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# THE UNDERLYING CAUSES OF MALNUTRITION IN OLD FANGAK PAYAM

## CENTRAL UPPER NILE
## SOUTHERN SUDAN

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## Acronyms

| | |
|---|---|
| ANA | World Food Programme Annual Needs' Assessment |
| ACF-USA | Action Against Hunger – USA |
| BCG | Tuberculosis immunization |
| CCSV | Coordination Committee for Voluntary Service |
| CHW | Community Health Worker |
| CNC | Community Nutrition Committee |
| DTP | Diphteria, Tetanus, Pertussis (whooping cough) |
| EPI | Expanded Programme of Immunization |
| FAO | Food and Agriculture Organisation of the United Nations |
| GAM | Global Acute Malnutrition |
| GOS | Government of Sudan |
| FGD | Focus Group Discussion |
| MCH | Maternal and Child Health care |
| MUAC | Mid-Upper Arm Circumference |
| NCA | Nutritional Causal Analysis |
| NGO | Non-Governmental Organisation |
| OLS | Operation Lifeline Sudan |
| PHCC | Primary Health Care Centre |
| PHCU | Primary Health Care Unit |
| PSF | Pharmaciens Sans Frontieres |
| SAM | Severe Acute Malnutrition |
| SCF-UK | Save the Children – United Kingdom |
| SFP | Supplementary Feeding Programme |
| SRRC | Sudan Relief and Rehabilitation Commission |
| TBA | Traditional Birth Attendant |
| TFC | Therapeutic Feeding Centre |
| UNICEF | United Nations International Children's Emergency Fund |
| VSF-B | Veterinaires Sans Frontieres – Belgium |
| WFH | Weight For Height |
| WFP | World Food Programme – United Nations |
| WHO | World Health Organisation – United Nations |

## Local names

| | |
|---|---|
| Boma | Smallest administrative unit of Southern Sudan |
| Payam | Administrative unit gathering bomas and part of a county |

Contents

## 1. EXECUTIVE SUMMARY

After 3 years of intervention in Old Fangak payam, Central Upper Nile, Southern Sudan, Action Against Hunger (ACF-USA) was facing 2 main difficulties: on one hand increasing rates of malnutrition over the years in spite of external interventions in the fields of nutrition, food security and health; and on the other hand the low attendance to the feeding programmes despite the alarming nutritional situation. Therefore, ACF-USA decided to implement a survey on the underlying causes of malnutrition among the children under-5 years in order to have a better understanding of the nutritional situation and to improve the appropriateness of the programmes to tackle malnutrition.

The survey has been based on UNICEF approach: the Nutritional Causal Analysis (NCA). This approach identifies 3 levels of factors leading to malnutrition: the *direct* causes, which are inadequate food intake and disease; the *underlying* causes, which refer to 3 spheres: food security at the household level, public health and hygiene, and social and care environment; and the *basic* causes, which correspond to the structural factors, at the society level. The survey focused on the underlying causes of malnutrition.

The main tools used to collect information were the focus group discussions and individual interviews with key informants and caretakers. The implementation of the survey took place between November 2003 and January 2004. The team faced difficulties in accessing the population because of the displacement constraints in this area – all movements are done by foot, some villages are very distant or isolated because of swamps – and seasonal population movements due to water shortage. In spite of the constraints, the team succeeded in collecting the needed information.

In parallel, ACF-USA has also carried out an exhaustive survey in the same area aiming at estimating the prevailing nutritional status of the under-5 population, determining the coverage of the health education and nutritional surveillance programme implemented in mid-2003, and determining the coverage of the feeding programs. The findings of this survey has been useful for the understanding of the situation in Old Fangak, in providing more accurate population figures, new estimation of the nutritional situation among children aged 12-59 months (exhaustive screening using MUAC and height), and information on the practices related to water.

Following the analysis of the collected data, the main findings are:

- Disease is a prevailing factor leading to malnutrition in this area;
- The high prevalence of disease cases is due to hostile environment, lack of safe drinking water, poor personal and environmental hygiene, poor health seeking and limited health services;
- The food intake of the under-5 is also questioned, since weaning practices are inappropriate, children only benefit from 2 meals a day and diet is imbalanced;
- A large part of the underlying causes of malnutrition are related to inadequate childcare practices: breastfeeding, weaning, feeding, hygiene, and health seeking;
- The heavy women's workload affects the availability of the mothers for childcare and indirectly influence the nutritional status;

- The lack of support from kinship is an aggravating factor affecting the availability of the mothers and the food security situation at the household level.
- Food availability at the household level is not a major concern however a prolonged milk and cereals shortage can rapidly deteriorate the nutritional status.
- While these factors affect similarly all children, including children aged more than 5 years, children aged 6-29 months appear as the most vulnerable since they particularly suffer from inadequate breastfeeding and weaning.

The survey on the underlying causes of malnutrition has not provided the full explanation of the increasing malnutrition rates over the past years, either the identification of seasonal variations. Malnutrition rates fluctuate on an unexpected basis without obvious links with "hunger gap" or post-harvest period. Therefore it is difficult to conclude on the seasonal or chronic feature of the malnutrition in this area.

The exhaustive screening carried out in December 2003/January 2004 has displayed a significant improvement of the nutritional situation - 22% of the children aged 1 to 5 years are at risk of malnutrition using MUAC and height, as compared to 47.9 % in March 2003. This improvement has to be confirmed with a new anthropometric survey to be conducted in the coming month. In addition, the exhaustive survey has displayed population figures considerably below the official ones, meaning that the coverage of ACF-USA feeding centres was probably better than stated.

Taking into consideration the results of these surveys and in order to better tackle malnutrition in Old Fangak, ACF-USA particularly recommends:

- ***Recommendations for ACF-USA to participate in reducing malnutrition in Old Fangak:***

¬ **To continue and improve the nutritional surveillance:**

- <u>Nutrition surveys</u>: to ensure the implementation of anthropometric surveys ideally twice a year, before and after the rainy season, in order to compare the results to previous years and to have a clear picture of the evolution of the nutrition situation. The quality of the nutrition surveys needs to be ensured through a very close supervision of the local personnel recruited and trained for this specific purpose.
- <u>Nutritional surveillance through ACF-USA health surveyors</u>: to reinforce community capacity to have a reliable nutritional surveillance system. ACF-USA will particularly enhance this through a better monitoring of the health surveyors (with more regular presence of professional health and nutrition personnel in the field) and the reinforcement of the sustainability of the system (motivation of the health surveyors, involvement of the Community Nutritional Committees).
- <u>Pilot of growth monitoring</u>: since there is no proper growth monitoring in Old Fangak for the time being, ACF-USA proposes to implement a pilot. The health surveyors already operating in the field could follow specific children on a regular basis, using height (scaled stick) and age (referring

to local calendar). ACF-USA Health Education Department needs to go thoroughly into the methodological and practical issues, particularly the sample size, frequency, capacity of male/female health surveyors to do it for literacy reasons, etc.

¬ **To continue promoting adequate breastfeeding and to improve the promotion of adequate weaning**:

- Health education sessions: ACF-USA Health Education Department proposes to continue promoting breastfeeding through education sessions with the support of existing posters. ACF-USA also intends to add messages on weaning: on the appropriate timing (from the age of 6 months) and on weaning foods (consistency and diversification).
- Training on breastfeeding and weaning: as breastfeeding and weaning are important issues, ACF-USA Health Education Department envisages a specific training for the health surveyors in charge of the health education sessions as well as for the women's groups. It is assumed that women will be more sensitive to weaning issues than men and that mothers will be therefore more receptive if the message comes from women. As most of the health surveyors are male, it seems relevant to reinforce the dissemination of the messages on weaning through the women's groups. A first training should be organised before the rainy season, probably in Old Fangak boma. According to the results of this experience, the training will be repeated in the other bomas of Old Fangak payam.

¬ **To promote balanced diet**:

- Training/Education sessions on breastfeeding and weaning: the training and messages on weaning foods will be a good opportunity to promote diversification of the diet, including with the use of locally available foods that are not consumed at the time being, like pumpkin leaves and some wild foods.
- Training on gardening techniques: in order to sustain the gardening initiative implemented in 2003/04, ACF-USA proposes to ensure training sessions on gardening techniques like seeds savings.
- Distribution of diversified seeds: ACF-USA intends to distribute diversified seeds (possibly okra, simsim, groundnuts and cowpeas) in Old Fangak area before the next planting season.

¬ **To promote balanced diet**:

- ACF-USA intends to meet with SCF-UK, who is in charge of the education programmes in Old Fangak payam, in order to discuss possible plans regarding school feeding in this area.
- According to the discussions, and if SCF-UK does not intend to implement school feeding, ACF-USA will engage discussions with WFP in order to support a school feeding programme in the 4 bomas of Old Fangak. The implementation and monitoring issues will then be discussed with the local partners.

¬ **To continue and to strengthen health education**:

- To continue disseminating messages on the following topics: explanation on faecal transmission routes, need for building latrines or covering faeces, washing hands and face regularly, fetching water in the safer water points (in spite of the distance), systematically treating water, protecting water and foods, early referral of the children to the health centres when they are sick.
- To ensure a better dissemination of the health education messages through:
  - ♣ Reinforcement of the monitoring of the health surveyors with more regular presence of professional health and nutrition personnel in the field, in order to ensure they meet their objectives, i.e. house-to-house visits to randomly selected households and health education sessions.
  - ♣ Improvement of the presentation skills of the health surveyors (participatory teaching practices) and increased use of culturally acceptable visual aids.
  - ♣ Determination of other tools to facilitate the dissemination of the messages.
  - ♣ Intensive refresher training.
  - ♣ Extension of the audience with additional health education sessions in identified public places like churches, market or water points.
  - ♣ Reinforcement of the sustainability of the health educators network (motivation of the health surveyors, involvement of the Community Nutritional Committees).
  - ♣ Increasing involvement of the health units (PHCC/PHCU): collaboration of ACF-USA and CCSV on the definition of health education sessions/messages and monitoring; ACF-USA support to the CHW with training and visual aids.
  - ♣ Increasing involvement of the schools: collaboration of ACF-USA and teachers on the definition of health education sessions/messages and monitoring; ACF-USA support to the teachers with training and visual aids.

¬ **To ensure that people have the means to ensure proper hygiene:**

- To envisage a better access to soap: to envisage the possibility to locally make soap.
- To envisage better storage capacities for food and water: ACF-USA intends to make a needs assessment and according to the results to implement a distribution of non-food items (buckets, etc).

¬ **To assess the possibility to ensure safer water sources:**

- In-depth assessment of the needs
- Review of the different possibilities to ensure safe sources of water: digging wells, boreholes, filtering system, rainwater collection, etc.
- Proposition of intervention.

¬ **To save women's time with the promotion of a collective mill**: the findings of the survey on the underlying causes of malnutrition have highlighted that the heavy workload of the women prevent them from dedicating time to their children. This can affect the food intake of the children as well as the health seeking practices. The main time consuming activities of the women are grinding grains, cooking and fetching water. In order to save women's time, ACF-USA suggests promoting a collective mill, which should allow reducing the time spent in grinding. For this purpose, ACF-USA proposes:

- To gather information on existing experiences and successful stories of mill promotion (Tearfund).
- If relevant, to envisage a pilot project of collective mill in Old Fangak town.

¬ **To envisage the support to health structures to detect and treat malnutrition:** taking into account ACF-USA last estimation of population figures and the improvement of the nutritional situation, ACF-USA does not envisage any supplementary feeding programme but intends to focus on preventing mortality through the treatment of severe acute malnutrition. Therefore:

- ACF-USA proposes to discuss with COSV about the capacities of the PHCC in treating severe cases of malnutrition.
- According to the results of the discussion and if needed, ACF-USA could provide technical advice and support to set up a home treatment programme, with the first phase of the treatment in the PHCC inpatients. ACF-USA support could be envisaged through the training of the CHW and the supervision of the nutrition activities.

♦ ***Other recommendations to tackle malnutrition in Old Fangak:***

¬ **To improve the quality of the health services:**

- Decentralised services: as the CHW in the PHCU can only treat basic diseases and as people cannot always afford to go to Old Fangak PHCC due to the distance and difficulty to move (swamps), it is recommended that the PHCC nurse ensures regular visits to the 3 PHCUs (in Chotbora, Wangleil and Pulpam) in order to provide people with more appropriate diagnosis and treatment. This initiative could require additional professional health personnel.
- Improved skills in the PHCU: additional training and closer monitoring of the CHW, particularly those working in the PHCU, should allow a better quality of the provided medical services.
- Maternal and Child Health care (MCH): for the time being COSV is implementing pre-natal consultations in the PHCC and supports a TBAs network. No information has been collected on post-natal care. MCH definitely needs to be reinforced in order to have a better follow up of the mothers and new-borns (particularly for immunization) and to collect information on the birth weight. MCH could also be the initial step for a proper growth monitoring, which is non-existent at the present time.

- **To support diet diversification through farming training:** diet diversification is an important issue to participate in the reduction of the malnutrition in Old Fangak. ACF-USA has promoted and still promotes diversification through distribution of diversified seeds and training sessions. Additional technical support/training from specialised agencies, particularly FAO, would reinforce the impact of the diversified seeds distribution.

- **To increase the number of safe water points, particularly in Pulpam:** previous experiences of UN Water Bureau have failed in drilling boreholes in Pulpam because of the inadequacy of the drilling machine. ACF-USA recommends that the experience be renewed with a more performing machine.

- ***General recommendations:***

- The findings of the survey on the underlying causes of malnutrition in Old Fangak payam have displayed a large range of factors interacting and leading to malnutrition. These factors are related to different fields: nutrition, health, health and hygiene education, water and sanitation, and food security. Therefore **the response to malnutrition has to be multisectoral, with the complementary analysis and intervention of agencies/organisations specialised in the above-mentioned fields.** ACF-USA strongly recommends a **good collaboration and coordination of these agencies/organisations** to successfully tackle malnutrition. In particular:
  - For any feeding programme to be implemented in Upper Nile ACF-USA recommends a closer collaboration with the health structures of the area.
  - To ensure that all agencies working in the same area collect standardised information on the context (food security, epidemic outbreak) and their own activities (feeding/health centres attendance, morbidity, mortality, distributions, etc), and share it with the other agencies on a regular basis, e.g. every month.

- **To follow the food security situation:** as a possible aggravating factor of malnutrition, the food security situation needs to be followed-up in order to identify a possible food shortage and to plan actions to prevent it, like distributions of seeds, tools, fishing equipment or food rations. The main sources of information are the sentinel sites (like USAID Famine Early Warning System (FEWS net) and WFP Early Warning System) as well as the teams in the ground.

- **To strengthen the food security capacities of the population:**
  - To promote **animal health programmes** in order to preserve the existing herds and to increase the contribution of the livestock to the food security at the household level (as an economic asset and as a food source - milking products and meat).
  - To improve capacities of the community in being food self-sufficient: examples: training on farming and fishing techniques to increase yields, food preservation, seeds saving, marketing, etc. These are long-term initiatives.

## 2. INTRODUCTION

Old Fangak payam[1] is located in Zeraf Island, Central Upper Nile, Southern Sudan. It is composed of 4 bomas: Old Fangak, Chotbora, Wangleil and Pulpam, and it is part of Old Fangak county, in Phou State. The area is made of swamps and Zeraf River crosses the payam from South to North. The terrain is flat and regularly flooded, particularly during the rainy season.

The inhabitants are Nuers, belonging to Laak or Thiang clans. Figures related to the population of Old Fangak vary between SRRC estimations (around 40,000 people) and ACF-USA last estimations following an exhaustive survey carried out in December 2003/January 2004 (around 8,500 inhabitants). Villages and houses are scattered over the area and some of them are difficult to access because of the distance or swamps. People are agro-pisca-pastoralists, relying on agriculture, fishing and livestock breeding. They cultivate sorghum and maize as main crops, as well as pumpkin, okra, cowpeas and groundnuts. The river is a permanent source of fish and benefits to a large part of the community. In addition, people breed cattle, goats and sheep, and to a lesser extent keep poultry. Cows and goats provide milk on a daily basis almost throughout the year.

ACF-USA is intervening in Old Fangak since 2001. Insecurity in the area has affected the population, with serious attacks from the Government of Sudan (GOS) like aerial shells and barge attacks. The permanent threat of new assaults prevented people from cultivating and led to forced displacements of population. Since 2003, due to the ongoing peace negotiations and subsequent cease-fire, the situation is quiet but local fighting still has an effect on the community.

For 3 years now, ACF-USA has been particularly concerned about the nutritional situation and has been implementing nutrition-related activities: assessment and surveillance of the nutritional situation, feeding programmes, health education, food security assessment and gardening promotion.

After several years of intervention in the area, the problem is still pending: in spite of external interventions in the fields of nutrition (ACF-USA), health (CCSV, WHO) and food security (WFP, ACF-USA), the nutritional situation has continuously deteriorated, reaching alarming malnutrition rates.

### a. The nutritional situation in Old Fangak

Since October 2001, ACF-USA has carried out 5 anthropometric surveys in Old Fangak payam among the children aged 6-59 months. The results of these surveys are summarized in the following table:

[1] During the past years, propositions have been made to redefine the administrative units in Southern Sudan. Up to now, no final version of the divisions has been officially agreed. Therefore, ACF-USA refers to the administrative units as used in the past years for its previous interventions in the area.

*Results expressed in Z-score:*

| | April 2001 | October 2001 | March 2002 | September 2002 | March 2003 |
|---|---|---|---|---|---|
| **Global acute malnutrition** | 20.4% | 28.6% | 30.3% | 34.1% | 35.9% |
| **Severe acute malnutrition** | 3.0% | 6.0% | 5.7% | 10.2% | 8.2% |

The results display a constant increase of the global acute malnutrition (GAM), reaching rates clearly above the international emergency threshold of 10 %[2], and even above the 15% usually admitted by UNICEF - Southern Sudan to declare an emergency situation in Southern Sudan. Both GAM and Severe Acute Malnutrition (SAM) reflect a worrying situation, requiring external intervention.

WFP implemented food distributions while CCSV was in charge of primary health services. Insecurity regularly disturbed both activities. Regarding nutrition, ACF-USA implemented feeding programmes (2002 and 2003), linked with health education and gardening promotion (2003).

### b. The low attendance to the feeding programmes

To face this alarming situation, ACF-USA ran feeding programmes:

- In July/August 2002, ACF-USA opened a therapeutic feeding centre (TFC) in Old Fangak to treat SAM, as well as a supplementary feeding programme (SFP) with 4 distribution points to cope with moderate acute malnutrition; the programmes closed in October 2002;
- In July 2003, the TFC and the SFP resumed, but because of the low attendance, the TFC closed and was transferred to CCSV in November 2003 and the SFP at the end of January 2004.

In both experiences, the attendance to the feeding programmes was very low compared to what was expected. Usual treatment of malnutrition displayed limits and this difficulty to adequately cope with malnutrition in the area led to the necessity to have a better understanding of the nutritional situation.

Thus, in order to propose a better response to malnutrition in Old Fangak and to implement more appropriate programmes, ACF-USA proposed to carry out a survey on the underlying causes of malnutrition.

[2] According to *the classification of wasting prevalence in the under-5 population*, WHO, 1995.

In parallel to this survey, ACF-USA also decided to conduct an exhaustive survey[3] in the same area, aiming at:

- Estimating the prevailing nutritional status of the under five population,
- Determining the coverage of the feeding programs,
- And determining the coverage of the health education and nutritional surveillance programme.

ACF-USA Health Education department was in charge of the implementation of this exhaustive survey, which findings were supposed to provide useful information for the understanding of the underlying causes of malnutrition.

## 3. OBJECTIVES OF THE SURVEY ON THE UNDERLYING CAUSES OF MALNUTRITION IN OLD FANGAK

The 2 main objectives of the survey on the underlying causes of malnutrition were defined as follows:

- To provide an in-depth analysis of the underlying causes of malnutrition, referring to the UNICEF nutritional causal analysis (NCA) conceptual framework;
- To make recommendations in order to improve the appropriateness of the response to malnutrition, particularly ACF-USA intervention.

The study area was Old Fangak payam with the 4 following bomas: Old Fangak, Chotbora, Wangleil and Pulpam.

The target population was the children aged 6-59 months, commonly named under-5 children.

[3] Exhaustive survey because the objective was to visit all the households of Old Fangak payam and to screen all the under 5 children.

## 4. METHODOLOGY OF THE SURVEY

The survey on the underlying causes of malnutrition has been based on the UNICEF NCA conceptual framework.

### a. The nutritional causal analysis

In 1992, UNICEF elaborated a conceptual framework[4] aiming at identifying the different causes of malnutrition. The framework presents 3 levels of factors leading to malnutrition:

- The immediate causes, which are the **inadequate food intake** and **disease**, both interacting;
- The underlying causes, referring to 3 areas: **food security at the household level**, **public health and hygiene**, and **social and care environment**
- The basic causes, which refer to **local priorities**, **local resources**, **political-economic-social-cultural context** and **formal and informal organisations and institutions**.

This approach has been experimented in various contexts to provide an in-depth analysis of the causes of malnutrition. It benefits from international acknowledgement.

This kind of survey on the causes of malnutrition is a qualitative study, relying more on qualitative information than quantitative data. For this purpose, most of the information has been collected through Participatory Rural Appraisal tools.

### b. The collection of information

Such a survey requires collection of specific and qualitative information:

- At the global level, on the context. Information is usually collected through meetings with key informants and review of documents from different agencies working in the same area.
- At the community level for local issues like food security situation in the area, health situation, and practices related to hygiene and childcare. Important information is also collected regarding the local understandings and perceptions. This kind of information is gathered through meetings with local key informants as well as focus group discussions (FGD).
- At the household level, in order to draw the profile of the families where there is malnutrition. The individual interview with the mother or caretaker is the most appropriate tool. As it is a qualitative survey, a large sample size is not necessary but it has to respect the geographical distribution of the population in the area. For this specific survey, the sample has been limited to approximately 50 families, distributed according to population density. To be able to validate the results, some interviews were conducted in households where there was no malnutrition.

[4] Please refer to the annex 1.

- At the individual level, for information related to the malnourished children. The individual interview with the mother or caretaker was also the most adapted tool to get this information.

Primary data, i.e. information collected directly from the community – as a group or individually – is usually gathered through Participatory Rural Appraisal tools. For this survey, the team has used the following tools:

- **Focus group discussions (FGD)**: groups are composed of 10 to 15 persons, either official representatives of the community (women's group members, leaders, church representatives) or randomly selected persons. The objective is to get the most common ideas and opinions within the community on specific issues. Discussions usually last for 1 to 2 hours.
- Definition of the **calendar of events**: this is generally done during a FGD. The objective is to draw a calendar with events that make sense for people, with local references. It is particularly useful when communities do not have a precise track of time. It is then helpful to determine ages and durations.
- **Semi-structured interviews**: this exercise is complex since it aims at obtaining qualitative information from a semi-structured discussion. A questionnaire or guideline is usually needed to lead the conversation. Questions should not lead the answers but allow free expression of the interviewee. The discussion usually lasts for 1 to 2 hours.
- **Direct observation**: it plays an important role, particularly to crosscheck information obtained through discussions and as a base for the discussion.

The combination of the different tools allows proper collection of direct data.

## 5. IMPLEMENTATION OF THE SURVEY

The implementation of the survey required 3 months, from November 2003 to January 2004. The NCA team was composed of 8 persons: 1 livelihood specialist, 1 field officer, 3 nutrition specialists/surveyors, and 3 programme officers/assistants. To conduct the interviews at the household level, 4 mobile teams of 2 persons were formed, each one operating in a different boma.

### a. The activities

The main activities implemented for the NCA were:

- The review of secondary data and meetings with key informants
- FGD on food security, food and feeding patterns, representations of disease and malnutrition and activities within the household (according to gender and age)
- Individual interviews at the household level
- And analysis.

#### ¬ *Review of secondary data and meetings with key informants*

3 weeks were dedicated to the review of secondary data related to the situation in Old Fangak. Internal documents from the various ACF-USA departments constituted the main source of information. It has been quite difficult to obtain formalised information from other agencies on the specific situation of Old Fangak, either because of the difficulty in collecting or sharing the information. It was the case for morbidity figures and attendance to the health centres, as well as to get the frequency and amount of the food distributions over the past years. The lack of or difficulty to access standardised data has made the clear understanding of the situation in Old Fangak difficult.

Meetings with members of various agencies[5] working in Upper Nile in the field of nutrition, health or food security were also helpful to have a global understanding of the situation.

This preliminary work allowed the identification of gaps of information and the preparation of primary data collection.

#### ¬ *Collection of primary data*

The data collection was implemented in 3 steps:

♣ **A first series of 7 FGD on food security situation**:

The objective was to determine if the food availability in the area over the past 3 years had contributed to malnutrition.

The discussions focused on the definition of a calendar of events over the past 3 years, with a particular attention paid to the quality/quantity of own production

[5] CCSV, WFP (including ANA team), PSF, VSF-B, Tearfund, SCF-UK.

(milk, crops, fish, meat) and wild food, the ability to rely on exchange through markets or barter, as well as the coping mechanisms in case of low food availability (kinship ties, relief food).

The FGDs were organised separately for the 4 bomas of Old Fangak payam in order to take into consideration the geographical variations. In addition, since in this community, women are in charge of the food, half of the focus groups were composed only with women (including women's association representatives).

♣ **49 individual interviews conducted at the household level:**

The selection of the households to interview was determined as follows:

⊗ Selection of the villages to visit: the sample was limited to the villages accessible by 3-hour walk from each boma base. The number of interviews to carry out in each location was determined according to the estimated number of households in each of the villages[6].

⊗ Selection of the households to interview:

- *Assessment of the nutritional status of all the under-5 children of the household*:
  - For a household where there was malnutrition: at least one child had a WFH equal to or below 80 % of the median[7];
  - For a household where there was no malnutrition: all the children had WFH above 80 % of the median and had not been previously admitted in feeding programmes.

  1 interview out of 3 was conducted in a household where there was no malnutrition.
- *Settlement of the household in Old Fangak area for more than 3 months*: at the time of the interviews, population movements had been noticed in the area, including people coming from GOS towns[8]. As the objective was to get an accurate picture of the situation of people from Old Fangak, it was decided to select only households settled in the area for at least 3 months, which is the estimated time for people to adapt to the location.
- *Presence of the mother/caretaker and child the day before the interview*: the interviewee was either the mother or the permanent caretaker of the child. As some of the questions were related to the past 24 hours, it was necessary to ensure that the interviewee and the child had undertaken usual activities the day before (e.g. did not go for SFP distribution).

[6] Please refer to the list of the visited villages in annex 2. The initial list was modified during the data collection in order to take into consideration the updated information on villages distribution.
[7] When the mobile teams faced difficulties in finding families meeting the criterion, it was extended to WFH between 80 and 85 % of the median for children admitted previously in the SFP (i.e. former malnourished children);
[8] Since the beginning of the peace talks, people can move freely between GOS towns and former rebels areas.

- ⊗ The objective of the interview was to focus on one child only. In households where there were several malnourished under-5, priority was given to the most severely malnourished or the youngest child. In households where there was no malnutrition, the youngest child among the 6-59 months was selected.
- ⊗ The interview was based on a questionnaire which contents were defined according to the assumptions made after the preliminary work. Questions were related to the household composition, food security at the household level, child's food intake, child's health, hygiene practices and childcare practices. The questionnaire was first tested in the field and modified according to the results from the pilots.

In total 32 interviews were conducted in households where there was malnutrition and 17 in households where there was no malnutrition.

♣ **A second series of FGD with the community:**

Individual interviews could not cover all topics and it appeared necessary to more deeply investigate particular issues. Therefore, a second series of FGD was organised on the following themes:
- Food and feeding patterns
- Representations of disease and malnutrition
- Activities within the household according to gender and age.

Due to time constraints, it was not possible to organise the FGD separately for the 4 bomas of Old Fangak, but people from the different locations were invited to participate. The groups for food and disease/malnutrition discussions were only composed of women, including women's association members. The group for activities within the household was mixed.

♣ **Analysis and recommendations:**

Information from the individual interviews was entered in a SPSS[9] database in order to cross some variables. However the main analysis was done through team brainstorming and discussions.

### b. Constraints and difficulties faced during the implementation

The main constraints faced during this survey were related to:
- The movements to and within Southern Sudan
- The selection of the households to interview.

#### ¬ *The movements to Southern Sudan*

ACF-USA is an OLS member and therefore depends on OLS rules to move to Southern Sudan. For any staff movement, procedures to follow (travel permit, attendance to OLS security workshop, booking of OLS flights) are time consuming and offer little flexibility.

[9] SPSS: Social Package for Social Sciences.

In addition, most of the flights were suspended at the end of the year because of the reduction of the activities in Southern Sudan at that period.

Therefore, taken into consideration the time allocated to the survey and the various constraints to join Old Fangak area during this period, the length of the data collection in the field was limited to 3 weeks only in January.

- ***The movements in the field***

The movements within Old Fangak area are limited: there are no roads and boats/local canoes used to move along the Zeraf River are the only available means of transport. Most of the movements are done by foot. Therefore, and for security reasons, the teams could only access the villages located by 3-hour walk from the base, which represented only two thirds of the total estimated population.

Also, some villages were in fact not accessible because of swamps to cross.

- ***The selection of the villages to visit***

The population figures and the distribution of the villages within the area were based on official SRRC figures as well as ACF-USA own estimations.

During the survey, the mobile teams discovered that some villages were less inhabited than expected, some villages being even empty. The discrepancies between estimations and observation come from:

- The difficulty to get accurate population figures and distribution;
- The seasonal and unplanned movements of population because of insecurity or water shortage like for some villages of Pulpam and Chotbora bomas.

- ***The selection of the households to interview***

Except in Pulpam, the mobile teams faced difficulties in finding households meeting all the criteria for the interview. The most frequent encountered problems were:

- The low number of malnourished under-5 children compared to the number of malnourished children aged more than 5;
- The absence of the mother or caretaker at the time of the interview;
- The activity of the mother/caretaker and/or the child the previous day (away to get food in another village, attendance to the feeding programme, to the clinic);
- The recent arrival of the mother/caretaker and/or the child in the location (not especially as displaced or returnees).

Teams spent sometimes several hours searching for the appropriate households to interview.

¬ ***During the interview***

The teams also faced difficulties during the interview to obtain specific information like:

- Information related to time, particularly ages, dates of precise events (e.g. death, immunization session), frequencies, durations (e.g. duration of the sickness of the child), and hours. The reference to the calendar of events on one hand, and to the position of the sun in the sky on the other hand, was helpful but not sufficient to obtain accurate data.
- Information related to the composition of the household: the older co-wife is often called "mother", leading to confusion; as different families compose a same household, it was sometimes difficult to identify clearly the parents of each child present at the time of the interview.
- Estimation of the quantities, like crops harvest or milk production.

In spite of the encountered difficulties, the team succeeded in collecting information of good quality, allowing the in-depth analysis of the situation in Old Fangak.

### c. Contribution from the exhaustive survey

The exhaustive survey carried out in parallel to the survey on the root causes of malnutrition (December 2003 – January 2004) consisted in an exhaustive screening of all children under-5 years using MUAC and height, and interviews in each household on ACF-USA feeding programmes, health education and water-related practices.

The finding of the survey provided useful information for the survey on the underlying causes of malnutrition, particularly to understand the nutritional situation among the children aged 12-59 months and the practices related to water.

## 6. FINDINGS OF THE SURVEY

Before going through the details of the findings, some preliminary information is needed to understand the context of the survey.

The survey took place during the post harvest period, which can be considered as particularly good compared to the rest of the year in terms of food availability. Since the information collected on the past years also displays sufficient food availability in the area (including support from kinship ties and relief food), therefore the food security situation at the time of the survey can be considered as fairly representative of the usual situation in the area, i.e. young children have normal access to food.

Regarding nutrition, the exhaustive screening carried out December 2003 – January 2004 has displayed an improvement of the situation: 22% of the children aged 1 to 5 years were detected at risk of malnutrition (MUAC• 13.5 cm) as compared to 47.9 % in March 2003. While the results cannot be consistently compared to the previous anthropometric surveys because of the difference in the used methodologies, the following facts tend to confirm this positive trend:

- The fact that during the dry season, people have reduced activities – farm works take place during the rainy season – allowing them dedicating time to go to health or feeding centres, which are in addition more easily accessible (dried swamps);
- The difficulties that the team faced in finding households where there was malnutrition.

While the survey was focusing on malnutrition among the under-5, the attendance to ACF-USA feeding programmes and the observations of the mobile teams during the fieldwork highlighted a high proportion of malnourished children aged more than 5 years. It is difficult to estimate the extent of this problem but the survey team also paid a particular attention to these cases, in order to provide a short analysis of the possible causes of malnutrition among children above-5[10].

Before reviewing the causes of malnutrition among the children aged more than 5 years, the findings on the underlying causes of malnutrition among the under-5 are presented.

### a. The underlying causes of malnutrition among the children under-5 in Old Fangak payam

The analysis of the data collected during the survey has allowed drawing the NCA framework presented in the annex 3.

[10] "Children above-5" gathered children aged more than five 5, pre-adolescents and adolescents.

Initially, food security in the area was considered as a possible factor having contributed to the increasing rates of malnutrition in Old Fangak. Interviews and focus group discussions confirmed that over the past 3 years the food security situation was threatened by poor harvests (particularly in 2002/03) and insecurity that prevented cultivation and to some extent food drops (2002). To face food shortages, people relied on their usual coping mechanisms: extra fishing, wild food, sale of livestock to get grain, and kinship support. Seeds, tools and fishing equipment that ACF-USA distributed as well as WFP food rations also contributed to attenuate the food problems. In the end, in spite of the difficulties in maintaining food security at the household level, the community stated to have been able to preserve the diet of the under-5, i.e. to not reduce the quantities of food or the number of meals per day. The quality of the diet may have slightly changed (less cereals and more wild food) but generally, children under-5 ate as usual. Therefore, food security in the area cannot be considered as the factor explaining the increase of malnutrition over the past 3 years.

As the factors leading to malnutrition interact, it is difficult to isolate one more prevailing cause. However, while most of the identified factors are common to the entire community, the sickness of the child appears as a determining cause. In most of the households, the malnourished child was sick at the time of the interview and/or had been sick for a long period over the 3 previous months. The main mentioned diseases were diarrheas (watery and/or bloody), respiratory infections and fever (possibly malaria and kala-azar). Most often, children suffered from a combination of diseases. Sickness is closely linked to hygiene and prevention, and it was noticed that in families where there was no malnutrition, hygiene and health practices were slightly better (which remain largely inadequate).

Food intake is also a concern, particularly for children being weaned. Indeed, breastfeeding and weaning practices are inadequate leading to insufficient coverage of the nutritional needs. It confirms the higher proportion of malnourished children aged 6-29 months compared to 30-59 months. Once the child is completely weaned, food intake remains problematic. Whatever the food availability is, people are used to have only 2 meals a day, even children. In addition, the quality of the diet is questioned: it is insufficient to cover the needs, particularly regarding micronutrients. Although it has not been possible to highlight specific deficiencies because of the lack of reliable data on health, the quality of the diet allows assuming that children suffer from deficiencies.

It has not been possible to identify socio-economic groups specifically vulnerable to malnutrition. In Nuer community, wealth groups are mainly based on livestock ownership. The last available ANA report on Phou State (2002/03) displays the following characteristics of the socio-economic groups:

| Group | % of the population | Nb of cattle per household | Nb of shoats per household |
|---|---|---|---|
| Poor | 10-20 % | 0 – 2 | 0 – 5 |
| Middle | 40-50 % | 4 – 8 | 10 – 20 |
| Better off | 0-10 % | 10 – 20 | 6 – 12 |

According to the information gathered during the individual interviews, there is no significant difference between households where there is malnutrition and households where there is no malnutrition. In both cases, all socio-economic groups are represented in similar proportions. There is a slight over-representation of malnutrition in poor households conversely a slight under-representation in the better off. However all wealth groups appear similarly vulnerable to malnutrition and in fact the criteria of vulnerability relies more on the support that a household can receive from the community. Kinship ties are generally strong within Nuer community and people can rely on relatives and clans for different purposes: to get food, to some extent to get money, to receive physical support to assume some works or to look after the children, etc. Families who cannot afford such a support are more likely to suffer from food shortage and poor living conditions. Some categories are particularly at risk, like widows and displaced people, but it is not possible to consider it as a generality.

The underlying causes of malnutrition are detailed below:

***Factors related to food intake:***

- When the child is still breastfeeding:

Children aged 6-29 months represent a large proportion of the malnourished cases, which is certainly linked with the inadequate practices related to breastfeeding and weaning.

⊗ Inadequate frequency of breastfeeding

Breastfeeding begins just after delivery. Mothers express the first milk (colostrums) considered as dirty because it is thicker and yellowier than usual breast milk. In most of the cases the child receives his/her first breast milk in the first hours following birth. Then children are breastfed up to the age of 2 years. The decision to stop breastfeeding is linked to the ability of the child to eat alone, and to the return of the husband in the bed of the mother. Indeed, Nuer culture prohibits sexual relations during all the lactating period, leading to a spacing of around 3 years between two births and preventing competition for breast milk.

While the spacing between successive births and the duration of the breastfeeding meet the usual recommendations in terms of maternal care, the frequency of breastfeeding is questioned. Indeed, while children are supposed to suck on demand as recommended, in fact the frequency depends on mothers' availability. During the days or weeks following delivery, mothers usually receive support from a relative for the house works. It allows them dedicated time to the newborns and regularly breastfeeding. Once this period is over, mothers resume their normal activities and their heavy workload prevents them to be fully available at any time to breastfeed their child. It is particularly true in families where the mother has no support, i.e. a co-wife or elder children able to do part of the house works. Therefore, frequency and quantity of breast milk are likely to be insufficient to cover child's needs.

The difficulty in regularly breastfeeding the child leads mothers to introduce cow milk quite early, which is not appropriate.

⊗ Inappropriate weaning

Weaning is a critical period in the development of the child. Inappropriate weaning increases the vulnerability of the child to infections and can lead to growth failure. Here, 2 problems have been noticed: the inappropriate timing in the introduction of foods and the inadequacy of weaning foods.

♣ Inadequate timing

While exclusive breastfeeding is generally recommended up to the age of 4 to 6 months, water and milk are introduced very early. Children usually receive their first water within the first month. Mothers introduce cow milk between the 1st and the 4th month, either because they need to leave the children for a while, or because they feel that children are not satisfied with breast milk only. It is difficult to establish to which extent mothers really lack breast milk or if the problem is linked to insufficient stimulation of the lactation. Again the lack of availability of the mothers seems to impact on breastfeeding and weaning practices.

As opposed to liquids, solid foods are introduced very late. From the age of 4 to 6 months, liquids and food are supposed to be progressively introduced. Around 7 to 8 months, children begin to crawl and to move around, expending more energy and therefore requiring more food. Here, solid foods are only introduced around 12 months, when children have teeth and demand for the food prepared for the other members of the family. Children between 6 and 12 months are likely to suffer from protein-energy and micronutrients deficiencies.

♣ Inappropriate weaning foods

In addition to the inadequate timing, the type of food given for weaning is not fully appropriate:

- Water and cow milk are not particularly boiled when given to a newborn or an infant;
- The usual solid food given to young children is *madida*, porridge made of sorghum with milk. From observation, this preparation is quite thick, even for children aged 1 year. In addition, as *madida* requires a specific cooking, mothers tend to rapidly move to the common meal, *piech*, which is thicker than *madida*. The main risk is that the child feels full while s/he has not eaten the needed quantity of food.
- The diet, as for the whole population, lacks fruits and vegetables.

In addition, once the child begins to eat, s/he faces the same constraints as older children, and to some extent as adults.

- ♦ <u>When the child eats as an adult:</u>

A series of factors contribute to inappropriate food intake for children who are about to be / are completely weaned:

⊗ Inadequate frequency of the meals

In this community, people are used to having only 2 meals a day, even children and during the weaning period. It is a habit and people do not envisage having an extra meal per day because:

- Grinding and cooking require lot of time and energy, and women cannot afford spending more time for these activities;
- People still live in the fear of hunger and insecurity:
  - ♣ They think that to be used to 3 meals a day will be more difficult to manage if they have to face a new food shortage, particularly for children;
  - ♣ One additional meal a day means a higher daily consumption and therefore a quicker exhaustion of their stocks.

Therefore, even if food is available, people are reluctant to have more than 2 meals a day. Outside of these 2 meals, people do not eat anything. Children can possibly benefit from cow milk if available in sufficient quantity but they do not consume any snacks. This frequency is insufficient to cover the daily food needs, particularly for children for whom 3 to 4 meals a day are recommended.

⊗ Imbalanced diet

The quality of the diet is also a concern. Indeed, diet is based on sorghum or maize, and milk (either cow or goat milk). They constitute the staple food and are usually consumed throughout the year, with seasonal variations.

To a lesser extent, people eat:

- Fish: because of the river and swamps, fish is present in high quantities throughout the year. Most of the households have access to fish, either fresh or dried. The consumption depends on the capacity of the household to catch or buy it. Even if the frequency is insufficient, fish ensures a quite regular supply of proteins.
- Meat is occasionally eaten: cows and goats are slaughtered for special events and chicken is not commonly eaten. Eggs are also hardly consumed.
- Pumpkin, sesame (*simsim*), okra and other vegetables are consumed occasionally, according to seasonal availability.
- Wild foods (fruits, leaves or roots): as it requires a lot of energy to collect them, they are preferably consumed in case of food shortage.

Availability of these foods varies according to seasons, and all in all the diet remains insufficiently diversified, particularly regarding fruits and vegetables.

To cope with the problem of the diet, ACF-USA decided in 2003 to implement a pilot project aiming at promoting home gardens. The objective was to focus on the families of malnourished children (TFC and SFP beneficiaries) and to support diversification of the diet through distribution of seeds and tools, training sessions on gardening techniques, and monitoring with home visits. The evaluation of the pilot project has displayed that ¾ of the participants ate vegetable/fruit from their home garden at least once a day.

- ⊗ Inadequate cooking

Some food items like vegetables, wild fruits and leaves seem to be cooked too long, which affects their quality and reduces nutritional benefits.

- ⊗ Inappropriate feeding practices

Until the child is totally weaned, i.e. around 2 years, s/he usually eats in a separate plate under the close supervision of the mother, sometimes with her help. Since the child is considered as able to eat alone, s/he joins the other children.

Children eat together in a common bowl. When they are numerous, they are gathered in age groups. This practice can lead to competition for food, where the young and weak have lesser access to food.

- ⊗ Possible food shortage

It has been explained above that the food security situation at the community level was not the major factor having led to inadequate food intake for the under-5. However, food shortage still has to be considered as a possible cause of malnutrition.

Indeed, food availability varies according to seasons and could have an impact on the diet. Thus, the middle of the dry season and beginning of rainy season constitute the most critical period since the production of milk, fish and wild food availability decreases. As well, the time preceding the harvest[11], which corresponds to the exhaustion of the previous stocks, is considered as a possible period of food shortage.

Food availability at the household level also depends on the support the household can receive from the community. Indeed, the possibility to rely on kinship ties to obtain grain, to benefit from a lent milking cow or from fresh fish is a determining asset to maintain food availability within the household. In case of food shortage, children usually have priority for food but prolonged lack of cereals or cow milk has in the end an impact on their food intake.

[11] Harvest time: August-September for maize, October-November for sorghum – Rainy season.

While the above-mentioned factors contribute to inadequate food intake, other factors contribute to disease, the second direct cause of malnutrition.

***Factors related to disease:***

The factors related to disease include environment, hygiene and health issues.

- ⊗ High presence of vectors of diseases

The area being made of swamps, with lot of stagnant water, it is particularly favourable to the proliferation of insects, especially mosquitoes, and other diseases causing vectors. Old Fangak is a malaria endemic area and for few months cases of *kala-azar* - transmitted via small flies - have also increased.

Also, the lack of hygiene favours the presence of insects and worms. As it is, human faeces and cow dungs in the surroundings of the compound offer good reproduction conditions for insects, particularly flies, which participate in the propagation of diseases.

- ⊗ Poor access to safe drinking water[12]

During the wet season, water is available in most part of the area, except in some places like Pulpam, which is the driest region of Old Fangak. During the rainy season, most of people walk less than 5 minutes to reach the closest water point, while during the dry season, people move to more permanent water sources such as swamps and rivers. The distance to the water source seems to be the major determinant in the choice of the water point, and not the quality of the water.

The main sources of water are rivers, swamps[13], ponds[14], large stagnant pools[15], and hand-dug wells. Only people living in specific villages can rely on ponds, stagnant pools and hand-dug wells: in fact most of the population rely on rivers and swamps. People do not make distinction between water points for drinking water and water points for

[12] Information from the exhaustive survey conducted by ACF-USA Health education team in December 2003 – January 2004 in Old Fangak payam.

[13] Here "swamp" includes the fairly shallow and stagnant water formed when the river overflows its banks but is still connected to the river, the small fairly seasonal and seasonal streams, and the large expanses of water formed in the wet season which dry up or become extremely small in the dry season.

[14] "Pond" is defined as a shallow hole - one meter deep, called *gulon* in Nuer, dug just before the rains and used as the main water source in the rainy season. It lasts just for the period of the main rains and cannot be used by the end of the rainy season as it quickly dries up. The *gulon* is usually dug near the maize farms, which are typically close to the house.

[15] "Large stagnant pool" is a semi natural deep and wide hole, which collects run of water from swamps or streams in the wet season. The community generally uses this water in the wet season. Most people who live near this will also typically dig a large deep wide hole which they call *hom*. This is covered and fenced once full and used mainly in the dry season.

bathing or cattle watering. Therefore, water sources are often contaminated and fetched water always needs to be treated.

While a large part of the population (more than 70 %) seems to filter water for drinking with guinea worm cloth, only 2 % boil it. Filtering is insufficient, as it cannot prevent parasites and bacteria transmission. People know the benefit to boil water but they argue that it requests too much time to collect firewood and to boil water.

In addition, water storage conditions are not adequate. Only 40% of the population cover the drinking water containers and a large majority stores the drinking cups, vesicles for collection of water, and containers directly on the ground.

In conclusion, fetched water is often contaminated, not properly treated and not safely stored, leading to high occurrence of water-borne diseases.

⊗ Poor personal hygiene

Hygiene is a major issue contributing to disease, especially diarrheas, parasites and worms infections. Regarding personal hygiene, the following problems have been raised:

- People only wash their hands with soap for specific purposes, like after having handled something smelly (fish). It does not include after defecation, before eating or cooking. As well, children do not wash their hands after having removed the dried cows' dungs from the compound. Most of the time, people just rinse their hands, with possibly contaminated water, and wipe them on dirty clothes.
- People say they take a bath everyday but the definition of bath is relative: most of the time people rinse in the closest river or swamp but hardly use soap.
- Mothers do not wash their breast before breastfeeding, except if they have been perspiring before or if they have gone away for a while.
- Clothes for both adults and children are supposed to be changed regularly but from direct observation, clothes are often dirty and very used.
- From direct observation also, children are generally covered with dust; faces are dirty, often with lot of flies on eyes and running noses. Their nails are not cut and are therefore full of filth[16].
- After defecation, adults and children use natural materials to wipe, like grass and leaves.

Soap is not frequently used because it is not available in large quantities on the market and most of the households cannot afford regularly buying soap.

⊗ Poor environmental hygiene

The environmental hygiene is also a great concern because it favours the proliferation of disease vectors and disease transmission.

[16] A local belief says that the children whose nails are cut become thieves.

People are used to open defecation. Latrines do not exist and are still taboo, as well as the fact to cover faeces[17]. While adults prefer to go far away and at night, children especially young ones, defecate few metres out of the compound, i.e. close to their playground.

Also, the surroundings of the compound are often covered with cows' dungs and waste is spread around.

The housing conditions as well favour the proliferation of insects. *Tukuls*[18] are generally narrow spaces, dark, with small apertures that prevent proper ventilation. People gather in this enclosed place for cooking, eating and to a lesser extent sleeping.

Finally, some practices related to food are detrimental. Like water, food is rarely covered. The main risks of contamination or disease transmission come from:

- The lack of protection from insects or animals (dogs)
- The poor condition of storage of the food items (on ground)
- The poor condition of storage of the utensils and plates (also on ground)
- The fact that people do not wash their hands before cooking and eating
- The fact that people eat from the same plate.

All these poor hygiene related practices increase the risk of contamination for young children and indirectly contribute to disease and malnutrition.

⊗ Little prevention

The findings regarding prevention confirm what ACF-USA Health Education team had already gathered: knowledge on diseases' transmission is limited.

At least people know the link between mosquitoes and malaria (more precisely fever), and thus, most of the households visited had mosquitoes' nets. The number of mosquitoes' nets per household remains limited (1 to 2 maximum) and priority seems to be given to mothers and young children, who sleep together. The mosquitoes' nets are made of cotton cloth but are not treated with insecticide. They are only used at night, which do not prevent children from mosquitoes' bites during the day, particularly inside the *tukuls*. At sunset, some households fill the *tukuls* with smoke from dungs fire in order to kill mosquitoes and other insects. The prevention from malaria is not fully efficient but at least exists.

People also use blankets but not systematically to protect children from cold at night. Therefore a lot of children met during the survey suffered from colds, running noses and cough.

[17] People do not want to have latrines because it is a shame to be seen going for defecation. And people do not want to cover their faeces because only the dead are buried.
[18] *Tukul*: Nuer traditional house made of mud, wood and straw.

Generally speaking, diseases' prevention is poor. The level of immunization is still very low in the area[19] and children who have completed all the recommended vaccinations (measles, polio, DTP and BCG) are rare. Full immunization is hardly ever done before the first birthday of the child, as advised. It is partly due to the absence of EPI in the past years[20], but also to the low access to health centres and again the little knowledge regarding disease. The absence of immunization makes children particularly vulnerable to specific diseases but also prevents them from a general improved immunity.

⊗ Late referral to the health centres

One of the main concerns regarding health-seeking practices is the late referral of the sick children to health centres, PHCC or PHCU. Different factors explain such behaviour:

- The late detection of sickness: mothers evaluate the seriousness of the sickness with fever, meaning that until the child is suffering from fever, they do no go the health centre.
- The low accessibility of the PHCC/U[21].
- To some extent the lack of information on the PHCC/U.
- The reliance of traditional treatments, particularly for people living far from the PHCC/U; it tends to delay the time when mothers decide to go the health centre;
- The low availability of the mothers, particularly during the rainy season. In addition, to leave the house to go to the health centre requires the organisation of food provision and cooking, and to find someone to look after the other children.
- The lack of confidence in CCSV, due to difficulties in the past in providing adequate health services.

The late referral of the child has an impact on the possibility to cure him/her properly and quickly. Some cases arrive too late to be adequately taken in charge, contributing to the deterioration of their nutritional status and sometimes leading to death. These cases also participate in the lack of confidence in CCSV services.

⊗ Inadequate compliance of the treatment

In addition to the lack of confidence in CCSV, people have doubts on the efficiency of the provided treatment: they reject tablets and ask for injections, which are supposed to be more curative. This belief added to the lack of awareness on the necessity to follow the full medical treatment lead to inadequate compliance. Therefore children are not completely cured and are more likely to relapse.

[19] Measles immunization coverage: 33 % of the children according to last ACF-USA anthropometric survey in March 2003.
[20] No EPI before 2002. CCSV is now implementing vaccination in a more systematic way.
[21] For more details please refer below to the section "limited health services".

- ⊗ Limited health services

CCSV is in charge of the Primary Health Care in Old Fangak payam since 2001. They are currently running 1 PHCC in Old Fangak town and the 3 PHCU in Chotbora, Wangleil and Pulpam bomas. While the health centres are located in each of the different bomas, they remain quite far for most of people. The population of Old Fangak is scattered and to come to one of the health centres can require more that one-day walk. People living in some locations cannot even access them because of the swamps and floods, particularly during the rainy season. The lack of physical accessibility to these health centres is a major issue preventing people from good health.

In addition to the access issue, the quality of the services has been questioned. It seems that in the past years, CCSV was not able to cure all the common diseases. People mentioned drugs shortage. CCSV assumes having faced internal problems in the past, particularly regarding their capacity to have a good monitoring of their activities in the field. Since the end of 2003, CCSV ensures a closer supervision through the permanent presence of health professionals in Old Fangak, as well as a better diagnosis with a local laboratory allowing detection of basic diseases. The impact of these changes will be only visible in some months.

Regarding prevention, the EPI started in 2002 but was interrupted because of a technical problem in the cold chain. CCSV has resumed the EPI at the end of 2003. At the time being, there is no proper growth monitoring, partly because of the irregular attendance to the PHCC/U.

- ⊗ Poor awareness and knowledge regarding diseases' transmission, prevention, detection and treatment

As mentioned in the above sections, the low level of awareness and knowledge plays a key role in the inadequacy of the practices. ACF-USA Health Education programme seems to have improved the sensitisation of the population on good practices[22] but it remains low. People have identified links between some practices and diseases (to sleep under a mosquitoes' net prevents malaria, to boil water and wash hands prevent diarrheas) but the practice remains limited.

These are the main underlying causes of malnutrition, contributing to inadequate food intake and/or to disease. Other factors contribute to malnutrition.

[22] Information from the exhaustive survey conducted by ACF-USA Health education team in December 2003 – January 2004 in Old Fangak payam.

***Other underlying causes of malnutrition:***

2 other factors related to social and care environment contribute to malnutrition in Old Fangak:

- The heavy women's workload
- The lack of support from the community.

⊗ The heavy women's workload

In Old Fangak community, women are in charge of a large number of house works, including cleaning, grinding, cooking, fetching water, plus seasonal duties like working in the farms, mudding *tukuls* and making beer. In addition, women exclusively take care of the children: men are not involved in daily child-related issues. This has two consequences:

- Mothers are the only ones in charge of the children and cannot rely on men's support;
- The daily workload of the women is heavy and time consuming, especially during the rainy season, which has consequences on the attention paid to children.

Mothers usually receive external support during the first weeks or months after birth, but as soon as they resume their normal activities, they cannot afford to be fully available for their children. In addition, the attention paid to children aged from 2 to 3 years decreases, especially after the birth of new child.

The lack of availability of the mother affects:

- *Breastfeeding and feeding*: if mothers are away for a while or busy, they cannot breastfeed children on demand. Generally they leave some cow milk that another caretaker can give if children are crying. It explains the early introduction of cow milk in the diet of the infants. Similarly when children have begun weaning, mothers leave food that other caretakers will cook when necessary. In any case, the frequency of breastfeeding and feeding is affected.
- *Health seeking*: the absence of the mother can delay the detection of sickness, particularly when she is away for the whole day. Then, the decision to go to the clinic depends on:
    - ♣ The priority at the moment: to plant and to weed, i.e. to ensure a good harvest for the whole family, or to spend several days to cure one of the children.
    - ♣ The possibility for the mother to organise her absence, i.e. to find someone to look after other children and to cook for the whole household.

To a lesser extent, it seems that the heavy workload of the women can also affect pregnancy and children's weight at birth. Little information exists on birth weight and growth monitoring but pregnancy appears as a concern since pregnant women do not benefit from any particular advantages in terms of workload, diet and antenatal care. This can affect the condition of the foetus and later on the growth of the newborn.

Thus, the heavy workload of the mother and the absence of support from the husband can affect the food intake of the children as well as the health seeking practices. The ability of the mother to cope with such a situation depends on the external support she can receive.

⊗ Support within the community: the limits of the kinship ties.

The Nuer community relies on strong kinship ties, meaning an efficient system of solidarity. People who are excluded from this system are particularly vulnerable because they cannot rely on neither physical support – men to clear the farms or to fish, women to look after the children – nor food support – gift of grains, fish, milk, lent milking cow, etc.

It is difficult to give precise criteria of vulnerability but the following list gives examples of persons lacking community support:

- *Widows*: widows usually marry the brother of her dead husband. Often the new husband has his own wives and he tends to give priority to them, even when he has new children with his brother's widow. Therefore his support partly depends on the number of wives he has.
- *Women whose husbands live far away*: it can be the case for widows whose new husbands live in a different place – the widow usually stays in the village of her dead husband. It is also the case for women married to soldiers or to husbands who have decided to live elsewhere with other co-wives. The fact that women cannot rely on their husbands' presence affects the food security of the household, since some activities are typically masculine like clearing farms and fishing.
- *Women living alone with young children*: young children require particular attention and before 6 to 8 year-old their support to the mother is limited. The situation is especially difficult to manage when the mother cannot rely on co-wives or other relatives.
- *Households where there is a bad relationship between the co-wives*: when several co-wives live in the same place, the second/last wife is generally in charge of all the house works while the first wife, called also "mother" has a lighter workload and can look after the children. This sharing of the duties allows a proper childcare but bad relationships can affect the respective workloads and the attention paid to children.
- *Newly arrived in the area, displaced persons or returnees*: it is estimated that 1 to 2 years are necessary for newly arrived in the area to fully rely on their own in terms of food security (i.e. to have been able to plant and harvest, and possibly to have a milking cow). During the transition period, these persons usually rely on the community to get food.

The support from kinship can prevent malnutrition through food security support, especially daily supply of milk, and also coping with the heavy women's workload.

A large part of the underlying causes of malnutrition among the under-5 in Old Fangak payam are related to inappropriate practices, leading to either food intake or disease. The social and cultural patterns also play a role in the nutritional situation since the lack of availability of the mothers and the kinship support can influence food security situation and practices.

While the analysis above only refers to children under-5, the team had also paid attention to children aged more than 5 years. A short analysis of the underlying causes of malnutrition among the children above-5 is displayed below.

### b. The underlying causes of malnutrition among the children above 5 in Old Fangak Payam

Lot of factors mentioned for the under-5 are applicable for this age group. The main causes contributing to malnutrition among the children aged more than 5 are:

- *Disease*: most of the children met during the survey were suffering from recurrent sickness over the previous months; the problems highlighted previously regarding environment, hygiene, health services, prevention and health seeking practices are also valid and participate in the vulnerability of these children to disease.
- *Insufficient food intake*: like for children under-5, the frequency of the meals is a great concern. 2 meals a day are not sufficient to provide adequate food intake. At the time being, no school-feeding programme offers additional meal for children going to school. In addition, the diet is imbalanced.
- *Lower attention from mothers*: from the age of 2 to 3 years, children are considered as small adults and mothers focus their attention to the younger children. Therefore childcare decreases.
- *Involvement of children in house works*: from the age of 6 to 8 years, children begin to support their parents in different activities (herding cattle, fetching water, grinding, etc). These activities are particularly energy consuming.

Therefore, the underlying causes of malnutrition among above-5 are very similar to the ones among under-5 but with a larger expectation of their responsibilities in household tasks and in turn energy.

### c. The basic causes of malnutrition

The underlying causes of malnutrition presented in the above-sections take roots in the chronic under-development of the area, aggravated over 20 years of civil conflict. Therefore:

- *The area lacks proper infrastructures*: there is no road and communication means are limited, which impact the access to markets and health centres. As well, there is no safe water network, preventing people from access to safe drinking water;

- *Economic exchanges in the area are very limited*: the market in Old Fangak has only resumed a few months ago, after years of limited activity. Economy is still based on barter and cash exchanges are rare. This affects the availability and access to diversified food, but also to non food items like soap, buckets and clothes;
- *The level of education is very low*: 4 schools are open in the area but the attendance is very low because of their location. Generally, people have a poor access to education and training, and the low level of skills prevent people to rely on local human resources. In addition, knowledge on general issues like hygiene, health but also farming techniques is very limited.
- *Health services are insufficient*: in spite of the intervention of NGOs, health and nutrition services are limited in terms of structures, geographical coverage as well as quality of the services.
- *Cumulative depletion of the assets over the years*: as livestock breeders, Nuer people have particularly suffered from the 20-year conflict. Fighting, displacements and cattle raiding have led to massive depletion of the livestock. In addition the lack of veterinary services could not prevent outbreaks and animals deaths. While the herds' size seems stabilised for some years, the number of animals per household has considerably decreased since the beginning of the war. Today in Old Fangak, 88% of the households own livestock, which in average corresponds to 4 cows, 6 shoats, and 10 chickens[23], as compared to 25-40 cows and 10-20 shoats before 1991. Cattle are of particular importance in Nuer community, as cows constitute the wealth of the family. In addition, it represents a significant source of food, especially for children. The reduction in the number of cows and therefore milking cows can have a direct impact on the diet of the under-5 children and can contribute to malnutrition. The persistence of local insecurity and cattle raiding, added to the absence of animal health services in Old Fangak prevent people from recovering past herds' size.

Generally, local insecurity still affects people's daily life, particularly cattle raiding.

The list of the basic causes of malnutrition is non exhaustive but all are linked to the under-development of the area and war context.

[23] From the findings of the post-distribution assessment that ACF-USA conducted in Old Fangak at the end of 2003: *2003 Food Security Items Distribution – Final distribution report – Jan 2004 – ACF-USA*.

## 7. CONCLUSION

The underlying causes of malnutrition in Old Fangak are related to a general precariousness aggravated by poor practices: hostile environment, lack of infrastructures, inadequate health services added to inappropriate practices regarding breastfeeding, weaning, feeding, hygiene, and health seeking contribute to a fragile nutritional status.

Disease is the major concern, but the inappropriateness of the food intake in terms of frequency and quality of the diet should not be underestimated as well.

In addition the heavy women's workload affects the availability of the mothers for childcare, and the lack of support from kinship is an aggravating factor for both mothers' availability and food security situation at the household level.

Other factors can aggravate the nutritional situation, especially:

- A prolonged food shortage, particularly cereals and milk;
- Insecurity and population movements, which can have an impact on the food security situation in the area and put pressure on the solidarity system.

Regarding prevention of malnutrition, it seems that combinations of practices can prevent the deterioration of the nutritional status. However it has not been possible to identify one key practice or combination seriously allowing preventing malnutrition.

In parallel to the identification of the root causes of malnutrition, some assumptions have been averted: malnutrition is not strongly linked to the socio-economic status of the household; and while food security situation in the area remains a possible aggravating factor, it does not explain the increasing malnutrition over the past years.

Generally, the findings of the survey have not provided the full explanation of the increasing malnutrition rates over the past years, either the identification of seasonal variations. Malnutrition rates fluctuate on an unexpected basis without obvious links with "hunger gap" or post-harvest period. Therefore it is difficult to conclude on the seasonal or chronic feature of the malnutrition in this area.

The current nutritional situation has significantly improved according to the results of the exhaustive screening carried out in December 2003/January 2004, which has to be confirmed with a new anthropometric survey to be conducted in the coming month. Also, the exhaustive survey has displayed population figures considerably below the official ones, meaning that the coverage of ACF-USA feeding centres was probably better than stated.

To some extent, the situation in Old Fangak is comparable to other areas of Southern Sudan: under-development and hostile environment are common characteristics in Southern Sudan and since practices are culturally related, what has been observed in terms of livelihood and childcare practices should be similar in other Nuer communities. Other factors like food security situation and health services coverage can vary from one

area to the other. However, because of the similarity of the contexts and cultural patterns, it can be assumed that the underlying causes of malnutrition are analogous in all Nuer communities.

To better tackle malnutrition in Old Fangak area, ACF-USA is proposing the following recommendations.

## 8. RECOMMENDATIONS

The NCA in Old Fangak payam has highlighted a series of problems leading to malnutrition. ACF-USA would like to call the attention of the stakeholders and agencies acting in Southern Sudan, particularly in Central Upper Nile, on the underlying causes of malnutrition and on the possible solutions to tackle some of the issues.

ACF-USA is recommending the following actions:

- ***Recommendations for ACF-USA to participate in reducing malnutrition in Old Fangak:***

¬ **To continue and improve the nutritional surveillance:**

- Nutrition surveys: to ensure the implementation of anthropometric surveys ideally twice a year, before and after the rainy season, in order to compare the results to previous years and to have a clear picture of the evolution of the nutrition situation. The quality of the nutrition surveys needs to be ensured through a very close supervision of the local personnel recruited and trained for this specific purpose.
- Nutritional surveillance through ACF-USA health surveyors: to reinforce community capacity to have a reliable nutritional surveillance system. ACF-USA will particularly enhance this through a better monitoring of the health surveyors (with more regular presence of professional health and nutrition personnel in the field) and the reinforcement of the sustainability of the system (motivation of the health surveyors, involvement of the Community Nutritional Committees).
- Pilot of growth monitoring: since there is no proper growth monitoring in Old Fangak for the time being, ACF-USA proposes to implement a pilot. The health surveyors already operating in the field could follow specific children on a regular basis, using height (scaled stick) and age (referring to local calendar). ACF-USA Health Education Department needs to go thoroughly into the methodological and practical issues, particularly the sample size, frequency, capacity of male/female health surveyors to do it for literacy reasons, etc.

¬ **To continue promoting adequate breastfeeding and to improve the promotion of adequate weaning**:

- Health education sessions: ACF-USA Health Education Department proposes to continue promoting breastfeeding through education sessions with the support of existing posters. ACF-USA also intends to add messages on weaning: on the appropriate timing (from the age of 6 months) and on weaning foods (consistency and diversification).
- Training on breastfeeding and weaning: as breastfeeding and weaning are important issues, ACF-USA Health Education Department envisages a specific training for the health surveyors in charge of the health education sessions as well as for the women's groups. It is assumed that women will be more sensitive to weaning issues than men and that mothers will be therefore more receptive if the message comes from women. As most of the health surveyors are male, it seems relevant to reinforce the dissemination of the messages on weaning through the women's groups. A first training should be organised before the rainy season, probably in Old Fangak boma. According to the results of this experience, the training will be repeated in the other bomas of Old Fangak payam.

¬ **To promote balanced diet**:

- Training/Education sessions on breastfeeding and weaning: the training and messages on weaning foods will be a good opportunity to promote diversification of the diet, including with the use of locally available foods that are not consumed at the time being, like pumpkin leaves and some wild foods.
- Training on gardening techniques: in order to sustain the gardening initiative implemented in 2003/04, ACF-USA proposes to ensure training sessions on gardening techniques like seeds savings.
- Distribution of diversified seeds: ACF-USA intends to distribute diversified seeds (possibly okra, simsim, groundnuts and cowpeas) in Old Fangak area before the next planting season.

¬ **To promote school feeding for above 5 years-old**:

- ACF-USA intends to meet with SCF-UK, who is in charge of the education programmes in Old Fangak payam, in order to discuss possible plans regarding school feeding in this area.
- According to the discussions, and if SCF-UK does not intend to implement school feeding, ACF-USA will engage discussions with WFP in order to support a school feeding programme in the 4 bomas of Old Fangak. The implementation and monitoring issues will then be discussed with the local partners.

¬ **To continue and to strengthen health education**:

- To continue disseminating messages on the following topics: explanation on faecal transmission routes, need for building latrines or covering faeces, washing hands and face regularly, fetching water in the safer water points (in spite of the distance), systematically treating water, protecting water and foods, early referral of the children to the health centres when they are sick.
- To ensure a better dissemination of the health education messages through:
  - ♣ Reinforcement of the monitoring of the health surveyors with more regular presence of professional health and nutrition personnel in the field, in order to ensure they meet their objectives, i.e. house-to-house visits to randomly selected households and health education sessions.
  - ♣ Improvement of the presentation skills of the health surveyors (participatory teaching practices) and increased use of culturally acceptable visual aids.
  - ♣ Determination of other tools to facilitate the dissemination of the messages.
  - ♣ Intensive refresher training.
  - ♣ Extension of the audience with additional health education sessions in identified public places like churches, market or water points.
  - ♣ Reinforcement of the sustainability of the health educators network (motivation of the health surveyors, involvement of the Community Nutritional Committees).
  - ♣ Increasing involvement of the health units (PHCC/PHCU): collaboration of ACF-USA and CCSV on the definition of health education sessions/messages and monitoring; ACF-USA support to the CHW with training and visual aids.
  - ♣ Increasing involvement of the schools: collaboration of ACF-USA and teachers on the definition of health education sessions/messages and monitoring; ACF-USA support to the teachers with training and visual aids.

¬ **To ensure that people have the means to ensure proper hygiene:**

- To envisage a better access to soap: to envisage the possibility to locally make soap.
- To envisage better storage capacities for food and water: ACF-USA intends to make a needs assessment and according to the results to implement a distribution of non-food items (buckets, etc).

¬ **To assess the possibility to ensure safer water sources:**

- In-depth assessment of the needs
- Review of the different possibilities to ensure safe sources of water: digging wells, boreholes, filtering system, rainwater collection, etc.
- Proposition of intervention.

- **To save women's time with the promotion of a collective mill**: the findings of the survey on the underlying causes of malnutrition have highlighted that the heavy workload of the women prevent them from dedicating time to their children. This can affect the food intake of the children as well as the health seeking practices. The main time consuming activities of the women are grinding grains, cooking and fetching water. In order to save women's time, ACF-USA suggests promoting a collective mill, which should allow reducing the time spent in grinding. For this purpose, ACF-USA proposes:
  - To gather information on existing experiences and successful stories of mill promotion (Tearfund).
  - If relevant, to envisage a pilot project of collective mill in Old Fangak town.

- **To envisage the support to health structures to detect and treat malnutrition:** taking into account ACF-USA last estimation of population figures and the improvement of the nutritional situation, ACF-USA does not envisage any supplementary feeding programme but intends to focus on preventing mortality through the treatment of severe acute malnutrition. Therefore:
  - ACF-USA proposes to discuss with CCSV about the capacities of the PHCC in treating severe cases of malnutrition.
  - According to the results of the discussion and if needed, ACF-USA could provide technical advice and support to set up a home treatment programme, with the first phase of the treatment in the PHCC inpatients. ACF-USA support could be envisaged through the training of the CHW and the supervision of the nutrition activities.

- ***Other recommendations to tackle malnutrition in Old Fangak:***

- **To improve the quality of the health services:**
  - Decentralised services: as the CHW in the PHCU can only treat basic diseases and as people cannot always afford to go to Old Fangak PHCC due to the distance and difficulty to move (swamps), it is recommended that the PHCC nurse ensures regular visits to the 3 PHCUs (in Chotbora, Wangleil and Pulpam) in order to provide people with more appropriate diagnosis and treatment. This initiative could require additional professional health personnel.
  - Improved skills in the PHCU: additional training and closer monitoring of the CHW, particularly those working in the PHCU, should allow a better quality of the provided medical services.
  - Maternal and Child Health care (MCH): for the time being CCSV is implementing pre-natal consultations in the PHCC and supports a TBAs network. No information has been collected on post-natal care. MCH definitely needs to be reinforced in order to have a better follow up of the mothers and new-borns (particularly for immunization) and to collect information on the birth weight. MCH could also be the initial step for a proper growth monitoring, which is non-existent at the present time.

- **To support diet diversification through farming training:** diet diversification is an important issue to participate in the reduction of the malnutrition in Old Fangak. ACF-USA has promoted and still promotes diversification through distribution of diversified seeds and training sessions. Additional technical support/training from specialised agencies, particularly FAO, would reinforce the impact of the diversified seeds distribution.

- **To increase the number of safe water points, particularly in Pulpam:** previous experiences of UN Water Bureau have failed in drilling boreholes in Pulpam because of the inadequacy of the drilling machine. ACF-USA recommends that the experience be renewed with a more performing machine.

- ***General recommendations:***

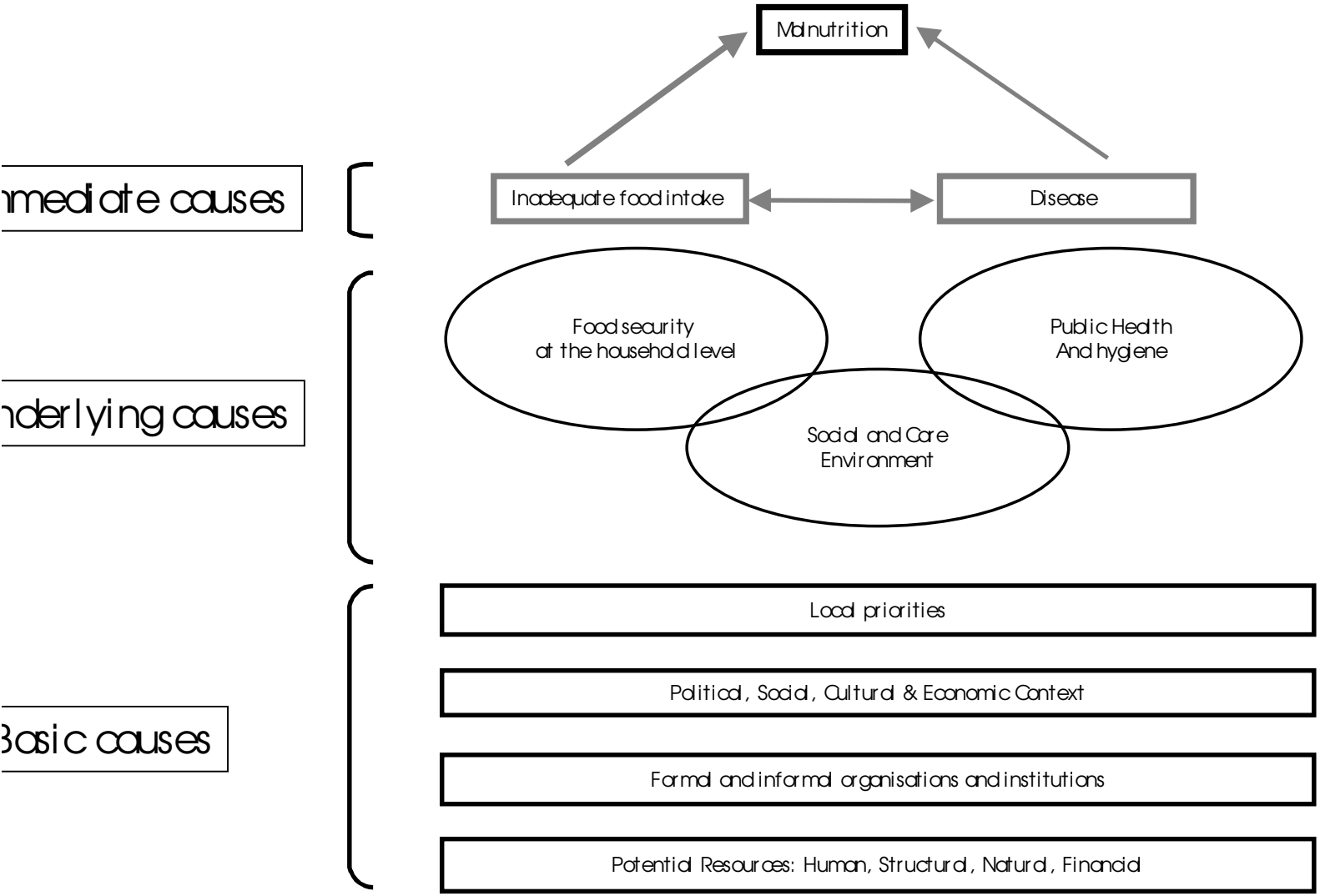
- The findings of the survey on the underlying causes of malnutrition in Old Fangak payam have displayed a large range of factors interacting and leading to malnutrition. These factors are related to different fields: nutrition, health, health and hygiene education, water and sanitation, and food security. Therefore **the response to malnutrition has to be multisectoral, with the complementary analysis and intervention of agencies/organisations specialised in the above-mentioned fields.** ACF-USA strongly recommends a **good collaboration and coordination of these agencies/organisations** to successfully tackle malnutrition. In particular:
  - For any feeding programme to be implemented in Upper Nile ACF-USA recommends a closer collaboration with the health structures of the area.
  - To ensure that all agencies working in the same area collect standardised information on the context (food security, epidemic outbreak) and their own activities (feeding/health centres attendance, morbidity, mortality, distributions, etc), and share it with the other agencies on a regular basis, e.g. every month.

- **To follow the food security situation:** as a possible aggravating factor of malnutrition, the food security situation needs to be followed-up in order to identify a possible food shortage and to plan actions to prevent it, like distributions of seeds, tools, fishing equipment or food rations. The main sources of information are the sentinel sites (like USAID Famine Early Warning System (FEWS net) and WFP Early Warning System) as well as the teams in the ground.

- **To strengthen the food security capacities of the population:**
  - To promote **animal health programmes** in order to preserve the existing herds and to increase the contribution of the livestock to the food security at the household level (as an economic asset and as a food source - milking products and meat).
  - To improve capacities of the community in being food self-sufficient: examples: training on farming and fishing techniques to increase yields, food preservation, seeds saving, marketing, etc. These are long-term initiatives.

## 9. ANNEXES

# NICEF Nutritional Causal Analysis conceptual framework



## List of the villages visited for the individual interviews
## NCA - Old Fangak payam

| Bomas | Villages to visit | Estimated nb of households* | Households with malnutrition | Households without malnutrition |
|---|---|---|---|---|
| Old Fangak | Pankir | 29 | | 1 |
| | Nyantuat | 31 | 1 | |
| | Old fangak | 40 | 1 | |
| | Wangmok | 29 | 1 | |
| | Galilee | 46 | 1 | |
| | Wangchoat 1 | 35 | | 1 |
| | Wangchoat 2 | 50 | 1 | |
| | Nonimac | 42 | 1 | |
| | **Total Old Fangak** | **302** | **6** | **2** |
| Chotbora | Biek | 60 | 1 | 1 |
| | Pultheolo | 40 | 1 | |
| | Pieth | 30 | 1 | 1 |
| | Wangikony | 63 | 1 | 1 |
| | Kuedar | 50 | 1 | |
| | Wangyet | 45 | 1 | |
| | Chotbora | 54 | 1 | 1 |
| | Patai | 20 | 1 | |
| | Wangretha | 91 | 1 | |
| | Kuergar | 28 | | 1 |
| | Tuok | 74 | 2 | |
| | **Total Chotbora** | **453** | **11** | **5** |
| Wangleil | Dieng Dieng | 40 | | 1 |
| | Malikey | 33 | | 1 |
| | Wangsile | 40 | 1 | |
| | Kadeat | 25 | 1 | |
| | Chuopjoy | 50 | 1 | |
| | Dorkoch | 20 | 1 | |
| | Mayiek 1 | 80 | 1 | |
| | Mayiek 2 | 29 | | 1 |
| | Kuergaigok | 27 | 1 | 1 |
| | Riangping | 8 | 1 | |
| | Dagriang | 25 | 1 | |
| | Toungroup | 52 | | 1 |
| | Dor | 50 | 1 | |
| | **Total Wangleil** | **479** | **9** | **5** |
| Pulpam | Puloln | 64 | 1 | 1 |
| | Pulieth | 50 | 1 | 1 |
| | Pultune | 45 | 1 | 1 |
| | Ell | 35 | | 1 |
| | Pulthook | 61 | 2 | |
| | Guaywier | 40 | 1 | |
| | Pulthep | ? | | 1 |
| | **Total Pulpam** | **295** | **6** | **5** |
| **TOTAL** | | **1,529** | **32** | **17** |

* The villages to visit and the estimated number of households per village were reviewed during the data collection to take into account updated information, particularly regarding population movements.