures for achieving this goal include a wide range of protection and public health interventions including “protection from violence, provision of adequate food rations, clean water and sanitation, control of diarrheal diseases, measles immunization, maternal and child health care including the case management of common endemic communicable diseases and selective feeding programs” (Toole and Waldman, 1997).

By doubling the baseline mortality rate for countries in sub-Saharan Africa, Toole and Waldman (1997) proposed a quantitative crude mortality rate threshold of one death per 10,000 people per day to define the acute phase of a complex emergency in Sub-Saharan Africa. This has become useful in emergencies when there is no local baseline data, as a tool for comparison between different emergencies and for monitoring trends during an emergency (Salama *et al*/2004).

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<sup>4</sup> Peter Salama, Paul Spiegel, Leisel Talley, Ronald Waldman: Lessons learned from complex emergencies over past decade. *Lancet* 2004; 364: 1801–13



Case specific mortality and morbidity rates are useful in informing aid agencies about the kind of public health intervention required to rectify, restore or prevent further deterioration of public health. In particular, it is known that “the four leading causes of mortality in refugee and displaced populations are measles, diarrheal diseases, acute respiratory infections (ARI) and malaria (Toole and Waldman, 1990, 1997), which have led to grave situations with remarkably high mortality rates in the past, for instance crude mortality rates “as high as 80 times the baseline rates” have been reported in some complex humanitarian emergencies in Africa (Toole and Waldman, 1997<sup>5</sup>). Morbidity in camp settings is exacerbated by malnutrition (which lowers immunity to disease among malnourished children and adults) and overcrowding (which increases the likelihood of infection especially in young children). Knowledge from case specific mortality rates has led aid agencies to develop priority “prescriptions” for public health interventions in refugee and camp settings, which include measles vaccination and treatment and prevention /treatment of malaria, diarrheal diseases and ARI.

The exact number of people who have died in Darfur will never be known. Various mortality estimates with varying degrees of exactitude have been declared. These include 396,563 by the Coalition for International Justice (February 2003 - April 2005), 180,000 by UNOCHA (October 2003 - March 2005), between 35,000 and 70,000 by the WHO (June -August 2004), 300,000 by a UK parliamentary report (unknown recall period, announcement in March 2005) etc.

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<sup>5</sup> MJ Toole and RJ Waldman: The Public Health Aspects of Complex Emergencies and Refugee Situations, 1997. *Annu. Rev. Public Health* 1997. 18:283–312

## MALNUTRITION

Food insecurity in Darfur was exacerbated by the conflict, but relatively high rates of malnutrition existed before the conflict. The Sudan Annual Needs Assessment (ANA) of 2004 gives an indication of existing malnutrition rates between 1999 and 2003 (see table below), which were relatively high and without doubt affected the long term public health status of the population in Darfur, especially micro-nutrient deficiencies and the prevalence of stunting and underweight children. Insecurity and the subsequent massive displacement of the population was a shock to their food security status. This study looks at prevalence of wasting among the several million vulnerable people – both displaced and affected populations – in Darfur in order to understand how their access to food was affected by the conflict and whether the relief intervention ameliorated their food security status. “Wasting indicates current or acute malnutrition resulting from failure to gain weight or actual weight loss. Causes include inadequate food intake, incorrect feeding practices, disease or infection or, more frequently, a combination of these factors” (Cogill, Fanta Report 2003).

Although the surveys are not directly comparable due to the difference in size, they nevertheless offer an understanding of the impact of both the humanitarian intervention and insecurity on the food security status of the affected camp or locality they cover.

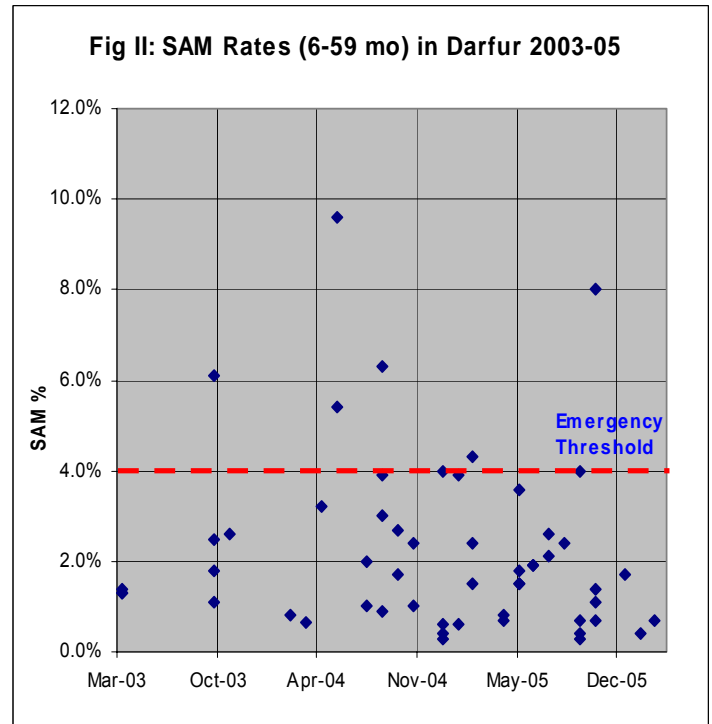
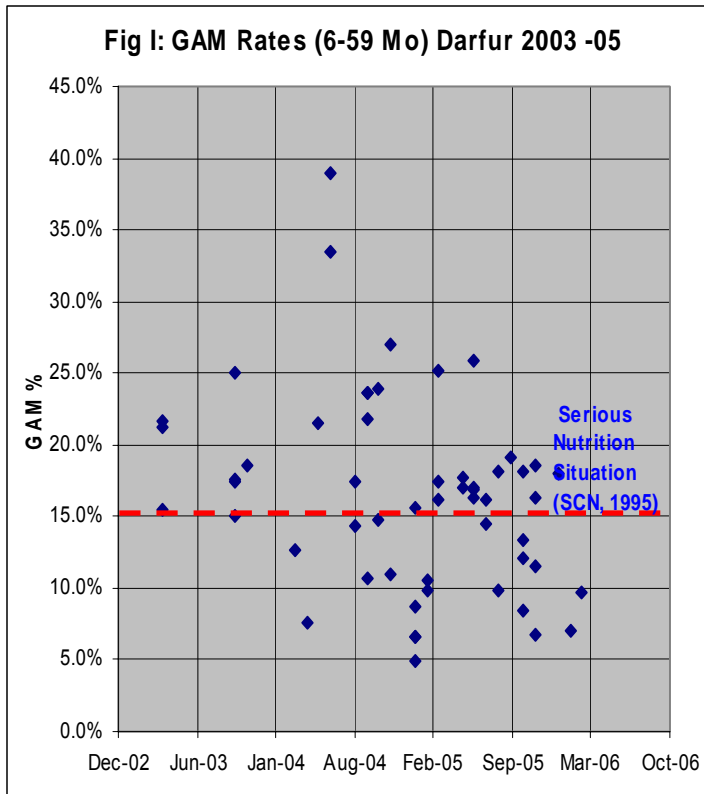
Table I

	<b>Malnutrition Rates</b>				
<b>Year</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
South Darfur (low rainfall areas)	20	9.3	23	24.4	25.6
North Darfur	15	25	23.4	27	25.4

Source: Sudan annual needs assessment 2003/2004

Scatter plots of both the GAM and SAM rates reveal that GAM rates remained generally high and above the “serious nutrition situation” threshold of 15% (UN Standing Committee on Nutrition, 1995) as many communities continued to live in an emergency

phae, but SAM rates remained largely below the emergency threshold (see figures I and II).



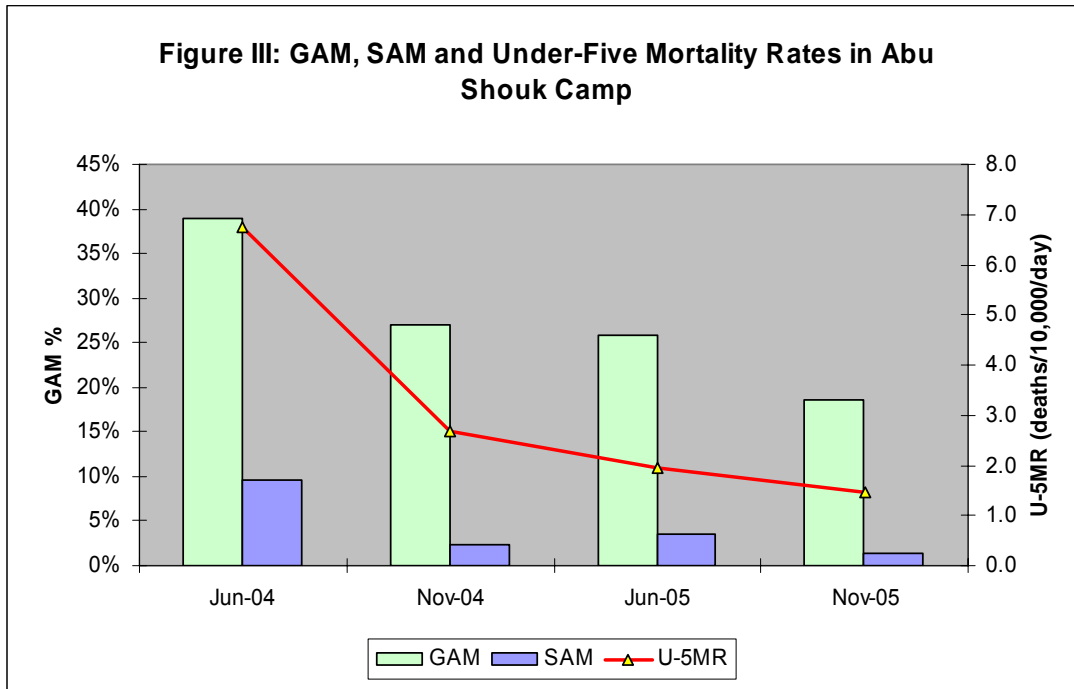
The highest reported GAM rate was 39% reported by ACF in Abu Shouk camp in North Darfur in June 2004 (extreme outlier in figure I). A longer list of GAM rates obtained from the CRED database<sup>6</sup> revealed GAM rates of 52.8 and 62% which were also reported by ACF in the same month (June 2004) in camps in North North Darfur (information on individual camps is unavailable from CRED).

### Malnutrition cycle

“Wasting in individual children and population groups can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence to which it is very sensitive” (Cogill, Fanta Report, 2003). To investigate the cyclical nature of malnutrition rates through the annual hunger and harvesting seasons, a relatively large camp, Abu Shouk located in El Fasher, was chosen as a case study.

<sup>6</sup> The studies’ methodologies could not be verified as the survey reports were unavailable

The camp population estimates varied between 50,000 and 71,000 people at various points in 2004 and 2005 (Darfur Humanitarian Profiles). The camp experienced some of the highest malnutrition rates in 2004 and 2005 and a trend analysis of the GAM, SAM and under-five mortality rates is shown in figure III.



Surveys done by ACF reveal remarkably high malnutrition rates combined with high morbidity rates in the period before the hunger seasons, especially in 2004 when the GAM, SAM, and under-five mortality rates were 39%, 9.6%, and 6.76 deaths per 10,000 per day, respectively. About five months later in November 2004<sup>7</sup> the GAM rate had decreased 12 percentage points, the SAM rate decreased by 7.2 percentage points and the under-five mortality rate decreased to 2.67 deaths per 10,000 per day. The same cycle is repeated in 2005, but both the malnutrition and mortality rates are not as remarkably high as in 2004, partly because the efforts of the humanitarian intervention were paying after the UN and other aid agencies started operations in the spring of 2004.

This cycle of high malnutrition and mortality rates at the beginning of the hunger period and amelioration towards the end of the year is consistent with several

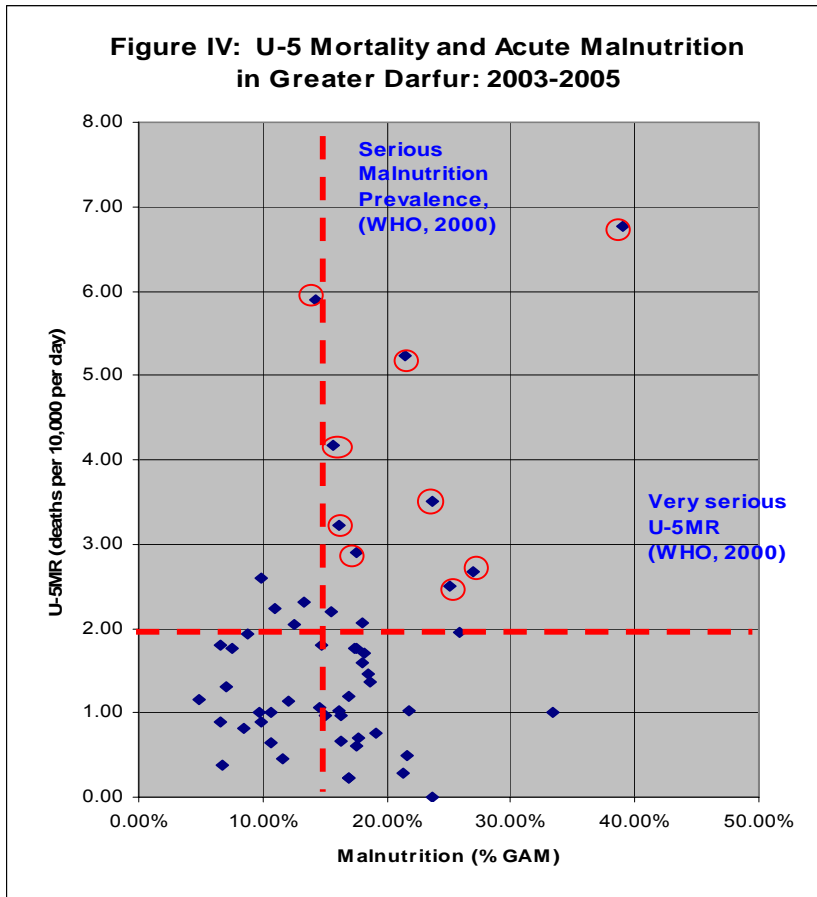
<sup>7</sup> The survey done November 2005 included both Abu Shouk and As Salaam camps

explanations: that the most vulnerable children die off during the hunger period, lowering both the under-five mortality and malnutrition rates in consequent surveys (recall periods of all retrospective mortality surveys were less than 3 months), improved child health was due to effect of supplemental (and/or therapeutic) feeding, as well as the fact that the health of surviving children may have been ameliorated by increased amounts of food during the harvesting period (occurring towards the end of the year).

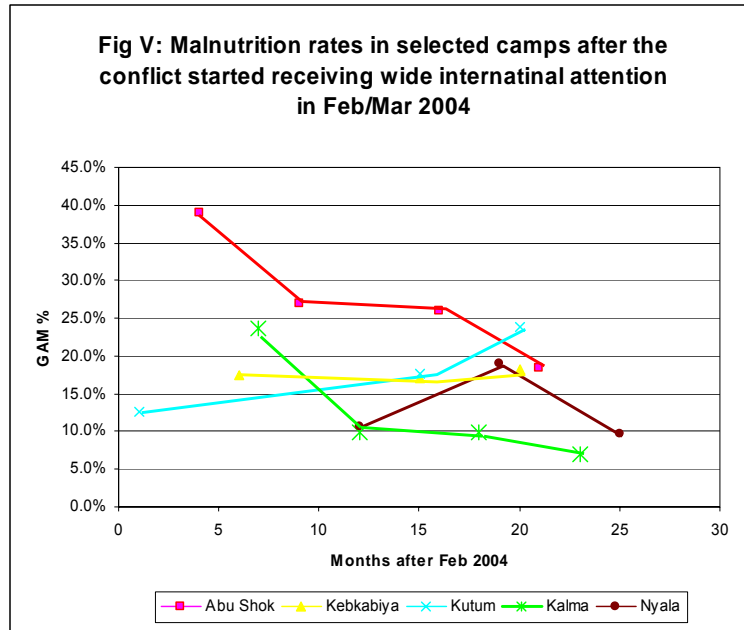
### ***Malnutrition and mortality in children under-five***

Younger children are likely to suffer more frequent and more severe incidents of disease than older age groups. In an emergency like Darfur, morbidity rates in children under five are exacerbated by malnutrition: which underscores the importance of programs to lower malnutrition rates in emergencies due to the nature of the complex relationship between disease and malnutrition. Malnourished children have low immunity against diseases like diarrhea, measles, malaria, respiratory infections etc, which in turn decreases their appetite and further increases their malnutrition status, which further lowers their immunity to diseases and increases their susceptibility to more infections, starting a downward spiral of the interplay between disease and malnutrition which could end in the death of the child in the absence of any intervention.

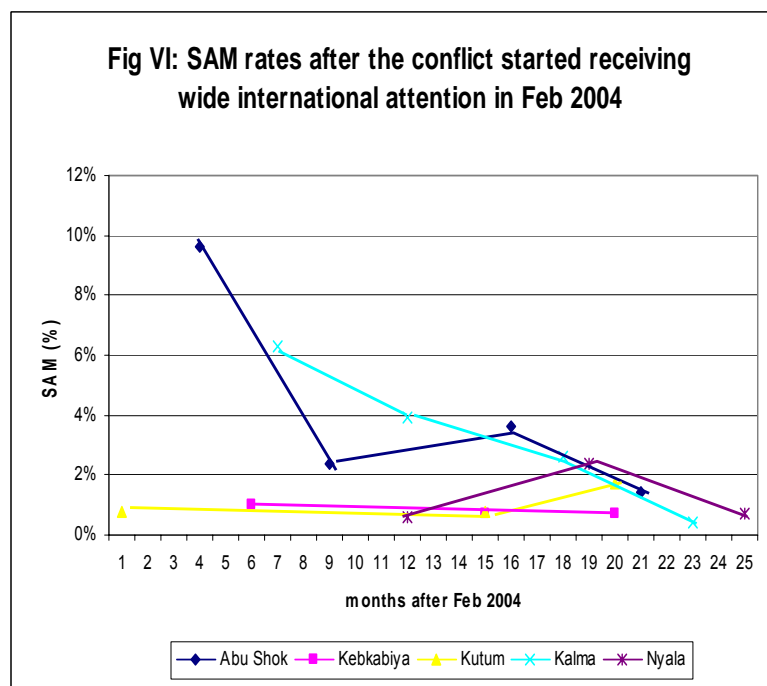
The WHO (2000) classifies malnutrition prevalence above 15% as a “serious”, while an under-five mortality rate above 2 deaths/10,000/day is classified as “very serious”. A bivariate scatter (figure IV) of under-five mortality and malnutrition rates indicate that eleven surveys in the study had simultaneous high GAM and under-five mortality rates above the threshold of “serious” and “very serious” prevalence, respectively. Six surveys had a combined situation of “very serious” under-five mortality rates and malnutrition rates below the “serious” threshold while twenty two surveys had a combined situation of “serious” GAM rates and an under-five mortality rate below the “very serious” threshold.



Abu Shouk camp, whose trend line is shown in figure III, is the extreme outlier in figure IV and had the highest GAM and under five mortality rate in June 2004 (GAM= 39%, U-5MR= 6.76) and also in November 2004 (GAM= 27.0% and U-5MR= 2.67). Other areas/camps with high GAM rates above “serious” and U-5 mortality rates above “very serious” classifications include Wade Saleh and Mukjar Provinces in May 2004 (GAM =21.5%, U-5MR = 5.23), Kalma Camp in September 2004 (GAM 23.6%, U-5MR= 3.5), Kebkabiya in August 2004 (GAM = 17.5%, U-5MR= 2.9) and the Pastoral el Malha Food Economy Zone in October 2003 (GAM= 25.0%, U-5MR=2.5).



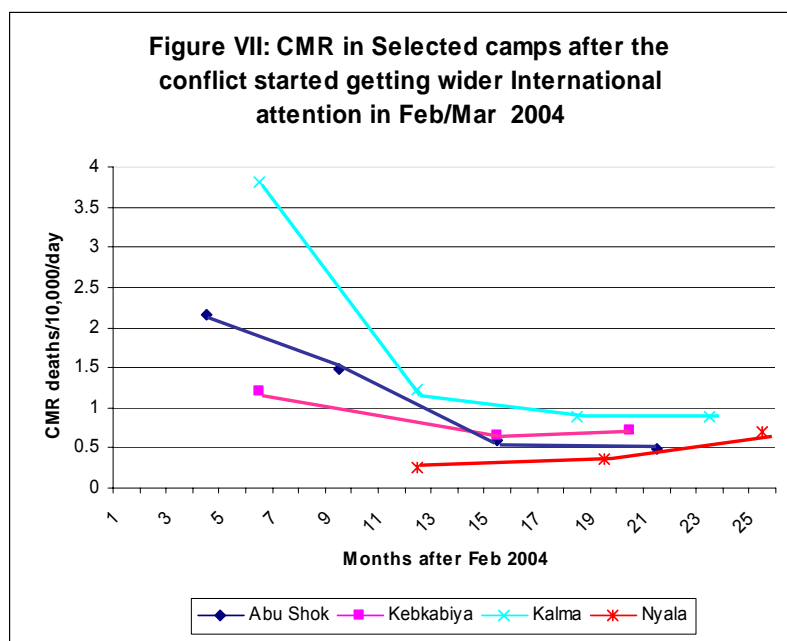
All incidences of coinciding high GAM and under five mortality rates above the “serious” and “very serious” WHO classification, respectively, occurred in 2003 and 2004, which is consistent with an explanation that increased humanitarian efforts were paying off after the UN and other aid agencies started operations in Darfur in the spring of 2004. Both the GAM and SAM rates were generally in remission after the UN and other agencies set up a presence in Darfur with increases humanitarian access (see graph V and VI).



## MORTALITY

The size of the sampling frames of the mortality surveys done in Darfur varied widely and it is thus inappropriate to directly compare them. The sampling frames ranged from large scale studies done in Greater Darfur by the WFP and WHO to several state-wide surveys, to a combination of IDP camps and/or towns to individual IDP camps or towns, but the surveys nevertheless gave important insights about mortality rates in camp situations in Darfur.

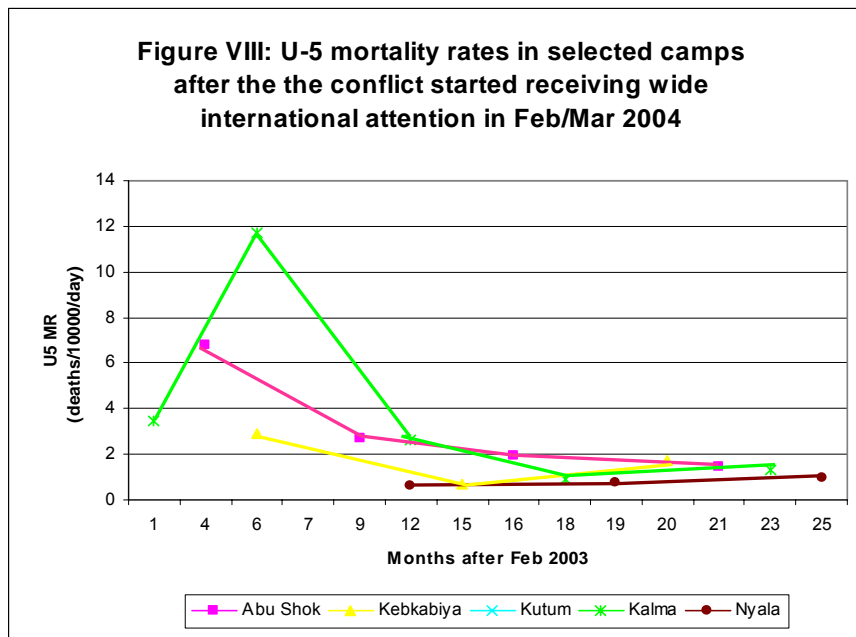
The WHO mortality study of 2004 indicated that “in spite of the intensity of humanitarian interventions in Darfur by most of the leading humanitarian aid organizations, mortality rates among displaced people in North Darfur, West Darfur and in some camps in South Darfur (e.g. Kalma Camp) remained high and above emergency thresholds”, which was indicative that some of the communities continued to live an emergency phase.



Kalma camp in South Darfur became the largest IDP camp in Darfur, it had a camp population of about 5,000 displaced people in April 2004, which dramatically increased to about 100,000 by the end of the year and continued to rise, peaking at about 1500,000 in the first quarter of 2005 and then decreasing to about 90,000 towards



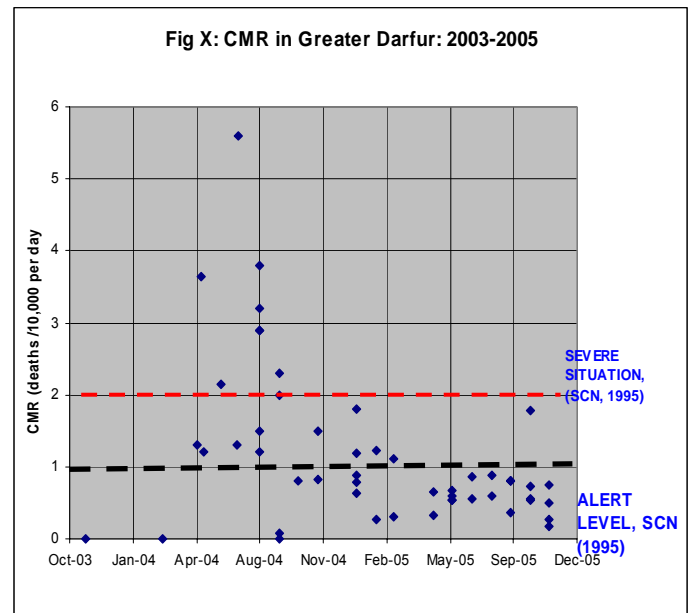
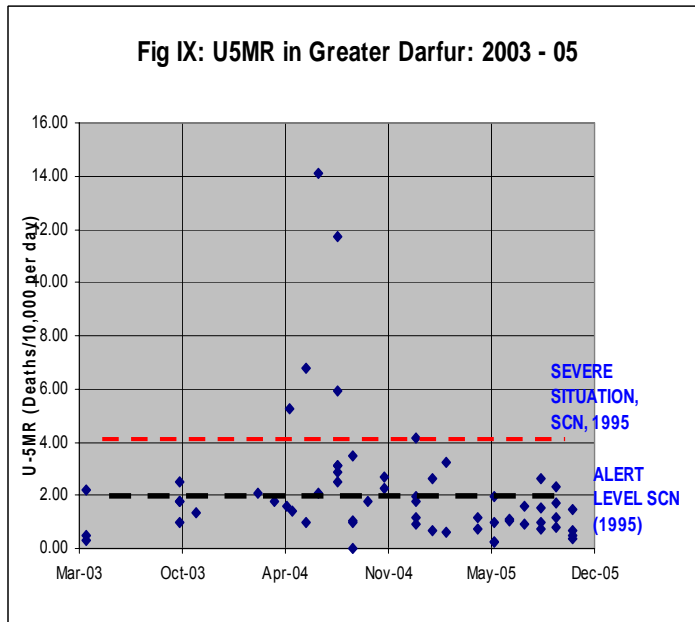
the end of 2005 (Darfur Humanitarian Profiles). A WHO retrospective mortality survey done in September 2004 (recall period of 62 days) indicated that the CMR and under-five mortality rates in Kalma camp were 3.8 and 11.7 deaths/10,000/day respectively, which were remarkably high and above emergency thresholds in this large camp (see figure VII and VIII).



As discussed under the section on the progression of the conflict, March 2004 was a turning point in the history of the conflict which was heralded by an increase in the number of aid organizations, wide international attention, easing of travel restrictions for aid workers, increased access to vulnerable people and an increase in the number of both local and expatriate aid workers. Mortality surveys in Abu Shok, Kebkabiya, Kalma and Nyala camps indicate that both the CMR and under five mortality rates were generally above emergency thresholds at the beginning of 2004 but they started declining in the wake of increased humanitarian interventions (see figure VII and VIII).

This general decline was captured by the findings of the second large scale mortality survey done by the WHO in September 2005. The study found that displaced populations in camps located in North, West and South Darfur were experiencing the same CMR of 0.8 deaths/10,000/day, but the under-five mortality rates among

displaced children in camps were 1.0, 1.5 and 2.6 respectively. A scatter plot of various surveys done between 2003 and 2005 (figure VIII and IX) also points to a general decline of mortality rates to below alert levels in various camp and resident populations.



Early on in the conflict, mortality attributed to injury or violence was relatively high. For instance the WHO study in September 2004 revealed a CMR of 1.5 and 2.9 persons/10,000/day in North and West Darfur respectively. Though the study was never completed in South Darfur due to insecurity, the CMR in Kalma camp was 3.8 deaths per 10,000 persons per day. In Murnei camp, an MSF study (recall period: October 2003 – May 2004) showed a cause-specific (violence) mortality rate of 2.6 deaths/10,000/day while in Zalingei the mortality rate due to violent deaths was 1.1 deaths/10,000/day. In some instances, the CMR was higher than the under five mortality rate due to violence-related deaths. An MSF study in Zalingei (recall period: October 2003 to April 2004) showed a CMR and U-5MR of 2.3 and 1.9 deaths/10,000/day respectively. In Murnei camp the CMR was 3.4 and the under five mortality rate was 1.6 deaths/10,000/day (recall period: October 2003 – May 2004).

Mortality in some camps was alarming and unacceptably high as shown in figure IX and X. In El Geneina camp the CMR was 5.6 (39 day recall period) in May/June 2004

and the under five mortality rate was an alarming 14.1 deaths/10,000/day. This high mortality rate was attributed to little humanitarian aid (apart from irregular food distributions) and also due to the fact the population was displaced almost at the 'beginning' of the hunger period, which exacerbated vulnerability as many people may have come in already seriously malnourished and traumatized. In the same camp, 50% of the children were found to have diarrhea (Depoortere, 2004) <sup>8</sup> partly explaining the unusually high under five mortality rate

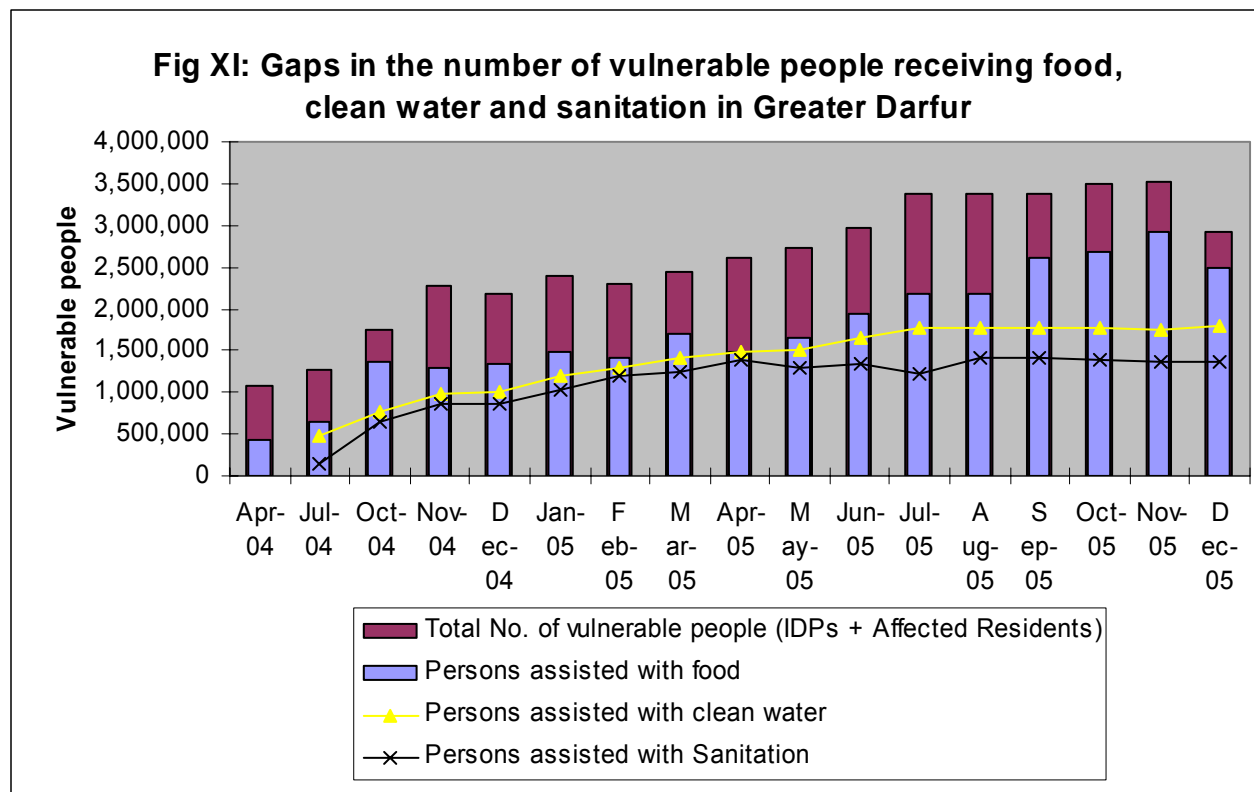
## Morbidity

At the turn of 2004 there were only six aid agencies responding to needs in Darfur after many had pulled out due to insecurity in 2003. These included: MSF-F, SC-UK and Goal Ireland (WHO Annual Report: Darfur one year on, 2005). In February 2004 the Sudanese government started easing travel restrictions to aid workers and the UN activated the Darfur contingency plan which included a 90-day humanitarian action plan for Darfur. At the end of 90 days, the Darfur response plan on health issues included establishing an epidemiological surveillance system, enhancing hospital services including rehabilitating critical hospitals, improving health care coverage, including filling gaps in primary health care in camps and hospital care, providing the back-bone of a medical supply and logistics system and ensuring free access of health care by waiving user charges (WHO Annual Report: Darfur one year on, 2005).

Establishing the epidemiological surveillance system was a pragmatic approach and possibly the best option to control morbidity by monitoring the displaced and affected population at that time, but the surveillance system had some limitations: for instance it could have missed a lot of deaths and diseases especially for people without access to health facilities and could have under-informed aid agencies. The functioning of the surveillance system was further complicated by a conflict of interests between the WHO and the Sudanese Ministry of Health (MOH), which was created by the MOH's tendency to downplay the emergency for political expediency.

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<sup>8</sup> Evelyn Depoortere *et al*, 2004. Violence and Mortality in West Darfur, Sudan: epidemiological evidence from four surveys. *The Lancet*, October 2004.



The effectiveness of preventing sickness among camp and affected residents was contingent not only on extending curative and preventive health services but also on providing potable water, sanitation and adequate food rations. The estimated number of people reached by the UN and NGOs is given in figure XI, which also shows the gaps in food, sanitation and clean water delivery to vulnerable people. The outreach gaps were partially due to inaccessibility of vulnerable populations by the UN and other NGOs as well as the under capacity of aid organizations in the face of mounting numbers of displaced and affected residents.

By April 2005, the number of people being assisted with clean water and sanitation reached a kind of equilibrium and provision ceased being very responsive to the large increases in the number of vulnerable people from May to July 2005. Provision of clean water stayed somewhat in “equilibrium” while sanitation providers did not catch up with the increased demand, leading to a dip in provision around July 2005. Provision of food aid was responsive to the increases in vulnerability through this period.

The dip in provision of sanitation and the non-responsiveness of both the provision of clean water and sanitation to the large increases in vulnerable people is attributed to the onset of the rainy season when motorized movement became difficult. Aid agencies attempted to solve this problem partly by predicting areas that would have large increases in vulnerability and leaving drilling equipment in these locations, but displaced people did not necessarily settle in the predicted camps. Provision of sanitation was made more complicated by the sandy nature of the camp locations – making it extremely difficult to construct pit latrines in the ordinary manner without the pits caving in. Insecurity was also a contributing factor to the gaps in the provision of food aid, sanitation and clean water.

Toward the end of 2004 when the UN was getting deeply involved in Darfur, Diarrheal diseases and by implication poor access to clean water and sanitation were prevalent among displaced people. Diarrhea in young children is generally transmitted through the fecal-oral route and usually as a result of exposure to contaminated foods, water and cooking/eating utensils etc. According to the WHO mortality study in August 2004 with a 2 month (mid June to Mid August) recall period, diarrhea remained the main cause of mortality in all displaced populations in all of Darfur (see table II below): it contributed 24 % of all deaths among displaced people in North Darfur, 37 % in West Darfur and 42 % in Kalma Camp, South Darfur. Among children under four years old, the survey found that diarrhea caused 44% of all deaths among displaced children in North Darfur, 76% in West Darfur and 52% in Kalma camp.

Though the prevalence of mortality associated with diarrhea was found to be remarkably high, especially among children under four years old, figure XI above does not indicate a significant shift in the humanitarian provision of clean water and sanitation, but it does suggest that aid agencies attempted to increase the provision of humanitarian aid, nevertheless, due to increasing populations of displaced and affected residents, the increase in aid continued to reach the same proportion of vulnerable people. (Note: a shortcoming of figure XI is that it does not show the number of people who were inaccessible due to insecurity and could decrease the proportion of people being given relief aid)

Table II: Comparison of % mortality caused by diarrhea in 2004 and 2005

State	0-4 yrs old		All ages	
	Jun-Aug 2004	May - June 2005	Jun-Aug 2004	May - June 2005
North	44%	59%	24%	14%
West	76%	45%	37%	29%
South (05), Kalma Camp (2004)	52%	31%	42%	25%

Source: WHO retrospective mortality surveys, 2004 and 2005

The next WHO survey carried out almost one year later in 2005 (May-June) indicates that the prevalence of cause-specific mortality associated with diarrhea was still very high, both for children under 4 years and for all ages among displaced people (see table II). The prevalence of mortality caused by diarrhea had generally gone down in almost all the three states both among children under 4 yrs old and among all ages except for children under 4 yrs in the state of North Darfur where the prevalence increased from 44% to 59%.

Between the two large scale WHO surveys, displaced children under 4 yrs old in North Darfur suffered the highest mortality reportedly caused by diarrhea (59% in May/June 2005) while South Darfur had the lowest prevalence at 45% in May/June 2005.

## **Empirical effects of the war on food security**

### ***An Overview of Vulnerability in Darfur***

Most households in conflict prone areas of Sudan experience an annual peak in vulnerability during the annual “hunger period” from July – August. In a normal year, poor households become drastically vulnerable during the hunger period when they employ various coping strategies in an attempt to smoothen consumption. The increase in vulnerability during the hunger season can be attributed to the length of time since the last harvest and a general increase in food prices due to rising transaction costs associated with impassable roads in the rainy season and as well as insecurity in Darfur. Restricted mobility due to poor infrastructure, including bad roads, drives up grain prices, which occurs at a time of restricted local supplies as households are busy

tilling and sowing. As a percentage of the consumer price of grains, the transportation cost from producing areas to the main consumption centers in Darfur ranges between 20-25% in the dry season to 30-35% in the rainy season (El-Dukheri *et al*, 2004<sup>9</sup>), which is quite high.

Households will employ different coping strategies depending on their level of vulnerability and how confident they feel about their future food security. The coping strategies vary from reversible to irreversible strategies. In March 2005 an inter-agency assessment mission in El Fasher, where the WFP had ceased general food distributions six months earlier, found that 12-24% of all households were employing irreversible strategies that tended to damage their future productive capacity.

Estimating vulnerability in a setting like Darfur would ideally encompass tracking variables that reveal the expected deviation of indicators of available resources from year to year, which was a difficult task since it was hard to predict how insecurity would affect them. These variables include availability of resources (like natural resources like rainfall, physical resources like livestock and social resources like private transfers), production indicators (e.g. area cultivated, access to farm inputs, etc), income from various sources, consumption and nutrition related variables like mortality, morbidity and malnutrition. In addition to these variables, the FAO/WFP crop assessment uses the Normalized Difference Vegetation Index (NDVI) to estimate agricultural production, which it compares to the population needs.

Projecting the number of vulnerable people during the year and through the hunger season was important to reduce vulnerability and allow effective planning of the required tonnage and most importantly preposition the grain before the start of the rainy season. WFP managed to preposition food aid without a major pipeline break with the assistance of a massive logistical operation that moved food aid from Port Sudan through primary transportation to various hubs, and from the hubs to capitals of each state through secondary transport and finally to distribution points through tertiary transport.

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<sup>9</sup>Ibrahim El-Dukheri, Hassan Damous and Abdul Majid Khojali, September 2005: Rationale for a Possible Market Support Program in Darfur, Sudan: A Brief Look at Markets and Food Security (Study commissioned by the USAID and implemented by CARE)

The 2004 Annual Needs Assessment estimated that a monthly average of 2.5 million people would require food assistance in 2005. Out of this 2.5 million people, the ICRC would provide 200,000 with food aid, and WFP would cater to the other 2.3 million. The number of IDPs was estimated to remain constant through most of the year at about 1.45 million people while the number of affected residents was projected to “gradually” increase, especially during the hunger period. The monthly number of vulnerable people was thus projected to incrementally increase between May and September but peak in the rainy season (July, August) and decline after September when the harvest begins. These estimates were predicated on the security situation improving, but the “actual” estimates released by the Darfur Humanitarian Profiles indicates that the number of IDPs was slightly higher and that the number of affected residents continued to rise sharply during the entire year to eventually match the number of IDPs by year end.

Aside from projecting vulnerability, estimating grain production and the gaps in household food baskets is another component required for an effective humanitarian response. Both the grain production and the number of vulnerable people were determined by the prevailing state of insecurity, which made it hard to make precise estimates of either.

In 2004 a CARE study estimated grain production in Darfur at 60% as a percentage of the long term average under an optimistic scenario, 50% under a moderate scenario and 34% under a pessimistic yield scenario (Dukheri, 2005). The FAO/WFP (2004) crop and food supply mission estimated the gross cereal production in Darfur to decrease by about 55% compared to 2003 and by about 46% compared to the 1999-2003 five year average (WFP Annual Needs Assessment, 2005), which was indicative of the level of vulnerability expected in 2005. In 2005, “there was 47% more land under cereals in Greater Darfur than in 2004” as security slightly improved during the planting season and cereal production was estimated to have increased all three states in Darfur. Cereal production was estimated to have increased by 136%, 183% and 193% as a percentage of the 2004 production in North, South and West Darfur respectively (FAO/WFP crop and food supply mission to Sudan, 2006).



Inaccessibility due to both political reasons and insecurity was a major hindrance to humanitarian access and a large contributor to vulnerability, and led to gaps in service delivery. In December 2003, the government of Sudan started a restriction policy that prevented humanitarian access to an estimated 600,000 people in Darfur altogether. In addition to the restriction policy, rising insecurity led to temporary suspension of humanitarian activities by aid organizations (for instance WFP suspended its activities in January 2004) and further delayed humanitarian access. In May 2004 the government relaxed its restriction policy and announced a series of measures to increase humanitarian access. In November 2004 the government “lifted” all restrictions on aid workers and revoked a state of emergency in North Darfur.

***Physical Access to and Availability of food in the midst of insecurity and displacement***

The actual displacement of households in Darfur - from their normal lives into camps or into more secure communities - mostly occurs in a sudden and unplanned manner. Due to “sudden and massive incursions by the militia, most of IDPs had to run for their lives and consequently were not able carry any of their belongings – food stores, basic kitchen sets and mattresses – to places where they currently live (State MOH, El Fasher, 2005)<sup>10</sup>, which sharply increased their vulnerability and in turn that of resident populations who shared their limited resources with the newcomers.

The conflict limited the ability of displaced people to acquire food or earn income as they did in pre-conflict times. New constraints that are a direct consequence of insecurity in Darfur have come about and increased vulnerability from the usual levels to extreme destitution. Chief among the new constraints is the adverse effect of insecurity on market accessibility and functioning. A study done by CARE in El Fasher in 2005 found that “the prices of six main food items had increased by an average of about 62%” in a six month period preceding the study (El-Dukheri *et al* 2005). Insecurity contributed heavily to the rise in prices, and as much as 35% of the increases could be attributed to insecurity (*ibid*). Other new constraints included limited opportunities to

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<sup>10</sup>State Ministry of Health, El Fasher, North Darfur, 2005. Nutrition and Food Security survey among IDPs and affected residents in El Fasher town & its attachments area, 2005

access food or earn income, restrictions on movement due to insecurity (women faced risk of gender based violence when working on their gardens or collecting firewood), lost or stolen animals and distress selling of animals due to the risk of theft by militia and/or fodder and water shortages (State MOH, El Fasher, 2005).

Reversible strategies employed by vulnerable households included increased dependence on inferior foods, borrowing and sharing within kinship systems, credit purchases of food, decreased number of meals eaten per day, sending household members to live with relatives, etc. As insecurity continued, many households adopted irreversible or crisis strategies that include seed consumption, distress selling of household assets including land, utensils, building materials, animals etc.

Insecurity during the critical months that farmers spend on ground preparation activities (tilling, sowing and weeding), harvesting and storage adversely affected food security in Darfur: population displacements in the July-August period disrupted ground preparation activities while around November it disrupted harvesting and storage activities, with the combined result of adversely affecting the physical access to and availability of food. After people fled their villages due to violence, their crops were sometimes burned or razed and livestock looted, leading to a 50% to 100% loss of livestock (ANA 2003/2004). The raids greatly affected food security and denied many Darfurians either a chance to cultivate crops or access to ready crops in the fields, while at the same time disrupting traditional coping mechanisms. Some women were brave enough to attempt going back to the villages to harvest their produce but aggression by militia would frequently lead to loss of life, sexual violence and discouragement from accessing their crops.

According to the FAO/WFP ANA (2003/2004) insecurity in 2003 led to a decrease in cereal and livestock supplies, leading in turn to higher cereal and livestock prices. In the three main Darfur markets – El Fasher, El Geneina and Nyala – livestock prices were rising in 2003 due to improved breeding conditions, decrease in supply and higher demand from big traders in Central Sudan. In remote villages, the value of livestock was adversely affected by insecurity, for instance villagers would rather sell

their livestock at lower prices than have it looted by militia – as was the case for sheep owners in El Fasher in September 2003.

In South Darfur, the 2003/2004 Annual Needs Assessment found that rainfall had improved through the entire state leading to at least 15% improved productivity (compared to 2002) – but the improvement in food availability did not translate to an improved food security situation primarily due to insecurity. The report cited Kass, Shearia and Nyala as some of the localities where massive displacement affected livelihoods and entire villages were burnt or looted. Displaced people salvaged few possessions (limited to the weight a human can carry), were reported to have harvested “very little” of their standing crops and lost more than 60% of their livestock, further increasing their vulnerability. The Sudanese mostly rely on kinship ties and sometimes on friendly tribes in their new locations, but these coping capacities must have been stretched given the large number of displaced people.

In 2004, the Annual Needs Assessment (2003/2004) recommended 50% rations for “old” IDPs and 100% rations for newly displaced people, and projected that a total of 340,000 people would need food aid, to be delivered using either food for relief or as general food distribution . North Darfur got better rainfall in 2003 compared to the preceding three years – though a long dry spell in August-September led to pest outbreaks that damaged millet in El Fasher and Mellit. Violence and displacement prevented farmers from harvesting in Kutum, Kebkabiya and Teina especially among agro-pastoralist communities. West Darfur received above average rainfall that resulted in improved crop yields and pasture but food security was adversely affected by a decreased area under cultivation (according to the 2003-2004 ANA about a third of the area was uncultivated), decreased harvesting, looting and loss of livestock due to the conflict.

### **Rethinking the Humanitarian Aid Portfolio**

In 2006, WFP commissioned an independent evaluation of its humanitarian activities between April 2004 and December 2005 under the Darfur EMOP. The evaluation found that the WFP management had put humanitarian needs as a top priority and distributed a large amount of food aid totaling more than 560,000 mt. This was however done “with reduced attention” on how its cooperating partners (NGOs) distributed the food aid, without focus on targeting issues, gender programming etc (WFP, 2006<sup>11</sup>).

The evaluation conceded that WFP had maximized the number of beneficiaries reached at the expense of maximizing the program quality, let alone any considerations of the portfolio of relief interventions *required* to reduce vulnerability. It is understandable that the WFP wanted to rush as much life saving food aid to Darfur, which was a commendable feat achieved in the midst of extreme insecurity, an uncooperative government, rough terrain and other almost insurmountable difficulties, especially since “the close association of mortality with under-nutrition leads us to conclude that refugee relief programmes should be given highest priority to ensure that adequate rations are distributed” (Toole *et al*, 1988). Nevertheless, it is imperative that the humanitarian community not only queries the effectiveness of the antecedent intervention (as was done in the 2006 WFP evaluation), but also the effectiveness of the choice or mix of interventions chosen to “reduce vulnerability” depending on the phase of the emergency.

The 2006 FAO/WFP crop and food supply mission called for a cautious approach in the design of both relief and rehabilitation efforts and for steps to be taken to enhance more medium to long term interventions. Though it recognized that continued relief assistance was required for IDPs and other vulnerable groups in the protracted conflict, it called for relief programs to, where feasible, purchase cereals locally to encourage production and promote the development of markets.

Given the same objectives of increasing entitlements in the very short term and reducing vulnerability in the mid to long term, the relief community must ask itself if

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<sup>11</sup> WFP, Summary report of the evaluation of Darfur EMOP 10339.0/1: Assistance to populations affected by conflict in Greater Darfur, West Sudan. <http://www.wfp.org/eb/docs/2007/wfp113623~1.pdf>

rushing food to more than 3 million vulnerable people in Darfur was the most effective manner of increasing entitlements and decreasing future vulnerability or if some form of market intervention was required alongside the usual portfolio of relief interventions to reduce extreme vulnerability, especially with due regard to the reality that the emergency in Darfur is a protracted conflict. The immediate need was not only to reduce immediate hunger (poverty) among the millions of displaced and affected residents but also to reduce the probability of food insecure households entering into deeper deprivation in the near future and to keep those already in deprivation from entering into extreme deprivation and starvation (i.e. to reduce vulnerability). In other words, the immediate need was to increase the *entitlements* of food insecure households not only at a point in time, but also in the medium and ideally in the longer-term. This view would question the effectiveness of rushing food aid as the predominant intervention to reduce vulnerability in the protracted conflict.

Market based interventions have not always been a priority in relief settings, despite the generally accepted validity of Amartya Sen's work on entitlements<sup>12</sup>. In fact, the humanitarian relief community has been reluctant to employ market-based interventions as part of the relief portfolio. Market-based interventions have been carried out in Sudan in the past with a fair degree of success, for instance a successful cash transfer program was done in Nyala (inside current demarcations of Darfur) during the great famine of 1984 when vulnerable households received cash to mitigate high prices following food distributions, this stimulated demand and attracted surplus produce from outlying areas, which lowered prices back to reasonable levels (Peppiatt *et al*, 2001<sup>13</sup>). Another recent example was when WFP intervened in 2004 after a bumper harvest in 2003 resulted in the production of more than one million metric tones of surplus cereals in Sudan. To stabilize prices and support the local economy, the WFP made an

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<sup>12</sup> Sen, A., *Poverty and Famines: an essay on Entitlements and deprivation*, 1981. (Sen defined 'entitlements' as "the command over commodities that people have" and recognized four kinds of entitlements: production-based entitlements, trade-based entitlements, own-labour entitlements, and transfer entitlements)

<sup>13</sup> David Peppiatt, John Mitchell and Penny Holzmann, *Cash transfers in emergencies: evaluating benefits and assessing risks*, 2001

unprecedented number of local cereal purchases in excess of 120,000 MT of sorghum against an annual average of 25,000 MT over the last five years (WFP Annual Needs Assessment, 2004/5). This market-based intervention protected grain markets by avoiding a collapse of grain prices below the farm gate price which improved the welfare of small and subsistence farmers who usually consume a portion of the produce and sell any surpluses to the market.

In Darfur, grain markets did not collapse *in toto* even during the worst periods of insecurity. However, “some markets did close during the peak of the conflict but most of them resumed operations underpinned by the need for market existence in rural areas as perceived by rural people” (El-Dukheri, 2005). Rural and urban markets were thus “functioning and competitively operating” and “the flow of grains between the main producing areas and the rural/urban markets” in Darfur was “smooth with no barriers and/or interventions from the local authorities” despite the constraints brought about by the rainy season, a harsh topographical terrain and insecurity (*ibid*). Both rural and urban markets in Greater Darfur are integrated, but they are not integrated well with the main grain markets outside, say, in Gedaref or Central Sudan due to high transaction costs (*ibid*). The humanitarian intervention was fairly well equipped to provide relief supplies (food and non-food items) to vulnerable people, but in view of the protracted nature of the conflict and that the fact that there has been no end in sight to alleviate the vulnerability of more than 3.6 million affected residents and displaced people by December 2005, market stabilization interventions should have been included in the mix of interventions to increase entitlements and pull vulnerable households out of poverty through trade in the short term future. This could have been done through some of the interventions suggested by El-Dukheri *et al* (2005) including: sales of subsidized grain to targeted food insecure households, cash transfers to targeted households, subsidies of transport (delivery) costs to markets, sales of subsidized complementary commodities, like groundnut oil, to targeted households etc.

## **Progression and Intensification of the Conflict: 2003 – 2005**

Physical insecurity was prevalent in all the three states and adversely affected food security among displaced people and affected residents. Insecurity and acts of violence were manifest in almost every month from 2003 to 2005, first beginning in North Darfur in early 2003 and then rapidly spreading to West Darfur and to South Darfur by the end of 2003.

Almost every month in the period under study was characterized by cases of armed banditry, murder, looting, abductions, ambushes, beatings and rape to a certain extent in Greater Darfur. In many cases, insecurity was site- or state-specific, but in general it remained an overriding concern for many displaced people, residents, Darfurian refugees in Chad and aid organizations working throughout Darfur. Almost every WFP weekly situation report up to December 2005 contains cases of insecurity in almost all the three states. The causes of insecurity included attacks on civilians by militia (Janjaweed), attacks by nomadic tribes, inter-tribal fighting, fighting between different rebel groups, fighting within the same rebel groups (especially the SLM/A), fighting between rebel and government forces, armed and opportunistic acts of banditry, displeased and irate IDPs and residents etc.

It was not entirely possible to correlate insecurity with the outcomes of interest in Darfur (mortality, morbidity and malnutrition). There was reporting bias in most sources consulted, it was not entirely possible to tell the intensity of insecurity, its geographic coverage and duration of the causes of insecurity. Reporting of insecurity was largely done by the news media, mostly with insufficient details to allow a coherent “big picture” of insecurity in Darfur. Instead of mapping insecurity and mortality, morbidity and malnutrition rates as originally planned, these have been discussed somewhat separately in this study.

The most significant source of insecurity however was the fighting between armed combatants like rebels and government forces. The actions of government allied militia, the Janjaweed, particularly introduced and sustained insecurity among the civilian population leading to massive displacements of people from their homes into camps. The actions of all these actors affected population displacement and directly

caused “excess deaths” attributed to violence, disease and malnutrition. Even though insecurity was site-specific in many places, the general level of insecurity in greater Darfur can be seen as having gone through phases characterized by cessation and upswings of violence that adversely affect both the physical security as well as public health concerns of both displaced and affected people. The phases ending in January 2005 have been adopted from both Guha Sapir and Degomme (2005)<sup>14</sup> and the US State Department<sup>15</sup> while the phase from January to December 2005 has been adopted from Young *et al* (2005). Both Guha-Sapir and Degomme (2005) and the US Department of State (2005) divided insecurity into four phases starting in March 2003 to January 2005 with respect to “epidemiological data on mortality, patterns of village destruction and displacement trends” (US State Department, 2005). These four periods will be adapted here as phases in the conflict while the period between January and December 2005 will be adapted as an additional phase as done in the WFP evaluation report<sup>16</sup> (2005). The phases and the accompanying graphs of the affected and displaced people in Darfur are described below:

### 1. Initial outbreak of violence (March – September 2003)

The initial phase of the conflict mainly involved fighting between government and rebel forces (SLM and JEM) in West and North Darfur. At the start of the conflict the government started co-opting militia (popularly known as the Janjaweed) who, together with the government army, adopted a scorched earth policy against ethnic groups that supported rebels based in North and West Darfur. Communities in these areas reported sustained attacks by the Janjaweed militia, who were sometimes supported by government aerial bombardments and ground forces, compelling civilians to flee, and stay away from their homes, eventually seeking sanctuary in larger villages and towns (Young, 2005).

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<sup>14</sup> Guha-sapir Debarati and Degomme Olivier; Darfur, Counting the deaths, 2005

<sup>15</sup> Fact Sheet, Bureau of Intelligence and Research, US Department of State, Washington, DC March 25, 2005. Accessed February 22, 2007 at 1600 hrs (GMT)  
<http://www.state.gov/s/inr/rls/fs/2005/45105.htm>

<sup>16</sup> WFP, Summary report of the evaluation of Darfur EMOP 10339.0/1: Assistance to populations affected by conflict in Greater Darfur, West Sudan. <http://www.wfp.org/eb/docs/2007/wfp113623~1.pdf>



In April 2003, intense violence was rapidly driving large numbers of Darfurians from their homes to become internally displaced or refugees in Eastern Chad. By September 2003 the number of refugees in Chad had reached 65,000 and UN agencies estimated that 500,000 people were in need of humanitarian assistance in Darfur. During this period, a “new” rebel group, the Justice and Equality Movement, was formed in Darfur.

In September fresh attacks by Janjaweed militia prompted at least 10,000 refugees to stream into Chad and the Sudanese government started a restriction policy that hindered humanitarian access to “about 110,000 IDPs in North Darfur and an additional 30,000 in West Darfur (Guha-Sapir and Degomme, 2005). The US state department estimated between 4,100 – 8,800 excess deaths primarily in West and North Darfur by September 2003 (US State Department fact sheet, 2005).

In early September 2003, the GOS and the SLM/A signed a six week ceasefire agreement in Abeche under the mediation of the Chadian president, Idriss Derby, but the government “continued to bolster their military machinery with additional training, weapons and combat support structures and extended attacks further a field” (Young *et al*/2006)

The FAO / WFP crop and food supply assessment mission to Sudan indicates that effective rains began rather late in late June and early July 2003, there were adequate seeds provided by the MOA, GAO and the Zakat fund and food production conditions were generally favorable leading to large areas of millet and sorghum being cultivated. Due to insecurity and huge displacements of local populations, much of this production was not harvested, and instead “marauders looted livestock and put them into fields of maturing crops to graze them” and “only about 45% of the planted millet crop was expected to be harvested in North and West Darfur (FAO/WFP crop and food supply assessment mission to Sudan, 2004). Livestock prices fell as farmers made distress sales to avoid looting. Terms of trade between livestock and cereals tilted sharply in favor of cereals and displaced households reported a 50-100% loss in their livestock. FAO gives malnutrition rates of 25.6% and 25.4% for South and North Darfur, respectively, in 2003, which does not reflect

much change compared to the rates of 24.4% and 27% in 2002 in South and North Darfur, respectively.

## **2. Breakdown of the ceasefire agreement and the escalation of violence (October 2003 – March 2004)**

During this period, peace talks between the GOS and Southern rebels (SPLA/M) were under way in Kenya - which distracted the international community's attention away from Darfur. In Darfur the GOS escalated the war against the rebel groups and further widened the scope of the conflict. Serious insecurity at this stage led to temporary suspension of WFP activities and at other times impeded the regular and timely delivery of food to people in need in all three of the Darfur states. Fighting continued to take place between the GOS and SLA/M forces, hundreds of civilians were killed and thousands fled to Chad. Humanitarian access remained limited. The highest numbers of conflict-related deaths are believed to have occurred during this period, primarily in West and North Darfur. An estimated 32-68,000 excess deaths (average 5,200-11,400 a month) occurred from October 2003 through March 2004 (US State Department, 2005).

In November the UNHCR reported that government allied militia had launched at least six raids on refugees in Chad. Attacks against civilians continued and in January 2004 at least 18,000 refugees entered Chad in one week following an increase in the frequency and intensity of attacks on villages. Fighting in South Darfur was relatively light during this period. In December the town of Koulbous was attacked by GOS Mi 24 helicopter gunships and the wounded were reported to number in the hundreds on both sides, with the GOS having suffered over 600 casualties (wounded and killed). At the end of 2003, FAO and WFP estimated that about a million people were affected by the conflict though it was difficult at this stage to estimate what the full extent of conflict would be on food security in 2004. At the beginning of 2004, Many NGOs had pulled out of Darfur due to insecurity and only Goal, MSF-France, Save the Children Fund-UK and MEDAIR remained (WHO Annual Report: Darfur one year on, 2005).

In February 2004, humanitarian access improved a little. The UN Darfur Contingency Plan was activated, and on 16 February the first UN and NGO teams were deployed to Darfur and the first phase of assistance to 250,000 IDPs began (WHO Annual Report: Darfur one year on, 2005). On February 17<sup>th</sup> the UNHCR announced an emergency airlift of 110,000 refugees from Chad and in March the UN humanitarian coordinator for Sudan, Mukesh Kapila, used the term “genocide” to describe the killings in Darfur, when he warned the international community that the first genocide of the 21<sup>st</sup> century was in progress.

Events of March 2004 took a dramatic change for the better when the Darfur crisis started receiving wider international attention. The international response in Darfur was limited up to this point, but March 2004 marked a turning point resulting in both a greater international awareness and a considerable ease of travel restrictions imposed by the GOS which consequently allowed greater humanitarian access. In March there were just over 200 aid workers in Darfur and the number expanded to over 9,100 staff with an additional 77 aid agencies (including 11 operational agencies) at the end of the year (WHO, Annual Report, 2005).

### **3. The second ceasefire agreement (April – June 2004)**

The ceasefire agreement between the government and rebel forces was concluded on April 12<sup>th</sup> 2004 in N’Djamena, Chad. A decrease in violence at this time was brought about by “increased international pressure, a greater humanitarian presence and a retreat of rebels following a series of battlefield defeats” (Guha-Sapir and Degomme, 2005).

Though this phase was characterized by a decrease in violence due to the ceasefire agreement negotiated at the N’Djamena peace talks, population displacement in all three states continued to increase together with the number of affected residents (see table I below). There were about 580,000 IDPs and 77,000 affected residents at the beginning of this period (in April 2004) and about 1 million IDPs and 100,000 affected residents June 2004

Table III

<b>Estimated Displaced and Affected Residents in Darfur, 2004</b>		
<b>2004</b>	<b>IDPs</b>	<b>Affected Residents</b>
Apr	581,354	76,941
May	986,373	103,636
Jun	942,891	99,268

Source: Darfur Humanitarian Profiles

In April WFP ceased operations under the OLS (Operation Lifeline Sudan) framework to a Darfur-specific Emergency Operation (EMOP 10339.0 – Food Assistance to Populations Affected by War in Greater Darfur) – which targeted 1.18 million beneficiaries between April 1 - December 31, 2004 at a total cost of US\$ 99.3 million. WFP began food deliveries to drought victims in Darfur in April 2002 under the OLS framework and later scaled up operations to vulnerable people in the region in June 2003. By April 2004 the situation had escalated to warrant a specific EMOP for the Darfur conflict.

In April 2004, Jan Egeland, UN Undersecretary General for Humanitarian Affairs said a coordinated "scorched-earth" campaign of ethnic cleansing by the Arab Janjaweed militia against Darfur's black African population was taking place. In the same month a humanitarian ceasefire was signed between the SLA, JEM and the Sudanese Government but atrocities continued as the AU established an observer mission in Darfur.

In May a WFP Budget Revision was approved for the Darfur EMOP, which had foreseen a reduced ration for the beneficiaries between October and December. This was based on the assumption that the security situation would improve during the farming season and allow farmers to plant. Since it was evident that this would not happen, a Budget Revision increasing the beneficiary caseload from 1.2 million to 2 million people during the period of October to December 2004 was prepared. WFP's initial response to the Darfur crisis was hindered by severe restrictions imposed by the GOS on access to Darfur. Following the ceasefire and intense

international pressure, the GOS lifted some of the restrictive travel regulations and announced a series of measures to facilitate humanitarian access.

In mid-June the rainy season arrived rendering roads impassable and left many people without access to humanitarian aid (see figure XII below). The conflict and violence spread south and the IDP population of South Darfur doubled in June. Even though violence as a cause of death was decreased during this phase, mortality rates among displaced populations in both Darfur and Chad remained elevated because of the increasingly weakened conditions of persons arriving in camps and deficient humanitarian response (Guha-Sapir and Degomme, 2005). The UN declared that IDPs had reached the figure of 1 million and that Sudanese troops and militia might be guilty of war crimes against humanity.

Though region-wide mortality rates dropped, a high number of deaths occurred because of an increase in the affected population throughout Darfur and higher mortality rates in South Darfur (US State Department Fact Sheet, 2005). Non-displaced populations hosting large numbers of displaced persons also began to experience elevated mortality rates as their water and food resources became strained and more vulnerable to infectious disease (*ibid*).

Major battles, resulting in a large loss of combatants on either side, sharply declined. From this point on, mortality reflects almost entirely civilian rather than combatant losses. Between 6,300 and 24,000 people (average 2,000-7,900 per month) are estimated to have died in this time period (US State Department, 2005).

In June the UN and NGOs activated the 90-day humanitarian action plan for Darfur which was a planning tool for both donors and aid agencies. The plan aimed to develop operational plans for food, nutrition, health, water and sanitation, education, agriculture, protection, shelter and non-food items.

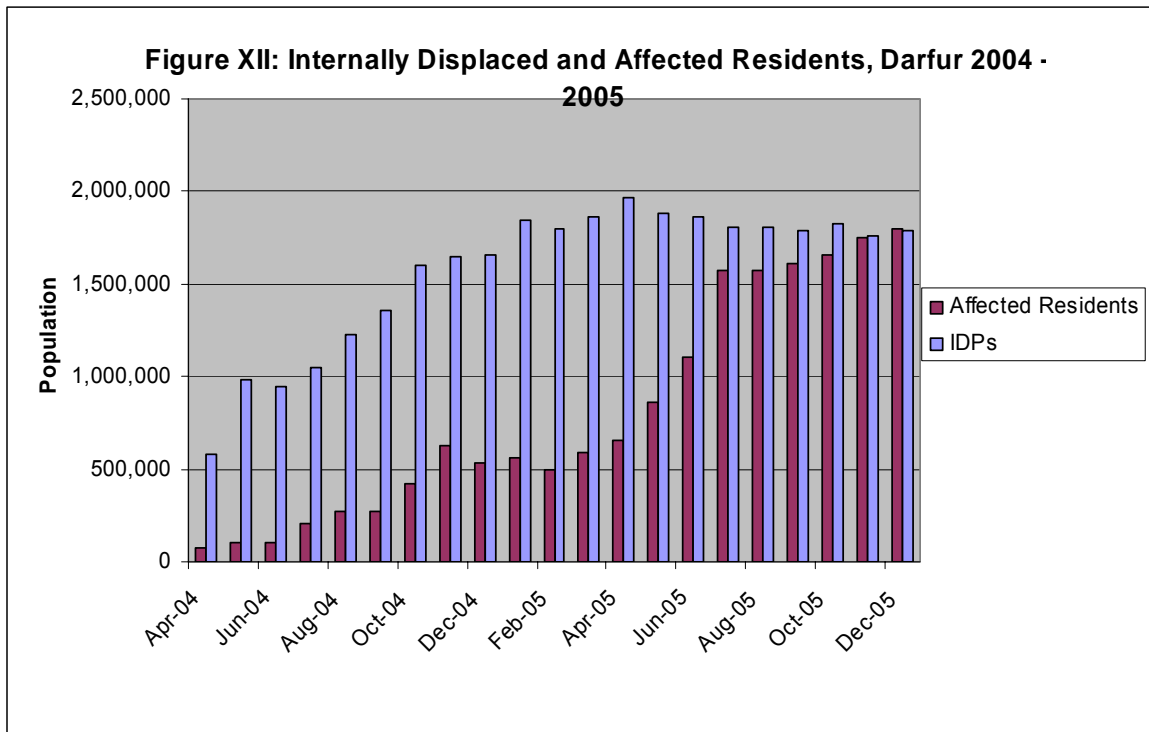
#### **4. Increased humanitarian response (July 2004 – January 2005)**

This period was marked by drastic increases in the number of both displaced and affected residents (see Figure XII below). The events of May to

August are particularly notable due to their magnified effect on vulnerability as this period contains events leading to the annual hunger period when households employ coping mechanisms to smoothen consumption. The largest number of people to be displaced in one month between 2003 and 2005 was 400,000 people, which was the case in May 2004 according to the Darfur Humanitarian profiles. These and approximately 200,000 others who got displaced during the actual 'hunger period' were displaced at the worst possible time during the year when food is scarce and when they are supposed to be preparing their fields for the next cropping season. Such large numbers of displacements at a critical period deeply increased their vulnerability, but also that of resident populations.

In July 2004 there were about 1.1 million displaced people and 200,000 affected residents and in August there were 1.2 million IDPs and 270,000 affected residents. About five months later in January 2005 there were about 1.8 million displaced people and more than half a million affected residents.

In August the humanitarian situation continued to deteriorate as ongoing violence and the rainy season left more people in need of assistance. There were about 188,000 refugees in Chad (Depoortere *et al*, 2004) and about 1.2 million internally displaced people in Darfur (Darfur Humanitarian profiles). The first AU protection forces arrived that month to protect AU observers monitoring the ceasefire and after the insistence from the Rwandan Government the troops were given a mandate allowing them to protect threatened civilians in their immediate vicinity.



Following a meeting with a UN mission in Asmara, WFP was granted unimpeded access by the SLA and JEM to rebel-controlled areas. The two rebel groups also assured WFP that they would not impede or delay food aid convoys. WFP then dramatically scaled up its air operations, particularly in West Darfur, which was worst affected by the rains. Airdrops into inaccessible areas reached more than 100,000 people.

In August the Sudanese President Omar Hassan al-Bashir ordered a "complete mobilization" to disarm all armed groups in Darfur and in September, Jan Pronk, the UN Special Representative to Sudan, told the UN Security Council that Khartoum had not disarmed the Janjaweed nor stopped attacks against civilians. He called for the AU mission to be expanded in size and mandate so that IDPs would be better protected. In October he told the UN Security Council that Khartoum had made no progress in the last month to disarm the Janjaweed, stop their attacks nor prosecute those responsible for the worst atrocities.

Despite access limitations, insecurity, low cooperating partner capacity, and weak local transportation networks which significantly impeded the delivery of food

aid, in September 2004 the WFP fed more than the targeted 1.2 million beneficiaries and more than 1 million people for the first time since the start of the operations in April 2004. A study conducted by CARE in August-September 2004 found that about 90% of IDPs and 40% of resident communities had lost their livestock (El-Dukheri *et al*, 2004<sup>17</sup>), increasing their vulnerability and adversely affecting nomadic tribes who rear livestock and use them to trade with agricultural communities. Livestock rearing plays a crucial role in the livelihoods and economy of Darfur.

In September FEWSNET issued a food security emergency alert for about 110,000 Darfurian refugees in Eastern Chad and said about 30-40,000 refugees had been crossing into Chad 'in the last several months'.

In October and December, the third and fourth rounds of peace talks, respectively, were held in Abuja, Nigeria. On October 15<sup>th</sup> a WHO mortality study estimated between 35,000 and 70,000 cumulative deaths in the period from March 1, 2004 to the end of September. However, the lower limit suggested by the study was consequently ignored by many sources quoting the mortality in Sudan (Guha Sapir and Degomme, 2005). In November the GOS signed a land mark peace deal with the rebels and agreed to a cessation of military flights over Darfur.

#### **5. Huge increases in the affected population: January 2005 to December 2005**

This period was characterized by dramatic increases in the estimated number of affected residents. The estimated number of displaced people remained above 1.5 million, peaking at 1.9 million people in April 2005. The large increase in affected residents was possibly due to a cumulative effect of the extra burden these communities had to shoulder in the presence of more than 1.5 million displaced people (see figure XII).

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<sup>17</sup>El-Dukheri et al, September 2004: Rationale for a Possible Market Support Program in Darfur, Sudan: A Brief Look at Markets and Food Security. Commissioned by USAID and implemented by Care, August-September 2004.



In March UNOCHA released preliminary mortality estimates that indicated that about 180,000 people had died in the conflict. A UK parliamentary committee announced that about 300,000 people had died in the conflict. In April 2005, the Coalition for International Justice (CIJ) released a mortality estimate of 396,563 people.

Security incidents leading to ceasefire violations by all sides and characterized by harassment of humanitarian workers and aid convoys continued to worsen the security situation in January 2005 despite the 4<sup>th</sup> round of peace talks that were held in Abuja, Nigeria, in December 2004. This type of insecurity continued throughout 2005, and was at its worst during subsequent rounds of peace talks in June (fifth round), September and October (sixth round). African Union peace keepers recorded their first fatality in an ambush that killed 4 soldiers while another 18 were taken hostage in January 2005. In April, the AU approved boosting their force from 2,200 to more than 7,700 troops, civilian police and military.

Three rounds of peace talks were held in Abuja, Nigeria, during this phase: in June, September and in November. Insecurity worsened during each subsequent round of peace talks (OCHA 2005). In April 2004 continued conflict and increased insecurity coupled with the poorer-than-expected 2004 harvest indicated that the humanitarian situation in Darfur was rapidly deteriorating. WFP started preparing to provide emergency food assistance for more than 3 million people at the peak of the hunger period from July to October 2005. The WFP also started using the Port in Benghazi, Libya to augment road and air deliveries of food to Darfur. In May 2005 a FEWSNET report classified Darfur and Chad in the highest category of concern for food insecurity. Pastoralists living near refugee camps in Eastern Chad were particularly singled out as needing humanitarian assistance. A shortage of diesel and jet fuel started affecting food aid convoys delivering food for the WFP due to preparations for an annual closure of refineries in Khartoum. The fuel shortage persisted well into September 2005 and persisted through a particularly bad time when the rainy season was a major hindrance to accessing vulnerable people.

According to the UN Sudan Humanitarian Profiles the number of affected residents increased by about half a million people in July alone, and by about 400,000 in the two months preceding the start of the hunger period in July. This huge increase in vulnerability coinciding with the annual hunger season put enormous strain on resources and sources of livelihoods for both local residents (1.5 million in July 2005) and displaced people (1.8 million by July 2005) (see figure XII). August heralded the start of the planting season in Darfur while increasing insecurity — murder, looting, banditry, abductions, ambushes, beatings and rape — remained the overriding concern throughout Darfur. In South Darfur, the security situation remained tense with armed men continuing to attack and loot commercial trucks and humanitarian vehicles. Attacks against humanitarian and commercial vehicles continued in South and West Darfur.

At about the time when the sixth round of peace talks began in Nigeria, intense violence erupted throughout Darfur in September and continued unabated until mid October. This period of intense violence was characterized by frequent militia incursions into IDP camps, for instance a major attack was launched on Aro Sharrow camp in which 34 men were killed (OCHA, 2005). In all three states, armed attacks on civilians and clashes among combatants were reported. Crimes including murder, rape, abduction, assault, robbery and harassment were the order of the day to varying degrees on civilians, peacekeepers and humanitarian workers (OCHA, 2005)<sup>18</sup>. Humanitarian access to populations in need became increasingly difficult throughout the three states of Darfur during this period. Armed clashes and banditry in West Darfur practically isolated the humanitarian community in Geneina, where all roads out of town were restricted and the UN together with some international NGOs evacuated their non-essential staff (OCHA, 2005).

At the same time tensions between nomadic/militia groups and sedentary farming communities were on the rise throughout Darfur. Villagers reported continuous harassment by nomads and militia through looting, banditry and the

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<sup>18</sup> OCHA, Sudan Humanitarian Overview, report, volume 1, issue 2.  
<http://www.unsudanig.org/docs/Sudan%20Humanitarian%20Overview%20Vol1%20Iss2%20Oct05.pdf>

forced payment of “protection taxes”, which if not paid led to herders deliberately sending their cows into the fields to destroy crops (OCHA, 2005).

In October and November, tensions remained high throughout Darfur, and causes of insecurity manifested in a complex manner. There was fighting between rebel groups on one hand and government forces together with allied militia on the other hand as well as intertribal fighting in both West Darfur (around Geneina and in Abaata locality) and in South Darfur (around Tulus) (OCHA 2005). The security situation in North and West Darfur was further compounded by the presence of hundreds of Chadian elements, reported to be defectors from the Chadian military, which culminated in a December announcement by Chad that it was in a “state of war” with Sudan over claims that the latter was aiding the former’s rebel groups (IRIN, 2005).

UN accessibility throughout Darfur continued to be reduced, with travel restrictions in West Darfur preventing road movement in over 30% of the state. (UN OCHA, 2005)<sup>19</sup>. Protection of civilian populations remained a major challenge, and incidents of murder, rape, abduction, displacement, beatings, robbery and harassment continued unabated. Villages and farmland continued to be burned. Humanitarian vehicles and commercial trucks transporting humanitarian goods continued to be ambushed and looted.

Security continued to deteriorate from November through December, with fighting continuing between GOS and rebels, and militia attacks on residents and IDP camps continued unabated. Jebel Moon in West Darfur was inaccessible to humanitarian workers after a military operation that involved helicopter gunships. Intense inter-tribal fighting was also causing insecurity, for instance the most serious inter-tribal fighting occurred in South Darfur between the massaalit and Falata ethnic groups, which included the involvement of rebel movements, militia and GOS forces. About 20,000 people fled their homes in November. In Shearia, also in South Darfur, there was tense inter-tribal fighting between the Zaghawa and town residents.

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<sup>19</sup> UN OCHA, Sudan Humanitarian Overview, volume 1, issue 3  
<http://www.unsudanig.org/docs/Sudan%20Humanitarian%20Overview%20Vol1%20Iss3%20Nov05.pdf>

Other sources of insecurity included ambushes on UN and aid agency convoys, displacement of civilians into IDP camps, deliberate destruction of farmland and crops and general harassment of IDPs. Incidence of gender-based violence also rose during this period. By December 2005, insecurity had reduced humanitarian access in Darfur to below 70% - the lowest since April 2004.

## Conclusions

Although not all surveys done in the period under study are included in the analysis, the ones obtained offer a crucial understanding of mortality, morbidity and malnutrition among vulnerable people in Darfur and the extent to which they were affected by the humanitarian assistance.

Food insecurity in Darfur was exacerbated by the conflict, but relatively high rates of malnutrition existed before the conflict. Younger children are likely to suffer more frequent and more severe incidents of disease than older age groups. In an emergency, morbidity rates in children under five are exacerbated by malnutrition: which underscores the importance of programs to lower malnutrition rates in emergencies due to the nature of the complex relationship between disease and malnutrition. In Darfur GAM rates remained mostly high as communities continued to live in an emergency phase, while SAM rates remained mostly below emergency thresholds, possibly due to the deaths of severely malnourished children.

Wasting showed marked seasonal patterns associated with changes in food availability or disease prevalence. A case study in Abu Shouk camp to investigate the cyclical nature of malnutrition rates through the annual hunger and harvesting seasons showed remarkably high GAM, SAM and under-five mortality rates before or during the hunger season, and an amelioration of the same during the harvesting period.

Younger children are likely to suffer more frequent and more severe incidents of disease than older age groups. Due to the close association between malnutrition and mortality, there is cause for concern in camps which showed remarkably high malnutrition and under-five mortality rates. Almost all incidences of coinciding high GAM and under five mortality rates above the “serious” and “very serious” WHO classification, respectively, occurred in 2003 and 2004, which is consistent with an explanation that

increased humanitarian efforts were paying off after the UN and other aid agencies started operations in Darfur in the spring of 2004.

In spite of the intensity of humanitarian interventions in Darfur by most of the leading humanitarian aid organizations, mortality rates remained high and above emergency thresholds which was indicative that some of the communities continued to live an emergency phase. Mortality in some camps was alarming and unacceptably high, e.g., El Geneina camp had an alarming under-five mortality rate of 14.1 deaths/10,000/day and a diarrhea prevalence of 50% in May/June 2004 due to little humanitarian aid and population displacements at the start of the hunger period, which exacerbated vulnerability as many people came in already seriously malnourished and traumatized.

Most households in conflict prone areas of Sudan experience an annual peak in vulnerability during the annual “hunger period” from July – August. In a normal year, poor households become drastically vulnerable during the hunger period when they employ various coping strategies in an attempt to smoothen consumption. The increase in vulnerability during the hunger season can be attributed to the length of time since the last harvest and a general increase in food prices due to rising transaction costs associated with impassable roads in the rainy season and as well as insecurity. Transportation costs as a percentage of the consumer price of grains range from 20-25% in the dry season to 30-35% in the rainy season in Darfur.

In 2006, WFP evaluation the Darfur EMOP between April 2004 and December 2005 found that WFP had put humanitarian needs as a top priority and distributed more than 560,000 mt of food aid with reduced attention on how its cooperating partners (NGOs) distributed the food aid, without focus on targeting issues or gender programming. The number of beneficiaries reached was maximized at the expense of program quality. It is critical that the aid community not only evaluates how the anteceding intervention reduced vulnerability but also if the mix of interventions was optimal to produce the greatest impact in reducing vulnerability depending on the phase of the emergency.

The objectives of the intervention was to increase entitlements in the very short term and reduce vulnerability in the mid to long term. Given these aims, the relief community must ask itself if rushing food to more than 3 million vulnerable people in Darfur was the most effective manner of increasing entitlements and decreasing future vulnerability or if some form of market intervention was required alongside the usual portfolio of relief interventions to reduce extreme vulnerability.

In Darfur, grain markets did not collapse *in toto* even during the worst periods of insecurity though some did close during the peak of insecurity. Rural and urban markets were functioning and competitively operating and the flow of grains between the main producing areas and the rural/urban markets in Darfur was smooth with no barriers and/or interventions from the local authorities.

The humanitarian intervention was fairly well equipped to provide relief supplies to vulnerable people, but in view of the protracted nature of the conflict and a huge number of vulnerable people, market stabilization interventions should have been included to increase entitlements and pull vulnerable households out of poverty through trade in the short term future. This could have been done through sales of subsidized grain to targeted food insecure households, cash transfers to targeted households, subsidies of transport (delivery) costs to markets, sales of subsidized complementary commodities, like groundnut oil, to targeted households etc.

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## ANNEXES

### Annex I: Historical Narrative of Events affecting Food Assistance to Populations Affected By War in Greater Darfur: March 2003- December 2005

<b>March 2003</b>
Darfur Liberation Front announces that the movement will be called the Sudan Liberation Movement and the Sudan Liberation Army (SLM/SLA). The Darfur Liberation Front was a secessionist organization calling for the secession of the area from Sudan. The SLA, led by Mini Arkoi Minawi, said it wanted to "create a united, democratic Sudan."
Fighting breaks out between GOS forces and SLA and JEM rebels.
<b>April 2003</b>
The Sudanese Liberation Army (SLA) attacks El Fasher airport and takes over the airport which was also a vital military outpost, destroying five Antonov aircraft and two helicopter gunships. About 100 soldiers are and the raid demonstrated to the GoS that the rebels are a major threat and not just intent on 'acts of banditry'.
Refugees from Darfur begin arriving in Eastern Chad and large numbers.
<b>September 2003</b>
Chad hosts about 5,000 refugees from Darfur and the UN estimates that 500,000 people are in need of humanitarian assistance in Darfur.
The GOS and SLA reach a ceasefire agreement and both sides accuse each other of breaking it.
Abeche talks mediated by Chad produce a ceasefire agreement between Sudanese government and the SLM/A, spelling out a 45-day cessation of hostilities, the control of irregular groups, and the containment of SLA forces at locations to be designated later.
<b>November 2003</b>
Government-allied militia launch at least six raids on refugees near the Chad border
The Government of Sudan and the country's main rebel group agree to extend their cease-fire for another two months, pending the negotiation of a peace agreement.
<b>December 2003</b>
Ceasefire settled during the Abeche talks ends.
The town of Koulbous was attacked by GOS helicopter gunships. The wounded are

reported to number in the hundreds on both sides, with the GoS having suffered over 600 casualties (wounded and killed). One gun ship is shot down by the SLM and crashes in Chad.
Arab Janjaweed militia launch fresh attacks, including burning villages, murder and rapes of civilians, which prompts a refugee stream to Chad.
The GOS begins a restriction policy which delays humanitarian access to a “near stand still”. More than a million estimated to be in need of aid while 600,000 are estimated displaced.
<b>January 2004</b>
Serious insecurity leads to a temporary suspension of WFP activities and impedes the regular and timely delivery of food to people in need in all three of the Darfur states. Fighting continues to take place between the GOS and SLA/M forces, hundreds of civilians are killed and thousands flee to Chad. Humanitarian access remains limited.
The World Food Programme (WFP) calls for \$11 million to help 60,000 Darfurian refugees living in Chad.
UNHCR begins relocating refugees to the first safe camp away from the border as more people continue to be displaced into Chad. A second convoy relocates about 95,000 Sudanese refugees away from the volatile Chad-Sudan border to the Farchana camp further inside Chadian territory.
UNICEF begins an anti-measles vaccination campaign and a vitamin A distribution scheme inside Darfur
SLA forms alliance with eastern-based Beja Congress
The town of Tawilla, 40 miles southwest of El Fasher and its surrounding forces are attacked - 75 killed, more than 100 women and girls are raped. 150 women and 200 children are abducted.
<b>February 2004</b>
UNHCR announces emergency airlift for 110,000 refugees, now in Chad after fleeing Darfur militias.
WFP starts airlifting commodities into Darfur due to insecurity on the roads. The security situation in most of Darfur continues to worsen throughout the month.
Peace talks are held between the GoS and Darfur Rebels in N'Djamena, Chad.
<b>April 2004</b>
WFP launches its new Darfur-specific EMOP 10339.0 – ‘Food Assistance to Populations Affected by War in Greater Darfur’ – which targets 1.18 million beneficiaries between April 1-December 31, 2004 at a total cost of US\$ 99.3 million.

Government, SLA and JEM rebels agree to a 45-day ceasefire.
UN declares number of IDPs to have reached 1 million.
WFP launches a new EMOP specifically for the Darfur conflict. Up to this point needs are being met under the OLS framework
<b>May 2004</b>
U.N. human rights report says Sudanese troops and militia may be guilty of war crimes and crimes against humanity.
Government, rebels agree to African, EU ceasefire monitors
About Shook camp outside El Fasher is created.
WFP's initial response to the Darfur crisis is hindered by severe restrictions imposed by the GoS on access to Darfur. Following the ceasefire and intense international pressure, the GoS lifts some of the restrictive travel regulations and announces a series of measures to facilitate humanitarian access.
A WFP Budget Revision is approved for the Darfur EMOP, which had foreseen a reduced ration for the beneficiaries between October and December. This was based on the assumption that the security situation would improve during the farming season and allow farmers to plant. Since it is evident that this would not happen, a Budget Revision increasing the beneficiary caseload from 1.2 million to 2 million during the period October to December 2004 is prepared.
AU mediated talks breaks down after the Sudanese government refuses to agree to rebel demands.
<b>June 2004</b>
The onset of the rainy season poses a significant challenge to the delivery of humanitarian assistance in Darfur. As rains continue, access to Darfur deteriorates along with the health status of the affected population as Darfur becomes a breeding ground for infectious diseases.
<b>August 2004</b>
Second round of peace talks on Darfur held in Abuja, Nigeria.
The humanitarian situation continues to deteriorate as ongoing violence and the rainy season leaves more people in need of assistance. According to estimates, around 1.4 million people flee their homes – 1.2 million are displaced within Darfur, while another 200,000 cross the border into Chad.
Following a meeting with a UN mission in Asmara, WFP is granted unimpeded access by the SLA and JEM to rebel-controlled areas. The two rebel groups also assure WFP that they will not impede or delay food aid convoys.
WFP dramatically scales up its air operations, particularly in West Darfur, which is worst affected by the rains. Airdrops into inaccessible areas reaches more than 100,000

people.
Sudanese President Omar Hassan al-Bashir orders "complete mobilization" to disarm all armed groups in Darfur.
<b>September 2004</b>
FEWSNET issues an emergency alert for 110,000 Darfurian refugees living in Eastern Chad
Secretary of State Colin Powell testifies before the Senate Foreign Relations Committee that the crisis in the Darfur region of Sudan is genocide. - His first public use of the word.
Access limitations, insecurity, low cooperating partner capacity, and weak local transportation networks significantly impeded the delivery of food aid. However, despite these constraints, WFP fed more than the targeted 1.2 million beneficiaries and more than 1 million people for the first time since the start of the operation in April.
UN SG, Kofi Annan said that regardless of their legal definition things are happening there which must shock the conscience of every human being.
<b>October 2004</b>
The U.N.'s World Health Organization (WHO) says 70,000 are estimated to have died in the region.
The third round of Darfur peace talks is held in Abuja, Nigeria.
<b>November 2004</b>
Sudan signs two landmark peace deals with rebels, banning military flights over Darfur and covering security and humanitarian access. Sudan says it has lifted all restrictions on aid workers and revoked a state of emergency in North Darfur state
<b>December 2004</b>
Sudan agrees to stop military operations in Darfur and asks the African Union to request that rebels do the same.
The Fourth Round of the Darfur peace talks between the GoS, JEM and SLM/A is held in Abuja, Nigeria
<b>January 2005</b>
Trucks started moving to the Darfurs again following WFP's temporary suspension of food convoys in Kordofan due to heavy fighting between rebel forces and Government of Sudan in Ghubaysh, West Kordofan in the last week of December 2004.
January is overshadowed by an escalation of violence in some locations especially in South and West Darfur with attacks on humanitarian vehicles by armed bandits, rebel

forces and irate bands of displaced people.
An increased population movement creates difficulties in keeping track of the number of conflict-affected people. Some displaced people settle in established camps, while insecurity drives some to move from insecure camps to more secure camps closer to urban centers. To compound the problem, insecurity forces some residents to move from villages to IDP camps located in safer areas.
Some 273,000 beneficiaries in South Darfur and parts of West Darfur remain cut off from assistance because of insecurity.
Insecurity continues to affect delivery of relief services in North Darfur, Government aircraft reportedly bombard Rahad Kabolong and kill more than 100 civilians and NGOs like Oxfam and MSF-Spain move to El Fasher.
<b>February 2005</b>
February begins without major security incidents, save for random acts of banditry that continue to plague the delivery of relief supplies. Tension between GOS and SLA is building up in South Darfur.
<b>March 2005</b>
Darfur security worsens: the African Union pressures Khartoum and rebels to restart stalled peace talks as soon as possible
WFP plans to cut non-cereal rations by half from May onwards in order to guarantee at least half portions of non-cereals in August and September distributions.
Aid convoys are increasingly attacked along main corridors into the Darfurs. Heavy fighting between the GOS and National Movement for Reform and Development (NMRD) continue in Jebel Moon with a general mobilization of Janjaweed into this area.
<b>April 2005</b>
A group of over 200 militiamen attack and ransack the town of Khor Abeche, South Darfur. The group, under the command of Nasir Al Tijani Adel Kaadir, claim that the attack is in retaliation for an alleged theft of 150 cattle as well as the SLA's refusal to surrender the bodies of two of its men.
The UN says that at least 180,000 people have died and more than two million have sought refuge from the violence since the two-year conflict began. A UK parliamentary investigation concludes that as many as 300,000 could have died in the Darfur conflict
WFP plans to reduce non-cereal rations by half from May onwards in order to guarantee at least half portions of non-cereals in August and September 2005.

Continued conflict and increased insecurity coupled with the poorer-than-expected 2004 harvest indicates that the humanitarian situation in Darfur is rapidly deteriorating. WFP starts preparing to provide emergency food assistance for more than 3 million people at the peak of the hunger period from July to October 2005. WFP also starts using the of Port Benghazi in Libya to augment road and air deliveries of food to Darfur
Ambushes on commercial trucks transporting between Ed Daein and Nyala hamper delivery of food to various camps in South Darfur.
WFP's plan to cut non-cereal rations by half from May is discontinued following a donation from the USAID who redirect approximately 14,000 MT of non-cereals already on the high seas to Darfur.
<b>May 2005</b>
A FEWSNET report classifies Darfur and Chad in the highest category of concern for food insecurity. Pastoralists living near refugee camps in Eastern Chad are particularly singled out as needing humanitarian assistance
The overall security situation in all 3 Darfur states remains fragile: banditry continues to affect food aid convoys and increased attacks by the Justice and Equality Movement (JEM) in South Darfur and fighting between SLA and the militia in North and West Darfur continue to be reported.
A shortage of diesel fuel starts affecting food aid convoys delivering food for the WFP due to preparations for an annual closure of refineries in Khartoum.
<b>June 2005</b>
The Fifth Round of the Talks on Darfur resumes in Abuja, Nigeria
Fighting between Sudanese Government forces and rebels, as well as between armed militias and tribesmen in wider Darfur falls but the UN reports that banditry continues to plague north Darfur.
Increasing number of new IDPs are observed with the arrival of the hunger period as insecurity prohibits normal coping strategies including seasonal movement in search of pastureland and water.
<b>July 2005</b>
Secretary-General Kofi Annan's report says that violence has diminished greatly compared to the period from early 2003 to mid 2004. The ceasefire agreement seemed to be holding.
Increased military activity targeting humanitarian and commercial vehicles particularly in SLA-held areas combined with the effects of the rainy season, seriously hampers the access to people in need of assistance
<b>August 2005</b>
Increasing insecurity — murder, looting, banditry, abductions, ambushes, beatings and rape — remain the overriding concern throughout Darfur. In South Darfur, the security situation remain tense with armed men continuing to attack

and loot commercial trucks and humanitarian vehicles. Attacks against humanitarian and commercial vehicles continue in South and West Darfur.
Jet fuel shortages continue to hamper food deliveries by air into Darfur.
Planting season commences across the Darfurs, especially in North Darfur.
SLA restrictions on national NGOs to operate in areas under their control are affecting operations.
As predicated, heavy rains pose serious challenges for road deliveries into the Darfurs. West Darfur remains inaccessible due to overflowing wadis and airdrops are prioritized. Rains in North Darfur affect dispatches into Nyala. South Darfur is accessed from El Fasher, North Darfur.
<b>September 2005</b>
The 6 <sup>th</sup> round of peace talks on Darfur begins in Abuja, Nigeria.
Escalating insecurity in Darfur, particularly between El Fasher, Jebel Moon hills and Nyala as well as areas throughout West Darfur, raises serious concerns among humanitarian agencies operating in the region. Violent clashes between groups, continued ambushes on vehicles, evacuation of humanitarian workers in North Darfur and South Darfur as well as restrictions on UN movement in certain areas is hampering humanitarian assistance across the Darfurs
With the worst of the rainy season over, roads into Geneina from El Fasher, Kebkabiyah, Birka Saira and Seraf Omra open up during the week and trucks are able to travel along these roads.
A Darfur rebel group- the National Movement for Reform and Development (NMRD) - which was excluded from upcoming peace talks in Nigeria says it has abandoned a ceasefire agreed with Khartoum and would resume operations
More than 500 fighters from the Sudan Liberation Army launch a surprise attack on Sheiria in South Darfur and captured it.
Twenty-nine people are reported killed in an unprecedented attack on the Aro Sharow camp in Darfur by 250-300 "armed Arab men on horses and camels".
The security situation around Kalma IDP camp — the largest in Darfur with an estimated 150,000 people — further deteriorates with a large number of incidents being reported. The commercial blockade of the camp, which was imposed after the 20 May riots, remains in place.
Tensions between nomadic/militia groups and sedentary farming communities are on

the rise throughout Darfur. Villagers report continuous harassment by nomads and militia through looting, banditry and the forced payment of “protection taxes”.
<b>October 2005</b>
Tensions remain high Throughout Darfur and causes of insecurity remain complex: there was fighting between GOS and Rebel groups and allied militia, fighting between tribes and the presence of hundreds of combatant elements that reportedly defected from the Chadian army. Intensive violence that erupted throughout Darfur during the month of September continued unabated during the first half of October.
African Union Monitors in Kutum, north Darfur, report sustained heavy bombardment to the south –east of Kutum as the GoS army fights the SLA
<b>November 2005</b>
The 7 <sup>th</sup> round of the peace talks on Darfur are held in Abuja, Nigeria and are attended by the GNUS, JEM, SLM/A. A Darfur rebel faction, the breakaway National Movement for Reform and Development, says it attacked a town in West Darfur state, killing 37 soldiers and police, to push for its inclusion in peace talks.
Insecurity continued to deteriorate with ongoing GOS forces fighting rebels and militia attacking residents and IDP camps. In addition inter-tribal fighting, general harassment of displaced people an increased incidences of gender based violence were on the rise. <ul style="list-style-type: none"> <li>• The most serious inter-tribal fighting is in South Darfur between massalit and Falata ethnic groups which included the involvement of rebel movements, militia and GOS forces. About 20,000 people flee their homes in November.</li> <li>• Shearia in South Darfur is also tense due to ethnic inter-fighting between the Zaghawa and town residents.</li> <li>• Jebel Moon in West Darfur is inaccessible to humanitarian workers after a military operation that involve helicopter gunships</li> </ul>
Deliberate destruction of farmland and crops continued to overshadow an otherwise optimistic agricultural season.
An alert about WFP pipeline is issued: Without further contributions the cereal pipeline would break in January 2006 and April 2006 for non-cereals. In-kind or cash donations are needed to avoid the break and allow WFP to feed 2.5 million people in 2006.
In West Darfur security is tense with frequent reports of banditry. There are also constraints on humanitarian deliveries in Geneina where all roads in and out of town are completely restricted due to armed clashes and roving bandits.
<b>December 2005</b>
The African Union (AU) announces it will run out of cash for its mission in Darfur within four months



## Annex II: surveys done in Darfur, 2003-2005

Location of	State	date of survey	Agency	n	# clusters	Malnutrition				Mortality deaths/10k/day			Morbidity		
						GAM (6-59 mo)	SAM (6-59 mo)	GAM (6-29 Mo)	SAM (6-29 Mo)	Mortality recall	U-5 MR	CMR	Measles vaccinati	Diphtheria	ARI prevalence
All of Darfur	Darfur	Sep-04	WFP	844	55	21.80%	3.90%			6 m0	1.03	0.072	66.70%		
West Darfur	West	Aug-04	WHO		23					62	3.1	2.9			
Abu Shok	North	Nov-04	ACF	960	30	27.00%	2.40%	36.80%	5.50%	11	2.67	1.49	49.7	18.9	14.4
Abu Shok	North	Jun-05	ACF	960	30	25.90%	3.60%	39.40%	6.70%	90	1.95	0.6	78.7	12.3	10.6
Abu Shok/	North	Nov-05	ACF	960	30	18.50%	1.40%	28.20%	2.70%	90	1.46	0.49	73.3	9.7	2.5
Abu Shouk	North	Jun-04	ACF	995	30	39.0%	9.6%	62.0%	19.5%		6.76	2.15	52.8%	38.5%	18.3%
El Fasher	North	Mar-05	MOH	960	30	17.50%	2.40%			90	0.60	0.3	88.2	25.9	38.1
Goz- El Fa	North	Apr-03	SC-UK	900	30	21.60%	1.30%				0.50				
Goz- El Fa	North	Oct-03	SC-UK	900	30	15.10%	1.80%			90	0.97		96.3	19%	15.4
Goz- Um K	North	Apr-03	SC-UK	900	30	21.30%	1.30%				0.29				
Kebkabiya	North	May-05	ACF	960	30	17.00%	0.70%	21.30%	1.30%	90	1.19	0.66	79.7	24.8	23.3
Kebkabiya	North	Oct-05	ACF	960	30	18.20%	0.70%	21.50%	0.90%	77	1.71	0.73	72.3	3.1	2.5
Kebkabiya	North	Aug-04	EpiCentre - MSF		30	17.5%	1.0%	-	-	36	2.90	1.2	63.2%	-	-
Kutum	North	May-05	Goal	900	30	17.7%	0.80%			77	0.71	0.32	84.3%	18.7	59.3
Kutum	North	Oct-04	Goal			23.9%	1.70%								
Kutum	North	Mar-04	SC-UK	916	30	12.6%	0.8%	16.1%		-	2.05	-	87.1	5	23
Mellit Tow	North	Jan-06	ACF	960	30	18.00%	1.70%	22.70%	3.00%	92	2.06	0.76	84.7	7.8	13
North Darf	North	Aug-04	WHO/MSF H	9274	23					62	2.50	1.5			
North Darf	North	Sep-05	WHO/MSF H							180	1.50	0.8			
Pastoral el	North	Apr-03	SC-UK			15.5%	1.4%				2.20				
Pastoral el	North	Oct-03	SC-UK	900	30	25.0%	6.1%			90	2.50		98.5	-	-
Senif Umra	North	Oct-04	EpiCentre - MSF	900	30	14.7%	2.7%	-	-	29	1.80	0.8	92.6%	-	-
Tombac-T	North	Oct-03	SC-UK	900	30	17.6%	1.1%			90	1.76		98.3	-	-
Tombac-T	North	Apr-04	SC-UK			7.6%	0.66%				1.76				
Goz- Um K	North	Oct-03	SC-UK	900	30	17.40%	2.50%			90	1.76		94.8	2%	2.70%
South Darf	South	Sep-05	WHO								2.60	0.8			
Ed Daein	South	Mar-05	Tearfund	900	30	25.2%	4.3%						73.10%	39.6%	
Gereida C	South	Jan-05	ACF	956	30	15.60%	4.00%	22.00%	7.00%	15	4.17	1.18	39.2	39.5	41.5
Kalma	South	Sep-04	Grandess o/MSF	893	30	23.60%	6.30%	-	-	30	3.50	2	45.70%	-	-
Kalma	South	Feb-05	MSF-H		30	9.9%	3.9%			30	2.60	1.22	30.00%	50.9%	
Kalma	South	Aug-05	ACF	960	30	9.90%	2.60%	16.80%	0.60%	90	0.90	0.89	90.7	25.6	14.4
Kalma Car	South	Aug-04	WHO/MSF H		50					62	11.70	3.8			
Kalma car	South	Feb-06	ACF	960	30	7.00%	0.40%	12.50%	1.00%	92	1.31	0.89	95.7	6.8	4.1
Kass	South	Aug-04	Grandess o/MSF	900	30	14.30%	2%	-	-	121	5.90	3.2	69.60%	-	-
Muhajaria	South	Sep-04	Grandess o/MSF	900	30	10.70%	0.90%	-	-	30	1.00	2.3	50.60%	-	-
Nyala	South	Sep-04	ACF	960	30	23.6%	3.0%	31.2%	5.2%	-	-	-	75.3	12.1%	14.6%
Nyala Tc	South	Feb-05	ACF	960	30	10.60%	0.60%	13.90%	0.90%	90	0.65	0.26	78.4	25.9	20.7
Nyala Tc	South	Sep-05	ACF	960	30	19.10%	2.40%	-	-	-	0.75	0.36	93.7	11.3	6.9
Nyala towr	South	Mar-06	ACF	960	30	9.70%	0.70%	10.50%	1.20%		1.00	0.7	90	4.9	4.6
Sanya A	South	Nov-05	ACF	960	30	11.60%	1.10%	11.60%	1.40%	90	0.46	0.27	82.8	9.1	4.6
Dar Zagaw	West	Nov-03	SC-UK	933	N/A	18.60%	2.60%	-	-	-	1.36	-	61.3	5.8	10.9
El Geneina	West	Jun-04	MSF-Fr state	900	30					39	14.10	5.6			
El Geneina	West	Jun-05	MOH	960	30	17.00%	1.50%	28.70%	2.90%	90	0.23	0.53	78.8	32.6	19.1
El Genei	West	Oct-05	Concern	900	30	12.10%	0.30%			80	1.14	0.55	51.2	12.7	19.5
Fur Buran	West	Jan-05	SC-UK	1035	30	6.60%		8.20%	0.00%	93	0.89	1.8	75.9	22.8	9.7
Mornei car	West	Jan-05	Concern	949	30	4.90%	0.60%			106	1.16	0.79	67	41.3	24.3
Murnei	West	May-04	MSF-Fr	900	30					193	1.40	1.2			
Nieriti	West	Jun-04	MSF-Fr	900	30					145	2.10	1.3			
Seleia and	West	Jan-05	Concern	900	30	8.70%	0.40%			90	1.94	0.63	65.3	13.2	22.3
Seleia and	West	Jul-05	Concern	975	30	16.20%	1.90%			101	1.03	0.56	-	19.2	7.1
Sirba adm	West	Jun-05	SC	891	30	16.30%	1.80%	24.60%	3.00%	93	0.97	0.67	20.9	32.6	22.7
Wade Sale	West	May-04	MSF-H WHO/MSF H	921	30	21.5%	3.2%	28.3%	5.0%	92	5.23	3.64	-	46.8	-
West Darf	West	Aug-04	WHO/MSF H	7996	50					62	3.10	2.9			
West Darf	West	Sep-05	WHO/MSF H								1.00	0.8			
Zalingei	West	Apr-04	MSF-Fr	450	15					183	1.60	1.3			
zalingei ID	West	Jul-05	Cartas/n CA State	960	30	14.5%	1.9%	23.9%	3.4%	90	1.070	0.870			
Ardamat, E	West	Jun-05	MOH	900	30	16.90%	1.50%	28.70%	2.90%	90	0.23	0.53	79	35	
Fur Baran	West	Oct-05	SC	930	30	8.50%	4.00%	12.90%	0.90%	164	0.81	0.54	54		
Fur Baran	West	Jan-05	SC	930	30	6.60%	0.30%	8.20%	0.70%	93	1.8	0.89	76	16.7	21.3
Habila	West	Nov-05	SC	927	30	6.80%	8.00%	10.80%	1.70%	164	0.38	0.17	54	10.7	3.3
Zalingei to	West	Aug-05	Cartas/n CA	960	30	18.10%	2.10%	25.60%	4.50%	90	1.60	0.6			

## Annex III: Gaps in provision of relief services

Date	Apr-04	Jul-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
<b>North Darfur</b>																	
IDPs	286561	324215	378177	403889	393861	431135	484730	450902	479342	449209	444521	420855	420855	403576	413163	410150	409472
Affected Residents	57338	73492	111522	281311	282106	294601	247949	317811	275447	407603	580969	722104	722104	749631	773708	798483	828173
Total Number	343899	397707	489699	685200	675967	725736	732679	768713	754789	856812	1025490	1142959	1142959	1153207	1186871	1208633	1237645
Persons currently assisted with Food	203388	260270	350931	448980	305812	484493	455434	433537	255629	451890	726528	894055	894055	923547	1106444	1134515	946604
Gap (no. of people)	140511	137437	138768	236220	370155	241243	277245	335176	499160	404922	298962	248904	248904	229660	80427	74118	291041
% GAP	40.9	34.6	28.3	34.5	54.8	33.2	37.8	43.6	66.1	47.3	29.2	21.8	21.8	19.9	6.8	6.1	23.5
Persons assisted with clean Clean Water	50557	152976	296316	342950	319414	320448	343714	407803	417817	421097	477277	566244	566244	561198	565199	564730	588198
Gap (no of people)	236004	244731	193383	342250	356553	405288	388965	360910	336972	435715	548213	576715	576715	592009	621672	643903	649447
Gap %	69	62	39	50	53	56	53	47	45	51	53	50	50	51	52	53	52
Persons assisted in Sanitation	5500	90800	244441	232700	221049	223312	273679	265629	267619	324689	323950	339481	339481	336476	321396	321396	321396
GAP	281061	233415	133736	171189	172812	207823	211051	185273	211723	124520	120571	81374	81374	67100	91767	88754	88076
GAP %	98.1	72.0	35.4	42.4	43.9	48.2	43.5	41.1	44.2	27.7	27.1	19.3	19.3	16.6	22.2	21.6	21.5
<b>South Darfur</b>																	
IDPs	140343	225543	422661	595594	603719	701872	666370	698833	770808	727726	705261	678302	678302	673917	701592	636113	663278
Affected Residents	14608	33681	81410	165436	113842	122474	102445	124097	148177	214055	266180	455724	455724	455950	445842	480106	468708
Total Number	154951	259224	504071	761030	717561	824346	768815	823930	918985	941781	971421	1134026	1134026	1129867	1147434	1116219	1131986
Persons currently assisted with Food	24938	73227	326057	360593	432750	443436	455434	615651	529167	492262	640505	593542	593542	906574	776247	819910	653330
Gap (no. of people)	130013	185997	178014	400437	284811	380910	313381	208279	389818	449519	330916	540484	540484	223293	371187	296309	478656
% GAP	83.9	71.8	35.3	52.6	39.7	46.2	40.8	25.3	42.4	47.7	34.1	47.7	47.7	19.8	32.3	26.5	42.3
Persons assisted with clean Clean Water		87160	149816	304466	324216	427432	465540	511456	542815	518409	595200	582749	582749	595929	576058	544058	541892
Gap (no of people)	140343	172064	354255	456664	393345	396914	303275	312474	376170	423372	376221	551277	551277	533938	571376	572611	590094
Gap %	90.6	66.4	70.3	60.0	54.8	48.1	39.4	37.9	40.9	45.0	38.7	48.6	48.6	47.3	48.6	51.3	52.1
Persons assisted in Sanitation		14260	102200	255680	282600	373760	419540	468142	494399	431344	455434	339481	517198	513270	509513	466131	468131
GAP number of people	140343	211283	320461	339914	321119	328112	246830	231691	276409	296382	249827	338821	161104	160647	192079	169982	195147
GAP %	100.0	93.7	75.8	57.1	53.2	46.7	37.0	33.1	35.9	40.7	35.4	50.0	23.8	23.8	27.4	26.7	29.4
<b>West Darfur</b>																	
IDPs	573204	500748	640216	652509	662302	710084	647625	710412	715708	704780	709868	705174	705174	707407	711435	711435	715239
Affected Residents	12000	102747	125053	180527	134261	144304	147475	147061	233006	235186	254791	398487	398467	395844	441084	475804	498737
Total Number	585204	603495	765269	833036	796563	854388	795100	857473	948714	939966	964659	1103661	1103641	1103251	1152519	1187239	1213976
Persons currently assisted with Food	197965	316701	691123	483181	607953	560896	503584	662441	711878	697156	569168	688831	688831	775195	798187	959658	902381
Gap (no. of people)	387239	286794	74146	349655	186610	293492	291516	195032	236636	242610	395491	414630	414610	320056	354332	227581	311595
% GAP	66.2	47.5	9.7	42.0	23.7	34.4	36.7	22.7	25.0	25.8	41.0	37.6	37.6	29.7	30.7	19.2	25.7
Persons assisted with clean Clean Water	63500	238269	309363	326193	356922	440993	478680	499513	526950	567011	591074	616517	616517	619517	626857	647130	663743
Gap (no of people)	509704	262479	330853	326316	305380	269091	168945	210899	188758	137769	118794	88657	88657	87890	84578	64305	51496
Gap %	88.9	52.4	51.7	50.0	46.1	37.9	26.1	29.7	26.4	19.5	16.7	12.6	12.6	12.4	11.9	9.0	7.2
Persons assisted in Sanitation	15680	30920	306120	372266	364308	444259	508156	518266	629145	543438	558305	550896	550896	558924	557764	567764	581807
GAP number of people	557524	469628	334096	280243	297994	265825	139469	192146	86563	161342	151563	154278	154278	148483	153671	143671	133432
GAP %	97.3	93.8	52.2	42.9	45.0	37.4	21.5	27.0	12.1	22.9	21.4	21.9	21.9	21.0	21.6	20.2	18.7