Preliminary results
Nutritional anthropometric and retrospective mortality surveys
Children aged 6-59 months
Rub Kona County
Unity State
SOUTH SUDAN

13th – 25th of August 2008

Funded by:
UNICEF
INTRODUCTION

Bentiu and Rub Kona towns are located in Rub Kona County, Unity State, South Sudan. Unity state is an oil-bearing state bordered by South and Western Kordofan states on north (border with north Sudan), Warrap State on west and Jonglei State on east. These twin towns are located at approximately 800 km south of Khartoum. They are separated by a 7km tarmac road that crosses the Northern Bahr el Ghazal River by a bridge. All state governance bodies are located in Bentiu town.

The climate is sub tropical, with two main seasons: the dry season from October to April and the rainy season from May to September. This swampy area is endemic for diseases as malaria, Kala Azar, and parasites, such as bilharzia. Floods, which are normal to occur during the rainy season, are an additional factor to this disease-prone situation.

The main ethnic group is the Nuer, who belong to the Nilotic people, and are traditionally agro-pastoralists, for whom cattle is a landmark for prestige, wealth and social recognition. During the war, part of the population of the rural areas surrounding Bentiu and Rub Kona were displaced to Bentiu and Rub Kona, while others moved to Khartoum or bordering countries. Displacement and conflict have led to the disruption of livelihood strategies, and the implementation of emergency operations in response. This has shifted only recently, with the end of the war, and to some extent has induced a relative dependency on humanitarian aid throughout the area.

Three years after the CPA\(^1\) signature between North and South Sudan, returnees from Khartoum and from neighboring countries are still coming back to South Sudan. Since January 2008, 6,595 spontaneous returnees were registered in Unity State, from the 20,000 expected throughout the year\(^2\).

Arabs and Dinkas are also present as the migration roads of the Baggara and Arabs tribes cross part of the region. Tensions between Arabs and Nuers can rise quickly as Arabs are not well integrated into the Nuer community.

During the rainy season, as Bentiu and Rub Kona towns are flooded, there are population movements from one area to another within the town. In addition, in April 2008, Yoanyang area was destroyed and people moved to other areas in Rub Kona or in Bentiu towns, as well as to other counties.

ACF\(^3\) is running a nutrition program in Bentiu and Rub Kona which includes one TFP\(^4\) in Bentiu to treat severe acute malnutrition with medical complications, and two OTP\(^5\) distribution sites in Rub Kona and in Bentiu to treat severe acute malnutrition without medical complications.

The SFP\(^6\) which focused on treatment of moderately malnourished children was closed in January 2007 due to high defaulter rates.

Every year, since July 2000, ACF conducts nutrition surveys in the Bentiu area. Since February 2007 Bentiu and Rub Kona are gathered in one survey as no differences were found in terms of malnutrition rates from previous surveys.

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1. Comprehensive Peace Agreement
2. IOM Sudan Newsletter April May 2008, volume 24
3. Action Contre la Faim
4. Therapeutic Feeding Program
5. Outpatient Therapeutic Program
6. Supplementary Feeding Program
OBJECTIVES

- To evaluate the nutritional status of children aged from 6 to 59 months.
- To identify higher risk group of malnutrition and mortality (aged group, gender, residential status).
- To estimate the measles immunization coverage of children aged 9 to 59 months.
- To estimate the crude and under five mortality rates through a three months retrospective mortality survey.
- To determine immediate, underlying and basics factors influencing the nutrition situation of the community.
- To provide information about health, care practices, water/sanitation hygiene and food security indicators.

METHODOLOGY

A multi-stage cluster sampling method has been carried out using standardized questionnaires. SMART\(^7\) methodology was utilized. Anthropometric and mortality sample sizes were automatically calculated using ENA\(^8\) for SMART Software October 2007 version, after inputting the necessary data; 30 clusters of 25 children were sampled. Clusters were selected randomly with the probability of being selected proportional to the size of the population per village.

With the end of the national census on May 6\(^{th}\), the population data used for the survey was provided by the census department, which estimates 41,203 persons living in Bentiu and 18,835 in Rub Kona. During the planning phase, as some areas in Rub Kona were identified to have been destroyed between the end of the census and the beginning of the survey, theses areas were not included in the sampling. The Rub Kona population changed from 18,835 from 12,998. Therefore, the total population included in the survey cluster selection was reduced from 60,038 to 54,201. Children less than five years’ were estimated at 21.8\(^9\) of the population, 11,772 children.

Table 1: Survey sampling information for Anthropometric and Mortality data, Rob Kona and Bentiu town, Unity State, South Sudan - August 2008.

<table>
<thead>
<tr>
<th></th>
<th>Anthropometric survey</th>
<th>Mortality survey</th>
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</thead>
<tbody>
<tr>
<td>Population</td>
<td>11,772</td>
<td>54,202</td>
</tr>
<tr>
<td>Estimated prevalence</td>
<td>20%</td>
<td>2/10,000/day</td>
</tr>
<tr>
<td>± desired precision</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Design effect</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sample sizes</td>
<td>779</td>
<td>4,907</td>
</tr>
</tbody>
</table>

The second level of sampling was done directly on the spot using the “spinning pencil method”. A first direction was chosen randomly and followed by the team. In arriving at the edge of the quarter or section of the town, a second direction was chosen, from which the first household was randomly selected with use of a random numbers’ table.

The nutrition survey data collection was conducted from the 13\(^{th}\) to the 25\(^{th}\) of August in Bentiu and Rub Kona towns. The target group was children from 6 to 59 months.

\(^{7}\) Standardized Monitoring and Assessment of Relief and Transition
\(^{8}\) Emergency Nutrition Assessment
\(^{9}\) ACF nutritional and anthropometric survey, Bentiu and Rub Kona, September 2007.
Data were analyzed with ENA and EXCEL. Anthropometric data were analyzed in relation to the NCHS (National Center for Health Statistics) and WHO (World Health Organization) reference population.

**Team organization**

Four survey teams completed the data collection. Each team consisted of one team leader and two measurers. Prior to the survey, the survey team completed four days of training on survey methodology, anthropometric measurements and all practical aspects, including standardization and field tests.

**SUMMARY OF FINDINGS**

**Context description**

The Nuer traditional way of life, based on cattle-herding, agriculture and fishing, has been severely disrupted by the war. The north-south war led to loss of cattle and also hampered cultivation, as harvest was often looted and access to land was difficult or impossible. Hence the Nuer, displaced to Bentiu and Rub Kona during the war, rely largely on food aid and on monetized access to food – the latter is now the major food source for urban households. Since the CPA, the Nuer have resumed traditional livelihood activities (cattle rearing, agriculture, fishing) but in urban areas access to income remains essential to access food;

Moreover, agriculture wise, the Nuer have never cultivated enough land to cover their household annual food needs – as there is a higher value given to cattle than to agriculture. This is also an effect of other constraints, such as lack of manpower and lack of access to seeds/tools. Lastly, they often cultivate two plots: a small garden plot in town and a bigger one outside town.

The staple food is sorghum and maize. Vegetable access is limited as a result of high prices, as the market is mainly supplied from Khartoum. Wild leaves can also be found locally, though people do not have the habit of eating vegetables. As a result, diets are often not diversified, leading to limited standard nutritional intake. Hunting and fishing are also food source activities though to a limited extent in the town. As cattle are precious, they are rarely killed for consumption, only on special occasions, such as marriages, for example.

According to preliminary results, the main source of income in Bentiu and Rub Kona is formal employment (government, military, NGOs, companies) for 44.6% of households. Moreover, the market is the main source of food, for 84.4% of the households, further supporting evidence that revenue and purchase are the main food access mechanisms for households. In spite of the high need for income in order to access food, job opportunities are scarce in both towns, limiting access to income.

Water and sanitation conditions are poor. The main water sources available in the towns are the ‘water plant’ (were water is taken from the river, treated, and sold), hand pumps, river, swamps, and wells. As the main ‘water plant’ used by the population is reported to not have good bacteriological quality\(^{10}\), the only safe drinking water source is hand pumps. Thus, according to first results, the access to safe drinking water is reported to be 21.8%. Furthermore, only 38.8% of the households use latrines, most of the people defecate in the bush, or in possible open spaces around the house or in the street. From team observation, overall household hygiene can be improved.

As the area is swampy and subject to floods during the rainy season (when living spaces get very muddy), many diseases can occur. According to first results, in the two weeks prior to the survey, 10 ACF Water, Sanitation, and Hygiene (WASH) department
36.7%, 27.6% and 16.9% of the children were reported to have diarrhea, ARI\textsuperscript{11} or both, respectively.

**Agencies operating in the location**

<table>
<thead>
<tr>
<th>AGENCIES</th>
<th>ACTIVITIES</th>
</tr>
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<tbody>
<tr>
<td>Food and Agriculture Organization (FAO)</td>
<td>Food security</td>
</tr>
<tr>
<td>International Organization for Migration (IOM)</td>
<td>Protection, Re-Integration of the returnees</td>
</tr>
<tr>
<td>World Food Program (WFP)</td>
<td>Food Aid Distribution and Monitoring</td>
</tr>
<tr>
<td>UNICEF (office in Malakal)</td>
<td>Water, sanitation, education, health</td>
</tr>
<tr>
<td>Action Contre la Faim (ACF)</td>
<td>Nutrition, Food Security, WASH</td>
</tr>
<tr>
<td>German Agro Action (GAA)</td>
<td>Food Security</td>
</tr>
</tbody>
</table>

**Nutrition and Mortality survey results**

The table below presents the preliminary findings of the survey.

**Table 3: Malnutrition, mortality and measles immunization coverage rates**, Rob Kona and Bentiu town, Unity State, South Sudan - August 2008.

<table>
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<tr>
<th>INDEX</th>
<th>INDICATOR</th>
<th>RESULTS\textsuperscript{13}</th>
</tr>
</thead>
</table>
| NCHS (1977) | $Z$-score | Global Acute Malnutrition: $W/H < -2$ and/or oedema: 18.8% (16.0-21.5)
| % Median | Severe Acute Malnutrition: $W/H < -3$ and/or oedema: 2.3% (1.1-3.5) |
| WHO (2005) | $Z$-score | Global Acute Malnutrition: $W/H < 80\%$ and/or oedema: 9.5% (7.5 - 11.5) |
| % Median | Severe Acute Malnutrition: $W/H < 70\%$ and/or oedema: 0.6% (0.1 - 1.2) |
| MUAC Height >65cm | Global Acute Malnutrition (<120mm): 3.6% |
|                 | Severe Acute Malnutrition (<110mm): 0.6% |

Total crude retrospective mortality (last 90 days) /10,000/day: 0.68 (0.35-1.02)

Under five crude retrospective mortality /10,000/day: 1.99 (0.69-3.29)

Measles immunization coverage [N=724 children>= 9months old]

By card\textsuperscript{14} 16.3%

According to caretaker\textsuperscript{15} 49.9%

\textsuperscript{11} Acute Respiratory Infection
\textsuperscript{12} Anthropometric results (NCHS, WHO and MUAC) are for children 6-59 months
\textsuperscript{13} Results in bracket are at 95% confidence intervals.
\textsuperscript{14} The mass measles campaign card or the Road to health card was checked to verify measles immunization status of the child.
\textsuperscript{15} When no EPI card was available for the child at the household, measles vaccination information was collected according to the caretaker.
Quantitative results for health, care practices, water, sanitation, hygiene and food security will be further presented and analyzed in the final report.

DISCUSSION

In September 2007, ACF conducted a nutrition survey which revealed GAM rates of 20.5% and SAM rates of 2.6%. The August 2008 nutrition survey results are 18.7% GAM and 2.3% SAM. Though rates are slightly lower than in 2007, GAM is still above emergency thresholds of 15%, presenting a similar situation found by the September 2007 ACF survey.

The figure below illustrates the evolution of different malnutrition rates in Bentiu and Rub Kona since 2000. One survey including Bentiu and Rub Kona began to be conducted in February 2007.

**Figure 1: Evolution of the malnutrition rates of GAM and SAM in Bentiu and Rub Kona since July 2000** Rob Kona and Bentiu town, Unity State, South Sudan - August 2008.

In order to prevent a measles outbreak, 80% coverage is recommended and 90% is considered optimal by WHO\(^\text{16}\). Despite recommendations of previous reports, the measles coverage continues to be extremely low: 66.2% of the children were vaccinated from which only 16.3% confirmed by card and 33.4% of the children were not vaccinated. This is lower than coverage found in 2007, of 72.3%.

Moreover, it is possible that the percentage of children truly vaccinated according to caretakers without a card is less than 49.9%. When mothers confirmed by card that the child was vaccinated, it was often noticed that the child was not vaccinated against measles but against

\(^{16}\) World Health Organization
others diseases and that the mother did not make the difference. This was only possible to detect due to presence of a card.

The quality of water still remains poor as the main water plant used by the population is reported to be contaminated by bacteria\textsuperscript{17}. Therefore, the only identified source of safe drinking water is hand pumps, from which water is often salty and containing high levels of nitrate. At the time of the survey, there were 22 working hand pumps in Bentiu and Rub Kona, which should serve on average 11,000 people, a small proportion of the estimated 55,000-60,000 people living in both towns.

The crude mortality rate (CMR) was equal to 0.68/10,000 people/day and the under five mortality (U5MR) found to be 1.99/10,000 people/day, with U5MR at the limit of alert thresholds\textsuperscript{18}. These rates are slightly higher than in September 2007 when CMR was 0.6/10,000 people/day and U5MR was 1.02/10,000 children/day.

Despite several years of interventions in Bentiu and Rob Kona, in nutrition, food security and water-sanitation sectors, rates remain above emergency thresholds of 15% GAM and significantly high for Sam, with rates over 2\% . Alternative strategies, especially concerning hygiene, care practices and food diversification must be explored for best impact.

**RECOMMENDATIONS**

These recommendations are based on the preliminary analysis of the survey data. After further analysis of the data collected and the wider context, the recommendations that will appear in the final report may be different.

- To continue the treatment of acute severe malnutrition as the SAM rate is above 2\%.
- To address moderate acute malnutrition as rates are above the emergency threshold of 15\% GAM, such as via blanket under 5 years old distribution programs (BP5 or Plumpy Doz), as past targeted SFP programs have experienced high levels of defaulting with low overall impact.
- To increase the measles coverage vaccination.
- To increase access to potable water and latrine facilities to avoid infectious diseases and risk of malnutrition; to improve the water quality of the water plant and the hand pumps.
- To promote health, nutrition and hygiene education, by integrating such activities to those done by the health center workers.
- To continue active case findings of malnourished children in Bentiu and Rub Kona and involve the community who should be sensitized through community mobilization actions.
- To continue food security activities in order to increase the population access to a diversified food and a balanced diet.

\textsuperscript{17} ACF WASH department
\textsuperscript{18} U5: Alert level: 2/ 10 000 people / day and Emergency level: 4/ 10 000 people/ day

Total population (CMR): Alert level: 1/ 10 000 people / day; and Emergency level: 2/ 10 000 people/ day