NUTRITION CAUSAL ANALYSIS

ACTION AGAINST HUNGER

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UGANDA

MOROTO DISTRICT, KARAMOJA REGION

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FINAL REPORT

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About this report

The Nutrition Causal Analysis report presents the findings of an indepth investigation into the immediate, basic and underlying causes of under nutrition in Moroto district in Karamoja region of Uganda. The investigation process took the form of a mixed methods analysis combining qualitative and quantitative research methodologies to develop a comprehensive analysis of both the current and historical factors affecting under nutrition in Moroto district.

The Link NCA study survey in Moroto district was recommended following a consultative process with various stakeholders financing nutrition programs in the Karamoja region of Uganda. The overall goal of the survey was to better understand the factors behind the chronic nature of acute malnutrition as well as explain factors underlying the deterioration in the nutrition situation reported by several food security and nutrition assessments conducted in the region during recent years.

This report provides a summary of the findings of this assessment. It details the evolving livelihood context in Karamaoja and in particular in Moroto district over the past 10 years and its impact on food security and nutrition. It then outlines the key factors and causal pathways for under nutrition in two livelihood zones in Moroto district based on the findings of a literature review, a risk factor survey, a qualitative community survey and several multi-stakeholder workshops held in Moroto district during the first half of 2016. It then draws a set of recommendations developed through discussions by the communities involved in the survey and the technical experts in Moroto district to address the multiscetoral causes of under nutrition in the district.

The Link NCA study was conducted by an expert Link NCA study analyst from Action Against Hunger with technical oversight from the ACF Nutrition and Health technical advisors and the Link NCA technical unit in Paris. The survey was supported by the United Nations Children's Fund (UNICEF) and the United Nations World Food Program (UN WFP) with funding from the Department for International Development (DfiD).

Acknowledgements

The Link NCA study study is the result of many links of collaboration.

We firstly are grateful for their hospitality and patience to all the families that welcomed investigators in their homes in the 30 villages of the Moroto District.

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The financial support for the Link NCA study in Moroto was provided by the UK Department for International Development (DFID) through UNICEF and WFP, we are grateful for their commitment and support to development in Karamoja and Uganda.

Finally, on a personal note, I would like to thank a close friend, the sociologist Michalis Lianos, who read with care and perspicacity all the pages of this report.

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Abbreviations and Acronyms

ACF:	Action against Hunger
ANC:	Ante-Natal Care
ARI:	Acute Respiratory Infection
BF:	Breast Feeding
BMI:	Body Mass Index
CCIS:	Child-Caregiver Interaction Scale
CF:	Complementary Feeding
CI:	Confidence Interval
CP:	Care Practices
CSI:	Coping Strategies Index
DFID:	Department for International Development (UK)
DHS:	Demographic and Health Survey
DPT3:	Diphtheria, Pertussis and Tetanus third vaccine
ENA:	Emergency Nutrition Assessment
FANTA:	Food and Nutrition technical Assistance
FAO:	Food and Agriculture Organization
FCG:	Food Consumption Groups
FGD:	Focus Group Discussion
FSL:	Food Security and Livelihoods
FSNA:	Food security and Nutrition Assessment
GAM:	Global Acute Malnutrition
HDDS:	Household Dietary Diversity Score
HEA:	Household economy approach
HFIAS:	Household Food Insecurity Access Scale
HHS:	Household Hunger Scale
IDDS:	Individual Dietary Diversity Score
IYCF:	Infant and Young Child Feeding
LCD:	Liters per Capita per Day
MAHFP:	Months of Adequate Household Food Provisioning
MAM:	Moderate Acute Malnutrition
MDI:	Major Depression Inventory
MOH:	Ministry of Health, Uganda
MUAC:	Mid-Upper Arm Circumference
NCA:	Nutrition Causal Analysis
NGO:	Non-Governmental Organization
SAM:	Severe Acute Malnutrition
SD:	Standard Deviation
SMART:	Specific, Measurable, Attainable, Relevant and Time-bound
SQUAEC:	Semi-Quantitative Evaluation of Access and Coverage
UNICEF:	The United Nations Children's Fund
USAID:	United States Agency for International Development
VHT:	Village Health Team
WASH:	Water, Sanitation and Hygiene
WFP:	World Food Programme
WHO:	World Health Organization
WHO5:	Well-being index in 5 questions developed by the WHO
WHZ:	Weight-for-Height Z-score

Executive summary

Overview

Moroto district is one of the 7 districts in the Karamoja region of North Eastern Uganda. The district is located in Karamoja region of Uganda. It borders Napak in the west, Kenya (West Pokot) in the east, South Nakapiripirit and Amudat and Kotido and Kaabong in the North. The district has a total area of 8,516 km2 of which 4,900 km2 is covered by game reserves and 100 km2 by Mount Moroto. In 2014, the District of Moroto had a total population of 104,539 people (UNHPC, UBOS 2014). The major livelihood zones in Moroto district embraced by populations include Pastoral, Agro-pastoral and Agricultural. Moroto district, high rates of under-nutrition.

Moroto District has the highest prevalence of under-nutrition (wasting and stunting) in Karamoja region. Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) rates among children less than five years in Moroto district were at 13.2(9.9-17.3) and 5.2(3.3-8.0) percent respectively.

Link NCA rationale:

Evidence based on assessments since 2009-2015 suggests high acute and chronic malnutrition rates in district. The data review indicates that Global Acute Malnutrition rates have persistently been at serious levels (10-<15%) despite continued interventions. Similarly; stunting rates have plateaued above emergency levels (>40%) in the district. Owing to this, a Link Nutrition Causal Analysis (NCA) was implemented to understand the plausible causal factors linked to under-nutrition. The survey was supported by the United Nations Children's Fund (UNICEF) and the United Nations World Food Program (UN WFP) with funding from the Department for International Development (DfiD).

Timing of the study: The Link NCA was a comprehensive process that entailed several consultations and phases with the actual study happening between January to May 2016.

Study Objective

The overall study objective was to identify the main causes of chronic (stunting) and acute *(wasting)* malnutrition with the following specific objectives.

1. What is the prevalence and severity of wasting and/or stunting in the study population?
2. What is the prevalence of known risk factors for under-nutrition among the population and key "nutrition vulnerable groups"?
3. What are the causal pathways of under-nutrition by which certain children in this population have become stunted and/or wasted?
4. How have the stunting and/or wasting in this population and its causes changed a) over time due to historical trends, b) seasonally due to cyclical trends, c) due to recent shocks?
5. Which causal pathways are likely to explain most cases of under-nutrition?
6. Based on the causal analysis results, what recommendations can be made for improving nutrition security programming?

Methodology and Link NCA approach

Based on the UNICEF causal framework[1], a Link NCA is a structured, participatory, holistic study which builds a case for under nutrition causality in a local context. The study design utilized a mixed methods approach, combining both qualitative and quantitative research methods and drew conclusions from a synthesis of results.

The link NCA involved Risk Factor Survey (RFS) and qualitative enquiry. The Risk Factor Survey was done in 30 randomly selected with ENA software villages out of total 160 villages in the six sub-counties of Moroto district using a cluster sampling method. The qualitative enquiry was conducted in four purposively selected villages in Moroto district and it engaged community groups including: community leaders, key informants, fathers/mothers and mothers with SAM children. The preliminary workshop revealed key hypothesized risk factors linked to under-nutrition might be poor sanitation and hygiene, high morbidity rates over time (ARI and diarrhea), poor quality of drinking water, poor hygienic practices, low utilization of ANC, maternity and PNC services, instability in food security and low maternal nutrition during pregnancy. Communities were engaged in rating of risk factors during the data collection while technical actors were engaged in validation and rating of risk factors during the final Link NCA workshop.

Limitations of the study

An extrapolation of the results obtained in Moroto district to other districts (6) of the Karamoja region is not advisable. Indeed, all the results are based on triangulation between the prevalence of risk factors (RFS) and the results of the qualitative survey in villages in Moroto district. One could be tempted to do it, but beyond the disparities observed in other studies on nutrition and food security, the base of the NCA analysis is built on the characteristics of the context of this district.

Summary of findings

The final workshop and rating exercise of risk factors by NCA analyst revealed a couple of risk factors with the major risk factors linked to under-nutrition among children aged (0-59 months) included:

- Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding),
- High workload for mothers,
- Poor practices of initiation breastfeeding, and exclusive breastfeeding,
- Poor sanitation and hygiene practices,
- Poor health status of children under 5 (ARI and Diarrhea prevalence),
- High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap,
- Poor hygiene practices in the household (food preparation and storage, solid waste management),

Other cited factors included Low purchasing power, Low maternal nutritional status during pregnancy, Early child bearing, high prevalence of teenage pregnancies, High prevalence of Fever/malaria children 0-59 months and Poor status of reproductive health (birth spacing and family planning).

[1]- UNICEF (1990) "Strategy for improved nutrition of children and women in developing countries", A UNICEF Policy Review. New York, USA.

Important risk factors included: low utilization of antenatal care, maternity and post-natal services, open defecation, inadequate access to milk and animal products by children and mothers, poor maternal well-being (violence and alcohol indulgence), low utilization of mosquito treated nets at household level, low empowerment among caregivers, low utilization of soap for hand washing practices and insufficient income to cover transports costs.

Recommendations

Based on findings the following actions were recommended by multi-sectoral actors to address under-nutrition in Moroto, Karamoja region;

- Alternative income local labor markets and increase skills development among pastoralists and agro-pastoralists.
- Engaging men in maternal and child health care roles and responsibilities
- Advocate and engage community leaders and volunteer service providers to promote optimal IYCF practices at community levels
- Strengthen Capacity building school health program for village health teams, women, and youth groups.
- Enact policies at all levels District, Sub County-Parish, Village levels

The next steps will involve engagement multi-actors in designing of response plans based on Link NCA findings to address under-nutrition in Moroto district.

PART I

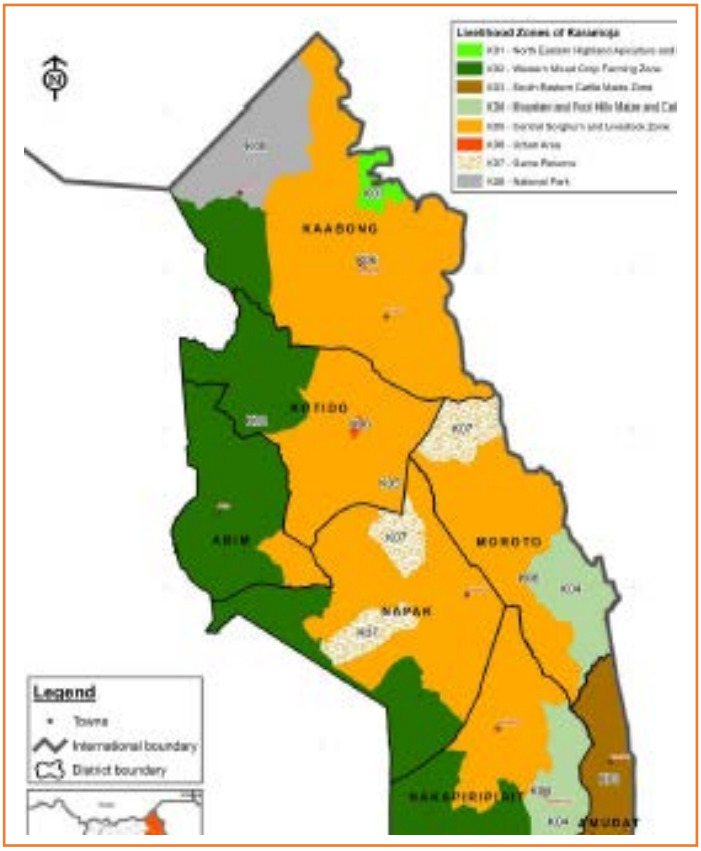
1.1. INTRODUCTION

1.1.1. Context Information of Moroto District

Moroto District is located in the Karamoja region, an area that carries specific cultural characteristics in the territory of Uganda. The town of Moroto, in the heart of the district, is an important regional hub where many NGOs are installed, including a base of the United Nations grouping several UN agencies deployed in the entire region.

As it can be seen on the map below, the Karamoja region, and the Moroto District, Karamoja are essentially inhabited by pastoral and agro-pastoral populations. Something here about the situation of the pastoral life and agro-pastoral life in Karamoja:

Map 1: Map 1, Livelihood zones in the Karamoja region.



"Many Karamojong can be said to be involved in a mixed agro-pastoral economy. This dual system revolves around two locations at the same time. The permanent settlement, the so-called "manyatta", where predominantly agricultural production takes place, and some animals are kept, and the mobile cattle camp, the kraal, for pastoral production. Agriculture is practiced to the extent permitted by the constraints in the ecological conditions. Consequently, agricultural activity has only a complementary role in the field of Karamojong economic activity, but it is an important role because, without it, survival would be a much more complicated matter. In case of complete crop failure, people resort to exchanging livestock with agricultural products with neighbouring tribes, or everybody tends to move to the cattle camps and depend on cattle completely until a new crop is harvested" (Kagan and all, p.11)

In 2008, Karamoja represented some 33 per cent of Uganda's rangelands, 16 per cent of its human population and 25 per cent of its livestock (UBOS 2008). In 2015, only 1 in 3 households owned cattle in Karamoja, which was once the main source of livelihood. As far as all the livestock was concerned, up to 40% of the households in Karamoja did not own any livestock, including chicken (FAO, 2015).

In 2015, the food security sector, IPC activities show that in 2015, there are two distinct areas in Moroto District: "*the Central Sorghum and Livestock Zone of Moroto district is a predominantly agro-pastoral zone, prone to floods caused by high rainfall as a result of climate variability. Characteristics are the same as in other districts that have this livelihood zone. Local inhabitants of this zone are exposed to a high risk of food insecurity. Moroto district's second livelihood zone is called Mountain and Foothills Maize and Cattle Zone. Household food stock deficit is expected in this zone. Household Food stocks ran out only one month after harvest and purchases are now the major source of food until the next harvest in September 2015. Two-thirds (67 %) of the households reported having harvested less food compared to the previous season. The lean season was therefore forecasted to start as early as February 2015. Majority of households have limited access to agricultural land (68 percent). Forty three per cent (43 percent) of households do not own livestock.*", (IPC 2015)

Consequently, between 2009 and 2015, an overall deterioration of pastoral and agro-pastoral life affected both agriculture and livestock and then, in parallel, the nutrition situation also deteriorated.

1.1.2Why conduct a Link NCA study in Moroto District?

In that context, we provide the highlights of the nutritional situation in Moroto District.

In Moroto District, for several years the prevalence rates of malnutrition (wasting, stunting) are particularly high when compared to the six other districts of the Karamoja region. [2]Analyses (2012-2015) resulting from FSNA investigations prompted recommendations for the implementation of programs aiming to reduce the prevalence of child malnutrition. However, it appeared that the prevalence rates of malnutrition continue their course, and in recent years, the prevalence rates tend to rise significantly ;

In addition to these nutritional surveys, many reports from various organizations (NGOs and UN agencies) show that the living conditions in Karamoja, especially in Moroto district are changing in an unstable environment at various levels, including the main risk factor which is related to climatic disturbances that have negative effects on crops. Also, this instability has added some uncertainty as to the economic future of the district, since the type of pastoral lifestyle is disturbed by the gradual disappearance of livestock.

[2] It is useful to note that since 2009, all districts were surveyed for nutrition security. Between 2009 and 2012, ACF assessed the malnutrition prevalence rate. Each year, three surveys (May, September December) researched households across the whole region of Karamoja using anthropometric measurements in children aged under 5 years and among mothers of childbearing age. Midway through 2012, the number of investigations over a year was reduced to two periods (May to December). However, the FSNA inquiry was mandated to provide for the following years a wider range of indicators in the food security sector, maternal care practices, and in the sanitation sector (water and sanitation).

From a nutritional point of view:

- Between 2008 and 2015, the territory of Moroto emerges as rather pastoral, while Napak is agro-pastoral. In 2011, a ACF report shows that in the pastoral zone, the prevalence of malnutrition tends to be lower. Yet it is in Moroto/Napak District that we find the highest prevalence of acute malnutrition of the Karamoja region "*Moroto/Napak recorded the highest rates of acute malnutrition in December 2011 with GAM* ***10.9%*** *(8.4-14.4, 95% CI) and SAM* ***2.5%*** *(1.4-4.2 95% CI). There was no significant difference between September 2011 and December 2011 (p>0.05)".*
- In 2014, the District of Moroto had a total population of 104,539 people (UNHPC, UBOS 2014). The district is bordered by Napak in the west, Kenya in the east, South Nakapiripirit, Amudat, Kotido and Kaabong in the North.
- Regarding food security, in 2015, the region of Karamoja "was majorly classified in overall phase 3 (Crisis) with the most affected districts being Napak and Moroto" (IPC, 2015).

It is naturally crucial to thoroughly explore the problem of the nutritional status of children after such changes. A central objective is to inform donors and partners on the risk factors that seem most likely to explain most of the under nutrition cases, and subsequently discuss short and medium-term solutions that will reduce the prevalence of malnutrition among children under five.

A Link NCA study can in this type of context provide plausible explanations of the causes of malnutrition. Indeed, the implementation of a quantitative survey of households combined with a qualitative survey bringing populations to express themselves on the causes of malnutrition can complement and enrich the findings of previous surveys. Link NCA study puts at the heart of this investigation the concern to move towards intelligible and successful programs to face the progressive deterioration of infant nutrition security in such a local context.

1.1.3Main Study Objective

The main objective of this Link NCA study is to identify the main causes of *chronic (stunting) and acute (wasting)* malnutrition, more specifically in the district of Moroto, thus allowing for greater clarity regarding the possible causes of under-nutrition of children aged 0-59 months.
Specific the NCA study sought to answer the following questions:

1. What is the prevalence and severity of wasting and/or stunting in the study population?
2. What is the prevalence of known risk factors for under-nutrition among the population and key "nutrition vulnerable groups"?
3. What are the causal pathways of under-nutrition by which certain children in this population have become stunted and/or wasted?
4. How have the stunting and/or wasting in this population and its causes changed a) over time due to historical trends, b) seasonally due to cyclical trends, c) due to recent shocks?
5. Which causal pathways are likely to explain most cases of under-nutrition?
6. Based on the causal analysis results, what recommendations can be made for improving nutrition security programming?

2.0 THE LINK NCA STUDY METHODOLOGY

2.1 Overview of the Link NCA study Approach

Based on the UNICEF causal framework[3], a Link NCA study is a structured, participatory, holistic study which builds a case for under nutrition causality in a local context.

a) Holistic Approach

Three types of surveys exist in the Link NCA study repertory (see table 1 below).

Table 1. Types of Link NCA study

Type1	Type 2	Type 3
Four communities in a local context Qualitative enquiry (4 communities)	Field study in local context Qualitative enquiry (4 communities) Risk Factor Survey (400-600 Hoh, 600-800 children<5)	Field study in a local context to estimate the prevalence of under nutrition Qualitative enquiry (4 communities) Risk Factor Survey (400-600 Hoh, 600-800 children<5) SMART Nutrition Survey

Choosing the type of Link NCA study on a given territory of a country depends upon all these factors[4]. All three configurations above require a preparatory phase and a phase in which the hypotheses will be identified to study in the field. Link NCA study method combines transversal surveys (secondary data, SMART survey and Risk Factor Survey) to estimate the prevalence of under-nutrition and of hypothesized risk factors. While qualitative enquiry is the core exercise of a Link NCA study and is compulsory, quantitative data can be collected rather by implementing surveys or by using secondary data. Secondary data can be used instead of implementing quantitative surveys only if they are recent, of high quality and representative of the studied area.

For Moroto District, given that a nutritional survey (FSNA) including anthropometric measurements was carried out in December 2015, the Link NCA study only included a Risk Factor Survey and used under nutrition prevalence from this assessment. These recent measures were largely sufficient for us not to undertake three months later the same measurements. As we have already mentioned, there were also plenty of historical anthropometric measures to put into perspective a number of risk factors in the four areas studied (FSL, MHCP, Health and WASH) via a Link NCA study investigation.

3- UNICEF (1990) "Strategy for improved nutrition of children and women in developing countries", A UNICEF Policy Review. New York, USA.

b) Under nutrition causality

According to the Link NCA study methodology, we proceed to an inventory of the recent quantitative data and literature review. The core idea is to identify a set of risk factors (see Box1) that will help identify the causes of malnutrition.

Box1. Definition of hypothesized risk factor- Link NCA study Guidelines

> *A **hypothesized risk factor** refers to a specific risk factor from the UNICEF causal framework that is believed to relate to under-nutrition in the NCA context. Risk factors defined by the community that do not appear in the UNICEF causal framework may also be potential "hypothesized risk factors".*

In particular with regard to the availability of measurements calculated using the standard indicators of the four sectors. In the Link NCA study methodology, qualitative findings are triangulated with other sources of information including 27 core indicators to identify 18 risk factors in four conceptual environments (see table below) and optional indicators

Table2. List of Link NCA study Core indicators and Specific Risk factor related

CONCEPT RELATED	SPECIFIC RISK FACTOR RELATED	CORE INDICATOR
FOOD SECURITY AND LIVELIHOODS (FSL) FOOD ACCESS	- HOUSEHOLD FOOD ACCESS AND INTAKE - FOOD ACCESS INSTABILITY	- HOUSEHOLD DIETRAY DIVESITY SCORE (HDDS) HOUSEHOLD FOOD INSECURITY ACCESS SCALE(HFIAS)
CARE PRACTICES AND MENTAL HEALTH (MHCP) INFANT AND YOUNG CHILD FEEDING PRACTICES (IYCF)	- INITIATION OF BREASTFEEDING - BREASTFEEDING PRACTICES - COMPLEMENTARY FEEDING PRACTICES - RESPONSIVE FEEDING	- EARLY INITIATION OF BREASTFEEDING - EXCLUSIVE BREASTFEEDING UNDER 6 MONTHS - CONTINUED BREASTFEEDING AT 1 YEAR - INTRODUCTION OF SOLID, SEMI SOLID OR SOFT FOODS - MINIMUM DIETARY DIVERSITY OR INDIVIDUAL DIETARY DIVERSITY SCORE (IDDS) - MEAL FREQUENCY - REPORTED RESPONSIVE FEEDING
CARE FOR WOMEN	- MATERNAL NUTRTION STATUS - CAREGIVERS LEVEL OF EDUCATION - SOCIAL CAPITAL - CAREGIVERS WORKLOAD	- MOTHER'S FOOD INTAKE EVOLUTION DURING PREGNANCY AND/OR LACTATION - CAREGIVERS COMPLTED YEARS OF EDUCATION - PERCEIVED SOCIAL CAPITAL - CAREGIVERS PERCEIVED WORKLOAD

	- MATERNAL WELLBEING	- WHO'S WELL-BEING INDEX AND MAJOR DEPRESSION INVENTORY (MDI)
PSYCOSOCIAL CARE	- CAREGIVER-CHILD INTERACTIONS	- CAREGIVER-CHILD INTERACTION SCALE
HEALTH STATIS AND ACCESS TO HEALTH SEVICES	- CHILD HEALTH STATUS - ACCESS TO HEALTH SERVICES	- ACUTE RESPIRATORU INFECTIONS IN THE PAST 14 DAYS - DIARRHEA IN THE PAST 14 DAYS - DPT 3 IMMUNISATION COVERAGE - ANTENATAL CARE (ANC) - BARRIERS FROM GOING TO THE HEALTH CENTER
UNHEALTHY ENVIRONMENT WATER	- DRINKING WATER QUALITY - DOMESTIC WATER SUPPLY	- ACCESS TO SAFE WATER SOURCES - WATER MANAGEMENT SCORE - QUANTITY OF WATER PER CAPITAL PER DAY
SANITATION	- SANITATION FACILITIES	- USE OF HYGIENIC AND SAFE SANITATION FACILITIES
HYGIENE	- HYGIENE PRACTICES	- CAREGIVER/FOOD PREPARER APPROPRIATE HANDWASHING PRACTICES - PRESENCE OFS SOAP OR ASHES IN THE HOUSE

For each of concepts related to FSL, MHCP, Health, and Unhealthy environment with their indicators, we built a table detailing the latest data (i.e., data collected in the last two years) at the national level, regional level and for the district of Moroto. An analysis of these data allows attaching to each of the measures the hypothesis formulation, that corresponds to the concept and to the indicator (see Section II- Link NCA study Findings).

c) Participatory study

One of the advantages of the Link NCA study methodology is to put into perspective all the contributions of the actors who are involved in the issue of malnutrition in a given local context: "*Link NCA study offers an opportunity to participants - key informants, technical experts as well as a range of other individuals from local communities – to express their opinions and perceptions of the causes of under-nutrition. Participants are given the opportunity to discuss, review and finally validate the conclusions of the study. The value place on perceived causes are as well as on evidence-based causes for the various perspectives that they provide.*" (Link NCA study Overview, ACF, p.6, 2015).

In concrete terms this means that in a given context such as Moroto context, two major categories of actors will be requested to participate to explain the causes of malnutrition. The first category includes all the experts from different sectors (government, NGOs, UN) which have in their areas of expertise (Food security,

Livelihoods, Nutrition, Health, WASH, social sciences) knowledge of challenges, conditions and gaps linked to nutrition insecurity in Moroto District. The second category includes all the actors with further proximity to the risk factors that contribute to increased malnutrition among children under five years. These may be individuals who face hardship of malnutrition as parents or as community members, community representatives, and representatives of local institutions engaged in the implementation of health programs, or education. We can refer to Figures 1 and 2 to understand their role in the conduct of the Link NCA study process.

Figure 1. Identifying and Discussing Hypothesized Risk factors and Pathways

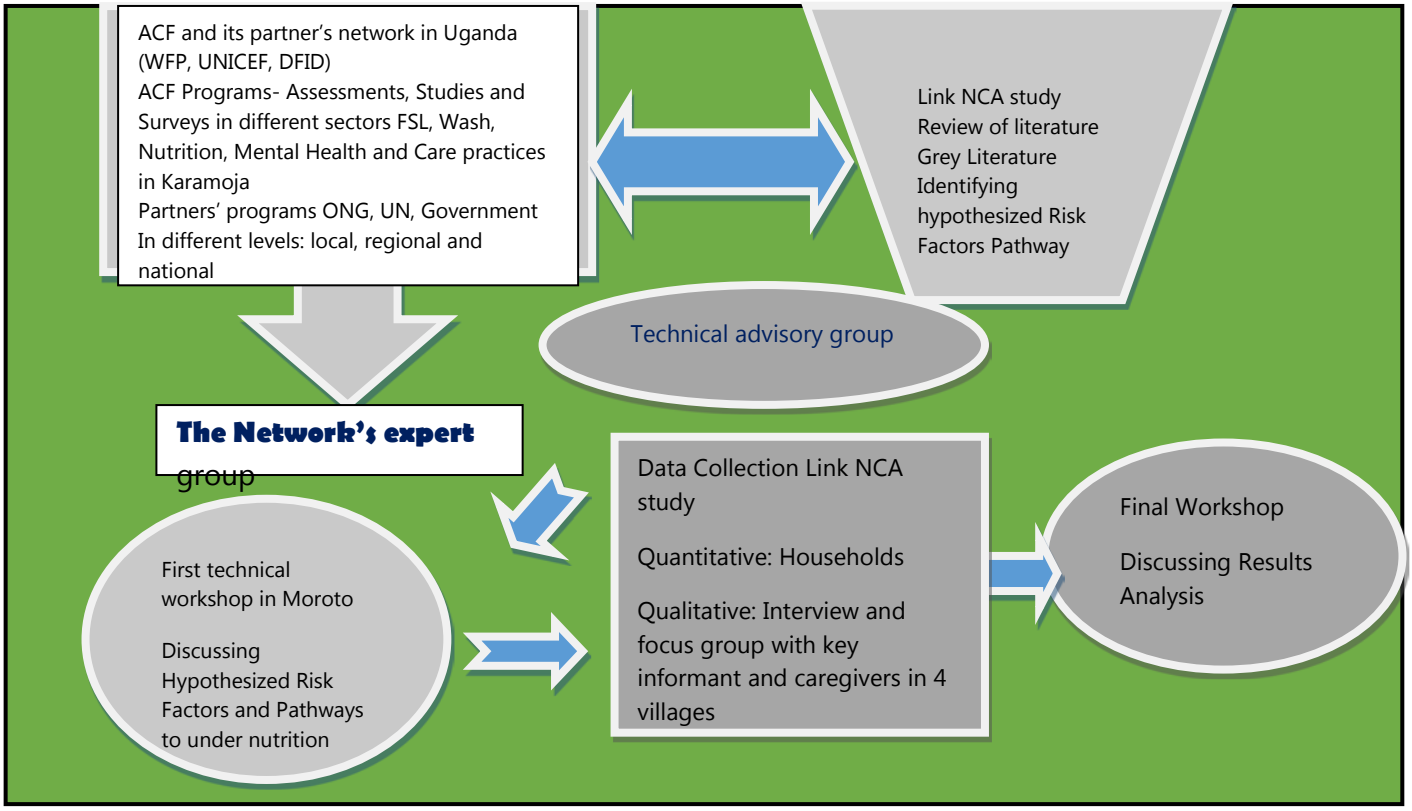
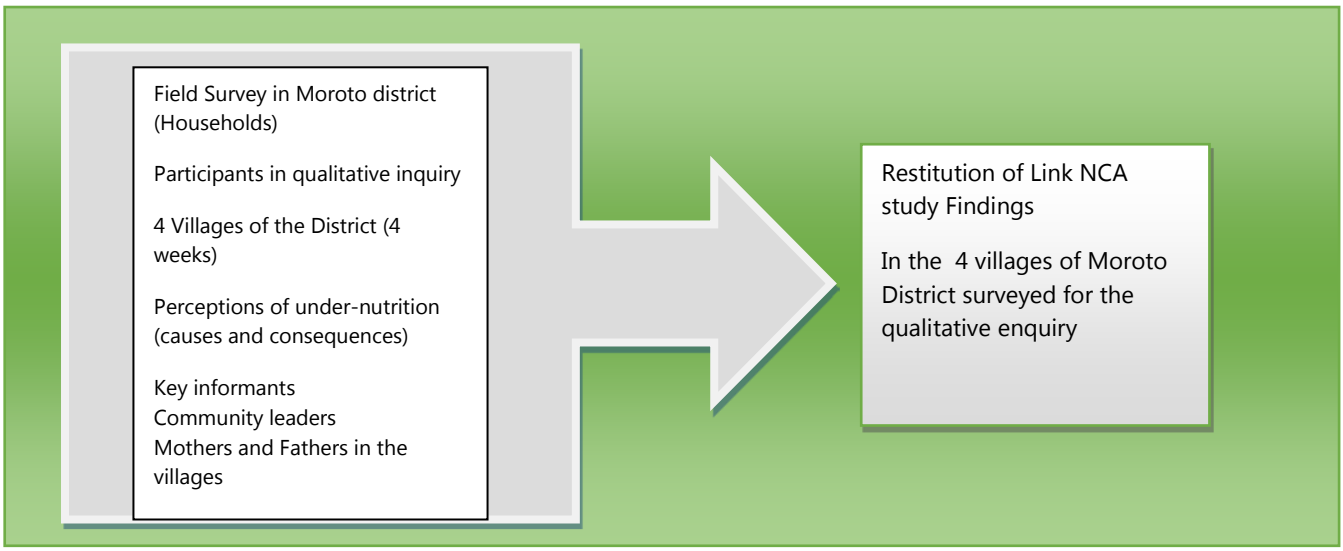


Figure 2: The Field Survey Participants



2.2 Study design

Concerning the Link NCA study[5] in the District of Moroto, the preparatory phase took place prior to the study. This first stage was finalized with the analyst who took up her duties mid-January 2016On March 7th 2016, the *first technical expert workshop* was held in Moroto. On March 8th 2016, the ACF team with a program manager started training field investigators (22), finalizing the household questionnaire and sampling the villages selected. The timetable of field surveys has been respected, the collection of data lasted from March 11 to April 11, 2016. The analysis of quantitative and qualitative data was conducted over the last two weeks of April. The final workshop was held on 16 and 17 of May 2016.

2.2.1 Initial Technical Experts Workshop

An Initial Technical Expert Workshop (March 7th 2016) was held to validate the proposed hypotheses for the causes of under-nutrition to be field tested during the Link NCA study data collection. Stakeholders were invited from multiple sectors and multiple types of organization and asked to work in mixed groups to facilitate multi-sectorial discussions and ideas (see more detailed in Section Ⅱ).

2.2.2 Field data collection

The qualitative component was conducted in four villages in Moroto District with selected groups in each community. This qualitative enquiry ran from 14th March to 11th April 2016 with 6 days spent in each village (4). The Risk Factor Survey was conducted at households in 30 villages from 13th March to 4th April 2016.

2.2.3 Final Technical Expert Workshop

Findings from the data collection were used for the Link NCA study Analyst to objectively rate causal hypotheses using pre-set criteria. During the qualitative enquiries, on the last day in each village the communities were asked to give a rating to the relevant causal hypotheses for their village. Findings and the results of the Link NCA study Analyst and Community ratings were presented to the Stakeholders on 16th and 17th May 2016 at a Final Workshop with the objective to validate the results and reach a consensus on the risk factors rating in the Link NCA study area.

2.3 Sampling procedures

The selected sampling method was random cluster sampling. In this section, we present the sampling technique for the two data collections involving households and villages, the household questionnaire components of the collection of quantitative data, and the survey methodology for the collection of qualitative data.

2.3.1 Sampling methodology

The household sample was pulled taking into account the parameters known on the prevalence rate of the Link NCA study indicators and demographic parameters (number of children under 5 years old) relative to the population of Moroto district. The Household (HH) average size has been considered as 5 members by

5- The minimal length of a Link NCA study with all component implemented (qualitative enquiry, Risk Factor Survey, SMART) is 5 months and can be increased according to the context and the complexity of the situation.

household (Uganda Demographic Health Survey (UDHS) 2011). The number of children for each age group per HH has been deduced from children under 5 years population of 18.8 %, and the number of members/HH (5). Sample size was calculated for a selection of relevant indicators: early initiation of breastfeeding (0-23 months), meal frequency (6-59 months), ARI prevalence 6-59 months, IDDS (6-23 months), Diarrhea (0-59 months) and the most large and feasible sample was selected (600 HH, representing approximately 829 children).

2.3.2 Sample size calculation

Sampling design: two/three stage clusters sampling: selection of clusters, selection of households.

- *First stage: selection of clusters (Primary Sampling Unit)*

Villages had been defined as clusters. Initially, according to available demographic data (population per village, number of villages), there are within the district 151[6] villages. In Moroto District, it was estimated that a sample of 30 villages was adequate; we used the ENA software using Probability Proportional to Size (PPS) for selecting them. The following table shows the 30 clusters selected.

Table3. 30 villages (clusters) selected in Moroto District: Risk Factor Survey

Name Village	Pop size	Name Village	Pop size	Name village	Pop size	Name Village	Pop Size
KATIKEKILE	1126	ARENGEKEJU	1009	AWOIMUJU	318	ACHOLI - INN	1558
NAKONYEN	1063	LORIKOKWA	1218	NABOKAT	531	NATURUMURUM	1546
ALAMAE	612	KAMBIZI	524	NANGORIT	1477	KAAKOLIYE	3163
NATEBA KALEJO	204	NADIKET	428	LOKITELAKAPIS	563	LABOUR LINE	1319
LONYILIK	1004	LOPUR	1296	KIDEPO	614	NAKAPELIMEN	2319
NAKODET	608	NAMATWAE	613	NATOPOJO	268	HOSPITAL	516
NADUKON	163	LOKERIAUT	1915	AKWAPUWA	2739	NAROO	252
LOPONG	125	LOPUTIPUT	592	LONGOROKO	592		

From this list of villages sampled, always with the ENA software, we randomly pulled 4 clusters that constituted the sample of 4 villages for the qualitative survey (see Section 4.2.2).

- *Second stage selection:* Selecting households within clusters

In the second stage of sampling, the *household* was considered as the secondary sampling unit[7]. There were 600 households to be included as part of 30 clusters, i.e. 20 households were interviewed in each of the 30 villages. For villages with a population exceeding 250 households, the second stage is related to a geographical

6- In the census of 2014, 151 villages were listed.

segmentation operated inside the village with one of the segment randomly selected, while the third stage is related to the HH selection.. If each segment contained approximately the same number of households, one was randomly selected. If each segment contained different numbers of households, then the segment was selected using PPS. Household selection was done using simple random sampling with random number tables. Households were selected from household maps with each house numbered.

2.4 Data collection methods

This section presents the data collection method for the RFS survey and qualitative inquiry into the 4 villages sampled.

2.4.1 Quantitative Survey

Data was collected through household interviews

2.4.1.1 Data collection methods

All prevalence results for all 27 core indicators can be found in annex 1. Note that following the analysis of secondary data, optional indicators have been added; these were useful to analyze each hypothesis (30). One can also find in the same Annex (1) the prevalence for optional indicators of the RFS investigation.

2.4.1.2 Collection of data for RFS Survey

Considering the indicators (core and optional), the questionnaire (RFS) was built in a series of three versions[8]. The final (fourth) took into account the hypotheses of the initial workshop additions, involving the addition of optional or local indicators and the corrections that were made by the trainers in FSL, WASH and nutrition, and investigators during training days for enumerators and supervisors. On paper, this was presented in three parts (see annex 2). For data collection, filling was done directly and answers noted on a paper questionnaire by investigators. The filling of responses is exclusive to two respondents: the head of the family and the mother (main caregiver). Of course, for children aged between 0 and 59 months, specific questions about their health status were asked to the mother. The paper questionnaire was written in English[9].

2.4.1.3 Organizing the RFS survey

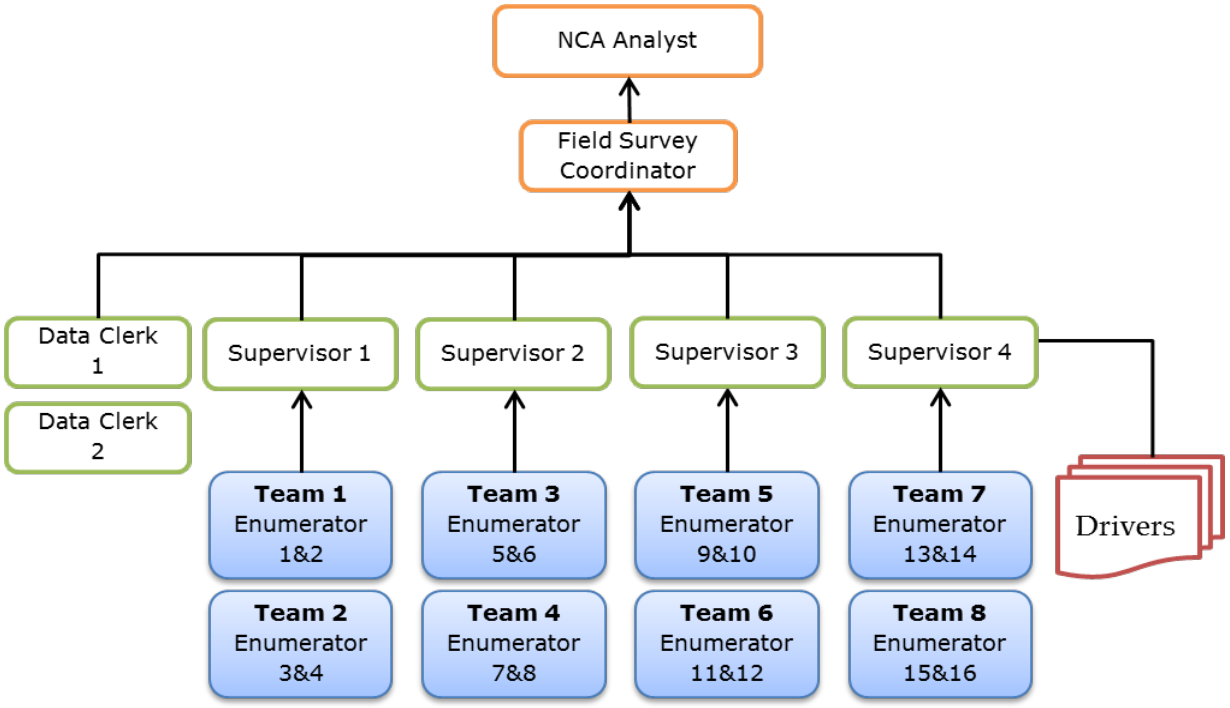
- Team composition

According to the Link NCA study guidelines a team is composed of six positions: one NCA Analyst, one Field Survey Coordinator, two data clerks, eight teams of two enumerators each, four supervisors (one per four enumerators) and 4 drivers (see diagram below). The Field Survey Coordinator was responsible for monitoring the schedule of visits in 30 villages; he has been present every day in the field with the investigation teams.
In addition to these tasks, all RFS field teams had to exhaustively cover all the water points of the 30 villages sampled. An evaluation of all water points (observation) has been added in this investigation. Also, each supervisor, with these two teams of enumerators, had provided one or two comments for each household

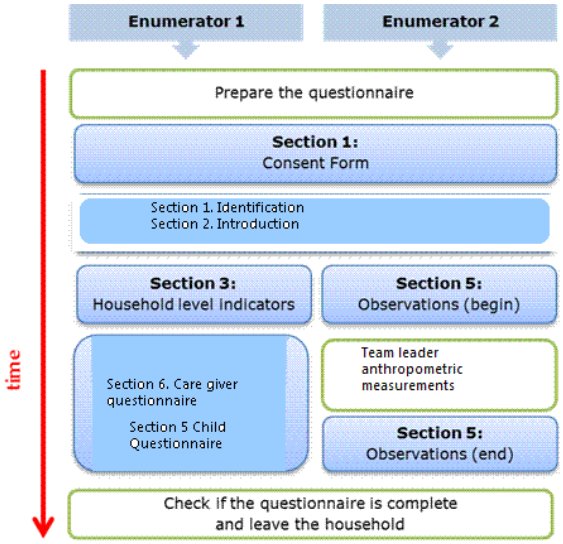
8- The first two versions were reviewed and corrected by the focal point ACF-Uganda, and the focal point NCA ACF USA.
9- See the section on training interviewers about the translation of the questionnaire in Karamajong.

visited. This list of comments was also taken into account at the debriefing of enumerators at the end of data collection.

ACF Uganda recruited a data manager who was responsible during the collection for encoding data management (excel) questionnaires. This function was of great assistance during the investigation. In addition, the data manager developed the questionnaires data input mask, he participated in data cleaning, and he also assured the relay between supervisor's field teams. At the same time, two data clerks were recruited and trained for a week in Moroto. The data entry procedure was followed according to Link NCA study methodology. During data collection (4 weeks) in the villages of the Moroto District, data clerks were located at the ACF base (Moroto). Five weeks were needed to complete the data entry for all survey questionnaires (600).



Thus in the field, the team responsible for filling the paper questionnaire proceeded as follows:



- Training and Questionnaire Piloting

ACF Uganda has organized training of 16 enumerators and 4 supervisors of the RFS investigation. The data manager and 2 data clerks have also participated in all the training sessions. We also asked the qualitative field team (2) to participate in the final day of training that was spent on the translation of the Karamojong RFS questionnaire. These training sessions were given by experts in three areas: FSL, WASH and Nutrition. During 4 days, investigators had theoretical training in each sector, technical explanations on each of the specific questions and group exercises on conducting data collection. Supervisors were trained in household sample techniques in the villages, as well as assessments of water points.

All field teams (qualitative and quantitative) participated in the translation exercise of the questionnaire. Each section of the questionnaire was studied in small groups. Then, in order to standardize the Karamajong questionnaire, consensus was reached in the plenary session on each question translated.

At the end of this training period, the questionnaire was piloted in a village near Moroto (Bazaar). The pilot-test was successful, which allowed teams to move quickly onto the ground. Note that the high quality of the organization (as trainers) and the right level of experience allowed investigators to have a high level pilot-test. Some corrections have been made on measures concerning the observation of water points.

- Length of the RFS survey

The field survey began on March 11, 2016, and ended on April 4. The teams have been on the ground 6 days a week. In total, during 17 days of fieldwork, teams have collected 600 questionnaires.

Number of teams	Number of clusters	Number teams/cluster	Number of HOH/day/team	Number of HOH per cluster	Number days spent in each cluster	Sample size	Total Number of days for the whole survey
8	30	2	10	20	2	600	15

You can see on annex 3 schedule of visits of field teams in 30 villages in the district of Moroto.

2.4.2 Qualitative Inquiry

In Moroto district, the qualitative survey took place during the same period as the data collection of the RFS investigation. Each village was visited during a six-day week. We chose to do a village for an entire week due to the approach of the rainy season, which could affect the data collection in the villages located in the mountains or near a river.

2.4.2.1 Research instruments and methods

According to Link NCA study methodology, respondents of a community fit into 4 groups: community leaders (1) key informants (2), mothers and fathers of children under 5 (3). In each village, we added a focus group with teenagers some of which were parents. All recommendations concerning the Link NCA study methodology were followed. We provide in the table below a summary of the data collection for the qualitative survey.

Table 4: Qualitative Survey, Instruments and methods, Moroto district

Objective	Develop a local definition and understanding of under-nutrition (1)	Characterize food security, health, and care in the community (2)	Explore respondent perceptions of the causes and consequences of poor food security, health, and care in relation to under-nutrition(3)	Explore respondent perceptions on the vulnerability of teenage girls with children(4)	Understand how the community prioritizes these factors(5)
Respondents	Key informants, Community leaders, Women, Men, and teenagers				
Instruments	Questionnaire, Discussions Guides, Role playing game				
Methods	Interviews and Focus groups				

2.4.3 Data Collection

The four villages are sampled villages within the RFS cluster list. . One can find their locations and their geographical, social and economic placement in section II of the report under the heading "Background characteristics of qualitative study participants" (section 3.2)

Table 5: Composition of the group the qualitative survey: District of Moroto

Target stake holder in village	Community leaders	Key informants	Fathers and mothers	Mother with SAM Child
Composition of the group	Chairman/ village VHT/village TBA/village Members of elected LLC1/village	Health worker/ village Nutritionist (Moroto Hospital) Teacher/village	Fathers: 30-40 fathers per village Mothers: same 15 mothers per session/ village	2 mothers with a malnourished child a single episode 2 mothers with a malnourished child with several episodes
Number of participants: 249	16 leaders	9 key informants	160 Men 60 Women	4 mothers

2.4.4 Field Team Composition, Recruitment and Training

To conduct of the survey, a translator and an assistant (for taking notes) were recruited. Throughout the investigation, they accompanied the NCA analyst. The team had a car and driver available.

The translator and assistant were trained for two days in the techniques of qualitative research and the challenges of data collection. In addition, they also attended the day dedicated to the translation of the questionnaire in order to become familiar with the core questions on the various sectors of the RFS investigation.

2.4.5 Development and pre-testing of discussion guides and other instruments

Regarding interviews with community leaders and key informants, two framework questionnaires were prepared and then tested by the team (Analyst, translator and assistant). In addition, each discussion guide for the thematic (objectives) focus groups (women, men and adolescents) were prepared during the conduct of the inquiry. Five discussion guides were built during the first week. For each village, the guide was reviewed and adapted according to its particular context, e.g. rural or urban. Also, all along the data collection, the team followed a process called "cognitive debriefing." Cognitive debriefing involves asking respondents, after conducting an interview, what their interpretations were of the questions that were posed to them to judge whether respondent understanding corresponds with the intended meaning of the question. These daily sessions lasted for two hours and were gathered in a narrative book of the qualitative survey.

- Field notes

We would like to give some field notes that could help understand how respondents, particularly mothers have responded to this survey. It should be noted that in all the villages visited, participants in group discussions said it was their first experience as a participant in such surveys (focus groups).

First observation: a participation rate of over 100%

We were not able to identify in each focus group (men and women) the participants according to their economic status. In the villages, it was very difficult to choose mothers by socio-economic status, particularly in rural areas where mothers had all the same income-generating activities. A clearly noticeable aspect was their motivation to be present every day of the week when the working sessions were held.
During the holding of all focus groups, 15 women participated in each of the 4 focus group sessions and 25 men in each of the one session reserved for males.

Second observation: Focus groups participation for mothers

Mothers were asked to play roles representing a husband, a mother, a grandmother, a health worker, a VHT or a traditional healer. The goal of the role playing was to collectively discuss the presented scenes. We observed that women were asking a lot of questions to "players" on the reason of their actions. Also in the following sessions, they were divided into subgroups. Each group had a representative who was to explain to others what they perceived the relationship between food security, health, hygiene measures and child malnutrition to be. Each team leader explained very carefully all that had been said in his working group. On the last day, mothers have questioned several risk factors in each of their subgroups. In plenary, they focused their efforts to achieve consensus on the main causes of malnutrition. In the first village, they kept 10 causes of malnutrition in the second village, they voted to retain five. In the third village, they said it was necessary to take six causes of malnutrition. Finally, in the last village, they decided to retain 5 consensual causes as the root causes of malnutrition.

Third observation: Focus group with men

We held in every village, a collective discussion with the men who were selected by the village chief or otherwise by the VHT. It has been observed that men have behaved the same way in the four villages. Firstly, they came in numbers. Then they all put issues forward and, alternately, they responded. We thought they

might be intimidated by the questions on domestic violence and alcohol. This was not the case. They were quite clear in their remarks. Also, at the time of our return to present the results in the three villages, men came in large numbers and made many comments on the economic and social situation of their villages (e.g. need mosquito nets, clothes, help repair damaged water points, better explanation and support hygiene and latrines).

Fourth observation: Focus group with teenagers

This was a new discussion group asked by the experts of the initial workshop who wanted information about increased vulnerability of young teenage mothers to child under nutrition. To contain the analysis, two focus groups were held, one with the girls without children, and the other with adolescent girls who already had a child. One result stood out; it seems that girls in urban areas could be a vulnerable group. Beyond this, it is interesting to note that among girls who do not have children yet, their perception of malnutrition refers to parental negligence. At each of these sessions, we asked in private: what was the most important factor in preventing malnutrition. By counting the answers, two factors emerged: go to the health center in order to better care for the children, and have an emotional relationship with the child.

2.5 Data Management and Analysis

Very special attention has been given to the quality of all data required for the analysis of risk factors in order to identify hypotheses covering the causes of under nutrition in Moroto district. First, the preparations for the initial workshop, we worked with a Technical Advisory Group (TAG) for the preparations for the workshop and to gather key information regarding the context. Then to obtain quality survey data, we also established a verification procedure of data collection for the household survey and the qualitative survey. Also, we have prepared very carefully by analyzing the first results of the joint RFS investigation of the qualitative survey, a preliminary analysis was produced and sent to the participants of the final workshop. Finally for the final workshop, the Link NCA study procedures have been established to seek consensus on the causes of under nutrition in the Moroto District.

2.5.1 Initial Workshop

Three methodological steps allowed us to collect data, analyze them and also discuss stakeholders. The first two concern the preparations for the workshop, and the last stage refers to the rating of the hypotheses of the initial workshop.

In the preliminary stage of the constitution of a list of hypotheses both TAG were established, first with the team responsible for the Link NCA study with the support of WFP program leaders and UNICEF, a meeting held in Kampala (February 23) to discuss the first hypotheses in the areas of FSL and Health. A second TAG was formed in Moroto with partner NGOs and UN agencies, two meetings were held: the first meeting focused on identifying the causes of malnutrition, and a second on assumptions that may be retained to hold the initial workshop.

2.5.2 Quantitative data management and analysis

On the level of the quality in conducting the inquiry, we can see in Table 7, the rating in the quality of data management. We may say that the RFS survey was of very good quality, especially because of the monitoring by the program manager on the ground, the very good level of experience of supervisors and investigators recruited, and the quality of work from the data manager.

Table 6: Quality of data management (RFS Survey)

Process	Tools	Validation	Rating
Sampling	Guidelines or Link NCA study ENA software	Program manager, NCA analyst, NCA Focal Point, Technical Advisor Technical Advisory Group (TAG)	Very good
Building the questionnaire	NCA guidelines	NCA Analyst, NCA Focal Point: Technical Advisor Technical Advisory Group (TAG)	Very good
Recruiting and training	NCA Guidelines	NCA analyst, Program manager	Very good
During the survey	NCA questionnaire Tool Kits for NCA Paper questionnaire	Program manager improves the quality of the measurements. NCA Analyst, Program manager The quality of experience of the supervisor team was very good	Very good
Data entry	Good instruments Excel and The Epinfo comparison module	NCA Analyst, and Data manager and data clerks	Very good

2.5.3 Qualitative Data Management and Analysis

The qualitative data were analyzed using ongoing thematic coding at the end of each day. Summaries of emerging themes were also developed. Discussions were transferred to narrative book with assigned themes, group type and village and later analyzed using content analysis methods.

2.5.4 Rating Hypotheses

During the workshop, an assessment of the Link NCA study hypotheses was requested from the participants of the 25 hypotheses proposed by the NCA team. A detailed discussion on this point can be found in Section II. The 30 hypotheses mentioned here were made in order to be tested in both NCA surveys.

Of the 30 hypotheses, 29 were actually tested. In preparation for the final workshop, an analysis of the results was presented to participants one week before the meeting. The analysis of the results was based on triangulation between sources of primary data, secondary data sources, the literature review and the results of

the qualitative survey. The analysis can be found in Section II along with the grid that was used to shape and rate the hypotheses (ranging from major hypothesis to significant, minor, rejected and untested; see Annex4).

2.5.5 Final Stakeholder workshop

The major final workshop objective was to establish a consensus on the list of hypotheses tested and ordered proposed by the NCA analyst. As a prerequisite, participants had also noted the confidence level for each of the hypotheses formed during the first day of the workshop.

- Vote for the confidence level on NCA analysis

Regarding the first activity on an assessment of the NCA analysis, four groups have therefore assigned a confidence score for each of the 30 risk factors. The average for the 30 risk factors is 2.46, which is a good score. As regards the 13 major hypotheses, the score ranges between 3 [high] and 2 [medium]. The average is 2.7. For important risk factors, the score is slightly lower at 2.35. Finally, for two minor risk factors, the score is 1.75.

- Consensus for the rating of 30 hypotheses

Of the 13 "major" risk factors, participants consensually kept 12 risk factors. One risk factor did not meet with consensus, that is, "*Early child-bearing, high prevalence of teenage pregnancies*.' Of the 12 'important' risk factors, participants maintained consensually 11 risk factors. They modified the allocation of two risk factors. The first, 'mental health', was assessed as a minor factor. The second *'Insufficient income to cover transport costs to the nearest Health Center'* was also assessed as a minor factor. The table further below points to explanations given for this consensual modification. Of the two risk minor factors, one was elevated to a major factor. This is the hypothesis relating to the role of fathers, '*Limited male-involvement in child care practices*.'

A report on the workshop was also delivered to all participants May 30, 2016.

2.6 Ethical considerations taken during the survey

Table 7: Ethical considerations for Link NCA study in Moroto district

Obtain permission to conduct the survey from appropriate local/national authorities	• District level: DOH • Local level: LC1
Obtain informed consent and respect confidentiality:	• Household • Consent form first section of the household questionnaire
Provide an adequate environment for the community-level qualitative enquiry	• Permission to hold the focus group with the village chief • Isolated place to hold focus groups with women to help them to express themselves (often made the the FGD in a private home..
Present the results of the NCA survey to participating communities	• Three villages visited on 4 • The entire population, men, women and teenagers took part in the final discussion in the 3 villages around 100 people by village

2.7 Limitations

2.7.1 Link NCA study methodology limitations

The Link NCA study Guidelines emphasizes two basic first limitations, namely what an Link NCA study survey cannot provide to operational actors and researchers in this field regardless of the country or region.

- The Link NCA study method does not seek to statistically demonstrate nutrition causality but instead creates consensus around the plausible causes of under-nutrition in a localized context. Initially, the Link NCA study was designed to rely primarily on statistical tests of association to inform conclusions; after testing, this approach was rejected by the scientific committee.
- The Link NCA study is not an emergency assessment tool: it is not well suited for application in rapid onset crises due to the time required to conduct the study. Furthermore, in acute emergencies the immediate causes of under-nutrition will likely be overt and prioritized over underlying and basic causes.

2.7.2 Limitations encountered related to the study presented

An extrapolation of the results obtained in Moroto district to other districts (6) of the Karamoja region is not advisable. Indeed all the results are based on triangulation between the prevalence of risk factors (RFS) and the results of the qualitative survey in villages in Moroto district. One could be tempted to do it, but beyond the disparities observed in other studies on nutrition and food security, the base of the Link NCA study analysis is built on the characteristics of the context of this district.

However, the methodological tools used to make a Link NCA study in other districts of Karamoja are just facts relevant to the implementation of a data collection on the territory of the Karamoja district. That could possibly involve the organization of the field with the same design of human resources knowing that one of the

strengths of this survey was to have a team of local investigators who have very good experience of data collection in the field (villages), including the questionnaire and the methodology of qualitative investigation.
This survey contributes significantly to providing an "excellent baseline". Also, by providing "a more holistic picture of the local situation" operational actors will have adequate information to structure innovative and relevant programs for reducing the prevalence of malnutrition in the Moroto District.

PART II- LINK NCA STUDY FINDINGS

This chapter includes 10 sections which account for the entire process of activities necessary to the analysis of the Link NCA study study findings (quantitative and qualitative) in the Moroto District.

This process starts with the highlighted studies and reports, which address the situation of food security and livelihoods, maternal care practices for children, the health of children and mothers, and unhealthy environment. That section includes the first formalization of the hypotheses concerning the causes of malnutrition given the risk factors identified in the literature review.

Then follows the activity of validating the hypotheses used according to the Link NCA study methodology, so, all these hypotheses have been discussed with the input of local, national and international experts by holding a workshop that took place in Moroto on March 8, 2016. 30 hypotheses were used in order to test the Link NCA study study.

Before the presentation of the findings, a section outlines what could be learned from the local definition of malnutrition in the specific context of Moroto district. Understanding malnutrition could be organized in a framework of analysis that evolves in four domains: impact of environmental factors, impact of living space, the complexity of humanitarian crises and unsustainable development, and resilience to food insecurity and malnutrition.

The analysis opens with an introduction of the major socio-demographic characteristics obtained by the Link NCA study household survey. All indicators measured by the household survey of March 2016 describe the food security situation, that of MHCP, that of health and finally that of the health environment. All hypotheses about each situation are analyzed while a reminder is provided of the reasons that justified their inclusion in the collection of data during the initial workshop. Also, the analysis of each hypothesis is based on the level of plausibility, and also on its consistency. Thus, a hypothesis will be maintained if on the one hand, a good triangulation between measurements in the household survey and data of the qualitative survey is obtained, taking into account the results of secondary data, and review literature. Also if, on the other hand, there is a consistency of data taking into account seasonality, historical trends and changes that mark the evolution of the causes of child malnutrition in the district.

Section 9 completes the part on the process of data analysis. Here, the assumptions on the causes of malnutrition are weighted or sorted in an interval scale ranging between "major", "important" and "minor" if they help explain malnutrition, otherwise, the hypothesis will be rejected. In this survey, the analysis shows that 29 out of the 30 hypotheses help explain malnutrition. None were rejected, however, a hypothesis has been neither rejected nor accepted, it was classified as tested with no consensus. This analysis was presented at the final workshop of local, national, and international experts, which was held in Moroto on 16 and 17 May 2016. We provide the evaluations of participants for each of the hypotheses studied and analyzed. Section 10 formalizes the local causal pattern of child under nutrition in the local context of Moroto. It was built based on the links between selected risk factors that lead to child under nutrition. One should keep in mind that because of the many transitions both positive and negative (nutritional, climatic, economic or societal), we cannot help but

describe the current situation as complex, meaning that uncertainty and instability currently affect all Moroto district communities. We will see in the third part of this report which contains our recommendations in this situation, how it might be possible to make proposals for reducing child malnutrition in the district.

1. UNDER NUTRITION IN MOROTO DISTRICT

In December 2015, a report covering Food security and Nutrition (FSNA) provided an overview of the nutritional situation for children under five years old on the territory of the seven districts of Karamoja. That FSNA report included the results on the prevalence of malnutrition (wasting and stunting) by districts. We have used that recent information to develop the conceptual framework of the causes of malnutrition in the Moroto District. What is also relevant as to the use of these findings relates to the fact that anthropometric measurements are made twice a year (December and May) in each of the districts of Karamoja since 2012. Also, it is important to highlight that between 2009 and 2012, ACF also produced two annual reports (September, December) on nutritional surveillance in Karamoja, based on anthropometric measurements as well. Thereby in 2016, we may not only have recent data from the previous year, but we can also draw on a period of 7 years regarding the evolution of the prevalence of malnutrition in children under five in each of the Karamoja districts.

1.1. Anthropometric results in Moroto District, Karamoja

As shown in Table1, the prevalence deduced from anthropometric measurements in children aged between 6 months and 59 months is high in Karamoja: "*The prevalence of GAM was 12.4% for Karamoja. The most affected age groups were children 6-23 months where GAM prevalence was at critical levels in all districts.*" (FSNA, Dec. 2015). Concerning the Moroto District, the prevalence GAM, SAM, and stunting are all above the regional average.

Table1. Prevalence of GAM, SAM, Stunting, and Underweight among children 6-59 months, Moroto, December 2015

Children 6-59 months	GAM	SAM	Stunting	Underweight
December 2015	% (95% CI)	% (95% CI)	%(95% CI)	% (95% CI)
Moroto (N=519)	13.2 (9.9-17.3)	5.2 (3.3-8.0)	46.8 (41.5-52.1)	37.1 (32.4-42.0)
Karamoja (N=3397)	12.4 (11.3-13.6)	3.8 (3.2-4.5)	39.5% (37.9-41.2)	31.0 (29.4-32.6

Source: FSNA-December 2015.

However, one may observe that in the 7 districts of Karamoja, the data collected in December 2015 showed significant differences which vary from 22.8% to 12.6% for the prevalence of wasting, and from 25.6% to 46.8% for the prevalence of stunting (see table 2 below).

Table2. Malnutrition among children 6-23 months, according to district, Karamoja, December 2015[10]

District (N)	Wasting	Stunting	Underweight
Abim (N=241)	15.4%	27.7%	21.6%
Amudat (N=215)	12.6%	25.6%	30.6%
Kaabong (N=241)	15.8%	48.3%	34.8%
Kotido (N=263)	18.6%	43.7%	35.8%
Moroto (N=248)	19.4%	46.8%	38.7%
Nakapirit (N=216)	17.6%	44.0%	35.2%
Napak(N=189)	22.8%	35.1%	34.4%
Karamoja (N=1613)	17.4%	39.1%	33.0%

Source: FSNA, December 2015

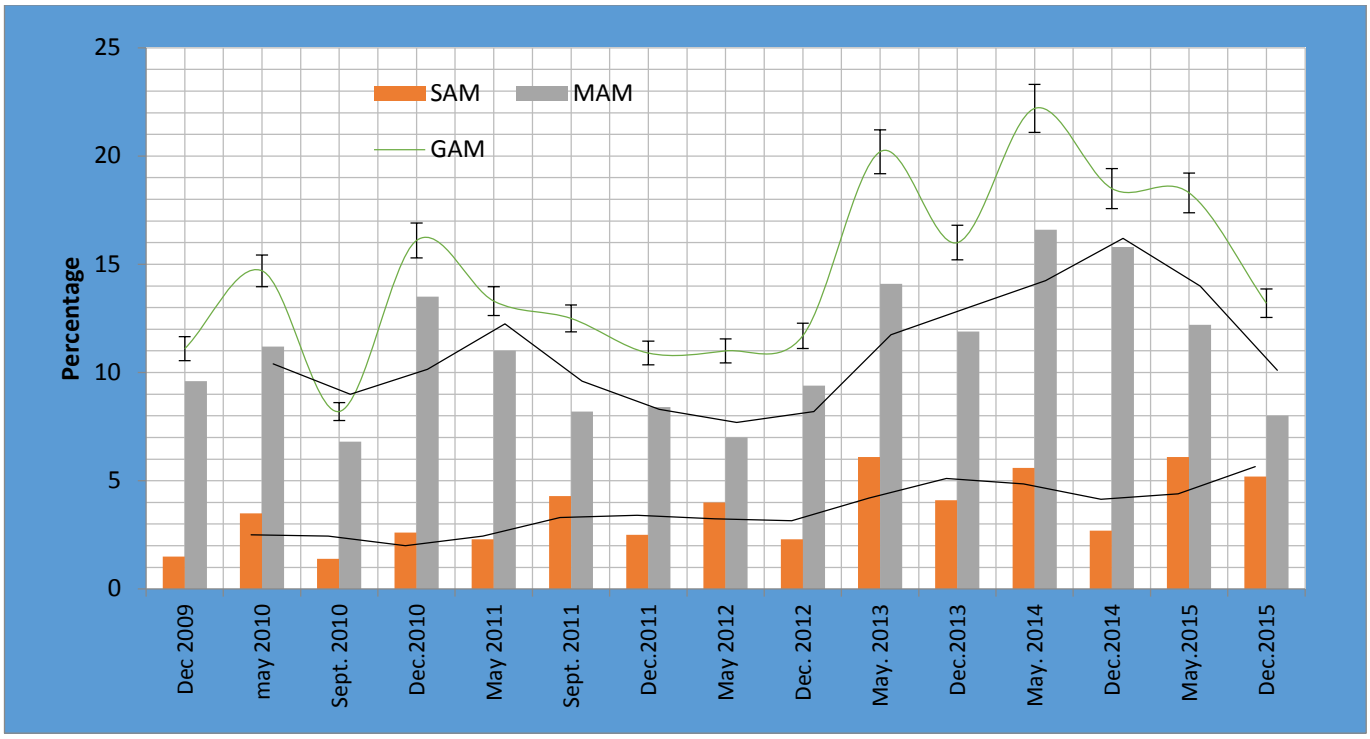
In December 2015, an unexpected conclusion appeared in the FSNA report: "*The trend of GAM in Karamoja over the last five years depicts a worsening situation.*" Thus, in the seven districts, the nutritional status across the region of Karamoja would be worse in 2015 than it was in 2010. Regarding the nutritional status of Moroto District, the report notes clearly enough that on this territory, there is a significant deterioration since 2013: "*Moroto has the worst prevalence of global acute malnutrition and, since May 2013, has remained at the 'critical' level. In June 2014, the rate in Moroto was 20 per cent, meaning that one fifth of the district's children were malnourished*" (FSNA, December 2015).

As it can be observed in Figure 1, the evolution of GAM prevalence in Moroto District could be divided into two distinct periods. Indeed, between 2009 and 2012 it was around 10% on average for the three years. In contrast, the prevalence rate begins to stand out from May 2013, with a significant increase. However, its growth slowed in 2015 but remained higher than the prevalence rate between 2009 and 2012. The progression of SAM prevalence evolves constantly since 2009.

It is also noted that the evolution of stunting prevalence rate is relatively constant between 2011 and 2015. However, according to the FSNA findings, there has been over the years a decrease of 6 percentage points between 2011 (52.3%) and 2015 (46.8%) for the Moroto District (see Figure2). Two basic questions appear as part of the Link NCA study: the first concerns the existing malnutrition prevalence rate (wasting and stunting) from FSNA investigations during the year 2015 (June and December) *What Link NCA study indicators (core and optional) were used to make credible hypotheses about the causes of malnutrition?* The second is the evolution of malnutrition prevalence rate (wasting and stunting) since 2009: *What Link NCA study indicators (core and optional) were used to put into perspective the structural causes to the degradation of the nutritional status of children under 5 years in Moroto District?*

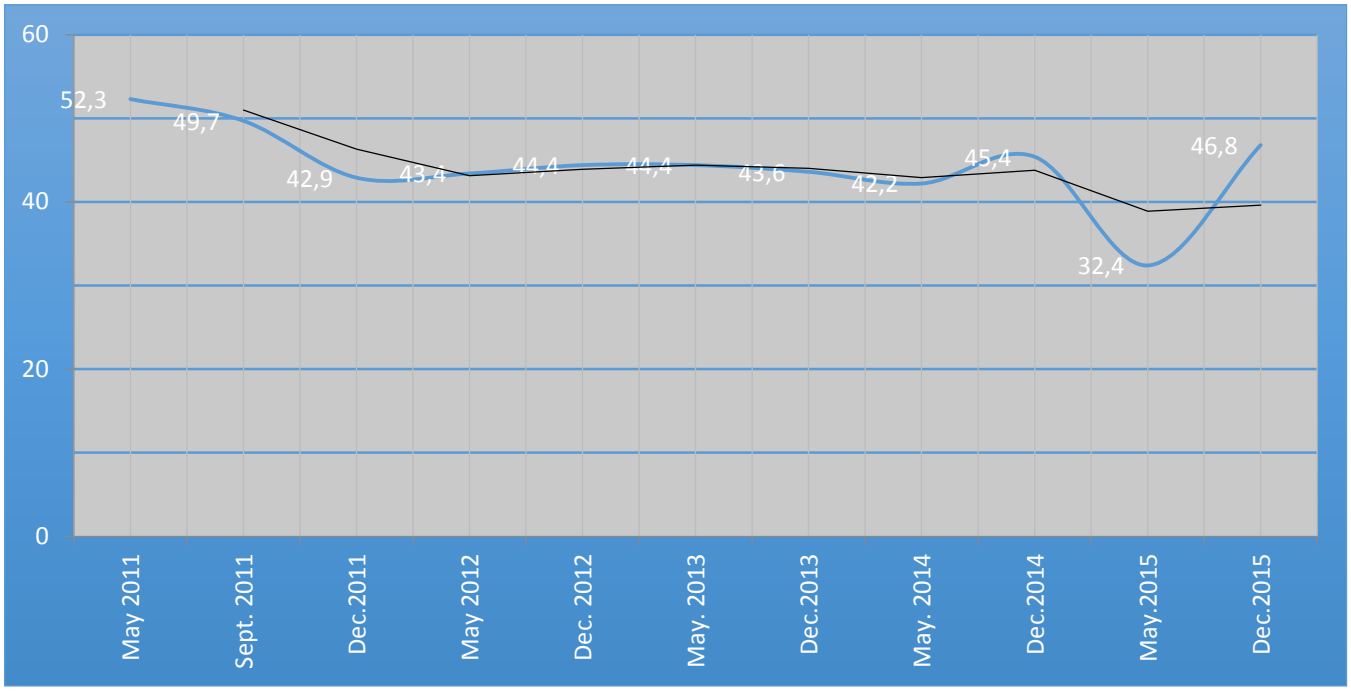
[10] This table should be taken with cautious as the confidence intervals are not presented, and sample size are different, there is a chance having the real prevalence similar from one to another district. The table was included to show tendencies only.

Figure1: Evolution of malnutrition (SAM, MAM, GAM), Moroto District, 2009-2015, Karamoja



Sources: FSNA 2012-2015, ACF Surveillance and Rounds 2009-2012

Figure2: Evolution of Stunting, 2011-2015, Moroto, Karamoja



Sources: FSNA 2012-2015, ACF Surveillance and Rounds 2009-2012

1.2. Nutrition Vulnerable Groups

In February 2016, the analyst and the local partners identified two vulnerable groups:

- Children under 5

- All lactating and pregnant mothers: identification of this group is due to the high number of children per mother in the Karamoja Region (more than 4 children, 43.9% of mothers, FSNA, Dec. 2015) and in Moroto District (more than 4 children, 32.1% of mothers, FSNA, Dec. 2015).

We will see in the following section that these two groups were identified at the initial workshop, however, the number of vulnerable groups has greatly expanded to other groups such as children and teens (6 -18 years), particularly to teenage girls of reproductive age.

2. OVERVIEW OF UNDER NUTRITION DETERMINANTS FROM THE LITERATURE REVIEW

If one refers to the various reports consulted since 2009, one could mainly focus on four different approaches: the impact of environmental factors, the impact of living space, malnutrition and its impact on the resilience of families and children, and finally a more comprehensive approach suggesting the complex changes from ecological, demographic, economic, political, cultural, technological, gender and other research perspectives to explain the origin of malnutrition following these transformations in the territory Karamoja.

1.1 Impact of environmental factors

As part of the investigated households (FSNA), an evidence-based definition of malnutrition was built on prevalence via anthropometric measurements. From there, through measures (indicators) on the living conditions of households, some factors were found to have a more significant impact than others on malnutrition: *"The factors that were independently associated with malnutrition included livestock ownership, household food security status, amount of water available for use at household level, household socio-economic status*[11]*, anemia status of children, maternal underweight and a child being of male gender*".

1.2 Impact of living space

Most recently, the latest FSNA report (December 2015) shows a new configuration of malnutrition, which would also be distributed across different geographical areas. *"The study was geared to provide findings at the level of the district. However, with well-designed studies, sub-group analyses should be able to predict the trends but less certainly. Therefore caution is needed while interpreting findings at the sub-county level. There were significant variations in the prevalence of malnutrition between sub-counties within districts"*. For example, for the 5 sub counties of the Moroto District (see table below), malnutrition (GAM Stunting, underweight) could be defined by geographical space.

11- Programs aimed at improving the socioeconomic status of the household and also possibly targeting social ills like alcoholism should be implemented. Anecdotal information from supervisors indicated a lot of alcoholism amongst mothers, which might hinder or even reverse all the gains made over the past decade.

Table 3: Prevalence of GAM, Stunting and Underweight according to sub-county, Moroto District, December 2015

Sub-County	GAM	Stunting	Underweight
Rupa	20.2%	60.7%	53.6%
Katikile	18.1%	44.7%	37.2%
Nadunget	16.1%	46.6%	36.9%
Tapac	8.1%	42.5%	30.2%
South Division	2.5%	32.5%	22.5%

Source: FSNA, Dec. 2015

1.3 Transdisciplinary approach to the complexity of humanitarian crises and unsustainable development

In 2009, the NGO ACTED and international partners published a transdisciplinary diagnosis on the situation of the pastoralist communities of Karamoja. This is identified through functional models (or "clinical pictures") based on the nature of interactions between humans and nature[12].

Concerning the nature of interactions between humans and nature: three components are examined, two are related to the population growth: (1) The loss of biodiversity will bring a loss of resilience to shocks and will destabilize food security; (2) The overexploitation of natural renewable resources means clustering the intensive utilization of these resources without enough time for them to regenerate. A third focuses on the impact of climate change: long droughts cause poor harvests. Consequently, the malnutrition pattern emerges because of a permanent crisis of hunger and is a result of food insecurity.

1.4 Resilience to food insecurity and malnutrition

In April 2015, a group of researchers of the Resilience Analysis Unit (RAU, IGAD) published a report on the resilience capacities of the population Karamoja (Resilience to food insecurity and malnutrition in Karamoja, Uganda).

Although the analysis of statistical results is not conclusive on the links between the drivers of food insecurity and malnutrition and the shocks, according to this deterministic approach, it seems that the most plausible impact on the resilience capacity of children is chronic malnutrition (stunting): "*Stunting is an important indicator of nutrition insecurity and also of child poverty, since it reflects economic and social deprivation and whether a child's basic needs have been adequately met in their early years. The effects are also long-term and intergenerational: stunting begins during pregnancy, results in lifelong damage and may be passed onto the next generation, since women who are stunted are at risk during labour and childbirth and more likely to deliver low-birth weight and stunted children who have lower levels of educational attainment, reduced physical capacity and poor resistance to infection and disease*".

12- "*To reach a transdisciplinary level of systems research, within the limited time and means of our project, we followed the "syndrome approach" (Syndromansatz) that was developed in 1993 by the German Advisory Council on Global Change (Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen, WBGU), and then further developed by the Potsdam Institute for Climate Impact Research (PIK)*".(Kagan and all. 2009)

The authors conclude: "*There are three main determinants of malnutrition: (1) limited access to food; (2) poor care and feeding; and (3) poor health and sanitation*". (p.44)

PRELIMINARY WORKSHOP

On the 7th of March 2016, ACF held an initial technical workshop with 25 national and local experts from the following domains: Food Security and Livelihoods, WASH, Health, nutrition, MHCP and DRR.

1.5 Initial causal hypotheses

Based on the results of a secondary data and literature review on risk factors and pathways to under-nutrition, a list of 25 hypothesized risk factors were presented to the technical experts.

During the months of January and February 2016, a first analysis of the literature review was conducted by taking into account all the available data on nutrition since 2009. It is useful to note that since 2009, besides data available on malnutrition, a biannual report (FSNA[13]) analyzes a series of primary data from a household survey in the seven districts of Karamoja. This great survey supplies statistical results on indicators in the sectors of FSL, IYCP, WASH and Health.

Also, there are many reports, bulletins and scientific articles on various subjects relating to the living conditions of the "Karamajong" population covering the seven districts in this Region. We selected nearly forty documents. These were considered relevant since they contained pertinent information on changes of the local context that could impact the nutritional status of children under five years old. One can find in annex (bibliography) all relevant documents that were consulted and led to identifying 25 risk factors related to nutritional vulnerability in children.

Data and analysis on nutrition: December 2009-May 2012 (ACF-UNICEF-DHO, Nutrition surveillance and rounds). January 2013-December 2015 (UNICEF, WPF, Ministry of Health, Food security and Nutrition Assessments, FSNA);

Literature review: Nutrition and Food security and Livelihoods (reports, bulletins and articles, 8); Health, Infant and Young practices, Care of women, Psychosocial care (reports, bulletin and articles, 6); Water, sanitation and Hygiene (reports, bulletin and articles, 4); Transition, Migration, Conflicts in Karamoja Region (reports, bulletin and articles, 20).

1.6 Local context: Karamoja and Moroto District

If the objective of the initial workshop is to define with partners a list of hypotheses to be tested during the two field surveys (qualitative-qualitative), it is necessary to have a good understanding of the local context. Indeed, a Link NCA study study is by definition centered on the context that has its own dynamic and its own operational rules may register economically, socially and culturally on its own identity.

Identity can thus be defined by its spatial or even territorial dimension. We also know that in a territory, not everything is homogeneous in the same space. Indeed, there can be multiple collective identities within a

13- Food security and Nutrition Assessment.

territory. Consider first what the major development indicators show on the socioeconomic reality of the large area of Karamoja.

Table 4 shows that the Karamoja Region is clearly distinguishable from other regions of Uganda at least regarding economic vitality (82% (World Bank 2006) population living in absolute poverty) first, and then sanitation conditions.

Table4. Comparative humanitarian and development indicators: Uganda and Karamoja

Comparative humanitarian and development indicators	National average Uganda	Karamoja
Population living in absolute poverty (World Bank 2006)	31%	82%
Infant mortality rate per 1,000 live births (UNICEF/WHO 2011)	54	105
Maternal mortality rate per 100,000 live births (DHS 2011)	438	750
Access to sanitation facilities (UNICEF 2008)	62%	9%
Access to sanitation safe water (UNICEF 2008)	63%	30%
Life expectancy (UNDP 2013)	59.2 years	47.7 years

This marginalization of the territory of Karamoja has its origin in the shock of a great famine in the late 1980s: "*Famine hit when a system under severe pressure for decades experiences simultaneously two successive crop failures, heavy internal and external raiding, and the collapse of the state*" (Kagan and all, p. 14).

The Great Famine (1989) proves to be the prelude to an impoverishment of the population. That shock also triggered the reform of pastoralist Karamajong identity in the years that followed. Indeed, in 2001, the Ugandan State will introduce a reform aiming at the settlement of the rural populations by "Land Sector strategic plan." Some researchers have questioned the adaptability of the pastoralist population to settle[14]. Regarding the particular case of the Karamoja Region, Jana Lüdemann (2009) who studied sedentary Karamajong populations puts forward the thesis of a "*destabilization of the pastoralist Karamajong identity.*" Other experts[15] believe that the greatest sedentarization of populations is incompatible with traditional rangeland management. In 2016, one can conclude that the local context of Moroto District and the greater region of Karamoja is in substance that of a pastoralist community currently living with a transitional identity.

It also appears that beyond the identity issue and the adaptability of the pastoralist kamarajong population to a sedentary lifestyle, there are several other problems the constantly change the human environment and the

14- Robert Blench (2001): "*The fact that nomads are often unwilling to settle suggests (particularly given the role of opportunism and adaptability in the decision-making process) that it is generally deleterious, except after some near-starvation critical point. Adverse conditions generally encourage pastoralists to wander more and further afield. If it were beneficial for pastoralists to settle, this is what they would do and until such time as this, the rationality of nomadism is evident.*" (Blench, "You can't go home again" Pastoralism in the new millennium. London: ODI, Overseas Development Institute).

15- De Koning, 2003; Gray, 2000; Gray et al., 2002; Levine, 2010; Stites and Akabwai, 2009; Walker, 2002.

natural landscape of the area. Recently, one study shows (2015)) that Karamoja is affected by multiple shocks and stresses. Most of the communities and households are typically affected not by a single shock or stress but by a combination, or by a sequence that makes recovery between episodes difficult (see table below).

Table5. Karamoja Region: Shocks and stresses, April 2015

Shocks:	Stresses:
Erratic and uneven rainfall resulting in severe dry spells and flooding; Outbreaks of livestock disease; Crop pests and invasive species; High food prices.	livestock losses; youth disempowerment; weak community leadership; inadequate access to education and health services; Inadequate access to water and sanitation; Low agricultural productivity and services; Violence, alcoholism and women's disempowerment; Negative social norms; Land degradation and tensions.

Source: Resilience to food insecurity and malnutrition in Karamoja, Uganda

This study takes us back to the major risk factors identified by the Link NCA study methodology and related indicators (core, optional and local). Thus, taking into account those representations of the local context of Moroto district, we used the standardized Link NCA study methodology and presented for each of the four sectors a list of hypotheses discussed at the initial workshop of March 7, 2016 in Moroto.

1.7 Food Security and Livelihoods (FSL)

In Table 6, we find the empirical basis for taking account of the three specific risks which relate to 4 hypotheses. It is useful to note that the collection of data from households (quantitative component) and from the mothers in the four villages (qualitative component) was made in March 2016, the month of the end of the dry season. In Karamoja, seasonal impact is very important in terms of food security. On this territory, only one harvest season is possible given the climate. The last great harvest was in October 2015. It goes without saying that at the time of the survey, the granaries were empty, therefore the population of Moroto District had only one choice that of feeding themselves via the local markets.

Household food access and intake:	Food access instability:	Socio-economic status
Hypothesis 1: Inadequate access to milk and animal products by children and mothers	Hypothesis 2: High food access instability	Hypothesis 3: Low Household livestock ownership Hypothesis 4: Low purchasing power

1.8 Mental Health and Care Practices (MHCP)

In this sector there are a substantial number of specific risk factors (7). They are concentrated around three themes: care of children, care of mothers, and the interactions between mothers and children. The FSNA

survey shows that we need to consider all risk factors for "Care of children", and also most of them for the care of women theme. Indeed, we have high prevalence rates which show that mothers in the Moroto district live in difficult conditions potentially affecting the nutritional status of their children. In this context, a qualitative survey among mothers was deemed to be useful to test the hypotheses proposed below (see Table 8).

Care of children
Breastfeeding and complementary feeding practices Hypothesis 5: Initiation of breastfeeding severely delayed Hypothesis 6: Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding)
Care for women
Health and nutrition status: Hypothesis 7: Low maternal nutritional status during pregnancy Social capital: Hypothesis 8: Mothers are not supported, especially when women headed households; Hypothesis 9: Limited male-involvement in child care practices Caregiver's workload: Hypothesis 10: High workload, mothers are also occupied with non-agricultural work Reproductive health: Hypothesis 14: Poor status of reproductive health (birth spacing and family planning)

1.9 Health

Two specific risk factors appear to impact the nutritional vulnerability of children aged under 5 years old in Moroto District. First, there was the high prevalence rate for infectious diseases and fever[16] during the dry season.

Child health status	Access and utilization of health services: Hypothesis 18: Low utilization of maternity and postnatal services, Hypothesis 19: Insufficient income to cover transport costs to the nearest Health Center
Hypothesis 15: Poor health status of children under 5 (Ari and Diarrhea prevalence), Hypothesis 16: High prevalence of Fever/malaria, Hypothesis 17: Poor utilization of bed net	

Second, according to the secondary data available, it appears that access and use of health services could help to maintain a high prevalence of child malnutrition in the five previous years.

1.10 Unhealthy environment

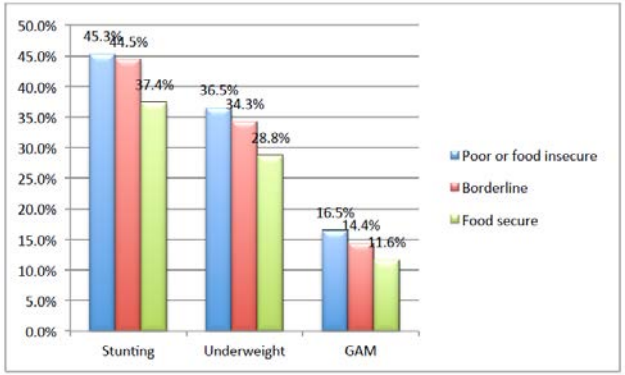
Among the specific risk factors classified by the Link NCA study, three areas are highlighted in this sector, i.e. water, hygiene and sanitation. In Moroto District, regarding water, the main risk factor relates to the access, quality, and quantity. As regards hygiene, two specific risk factors appear to be convincing causes of malnutrition. Finally, for the sanitation conditions, the widespread practice of "open defecation" in the villages seems important to clarify its negative impact on child malnutrition (see next Table).

Drinking water access	Hygiene	Sanitation facilities
Hypothesis 20: Poor quality of drinking water (treatment)	Hygiene practices Hypothesis 23: Insufficient use of soap	Hypothesis 25: Poor sanitation environment and practices

16- The causality chain between diseases and under-nutrition has been thoroughly studied and it is broadly accepted that diseases can affect children's intestinal absorption capacity and appetite" NCA Guidelines, p.109

Hypothesis 21: Poor water storage Hypothesis 22: Distance to water source and time needed to collect water are long	Household hygiene Hypothesis 24: Poor hygiene practices in the household (food preparation and storage, solid waste management)

Table6. Under nutrition and FSL: Hypothesized Risk Factors for Moroto District, Karamoja, Uganda

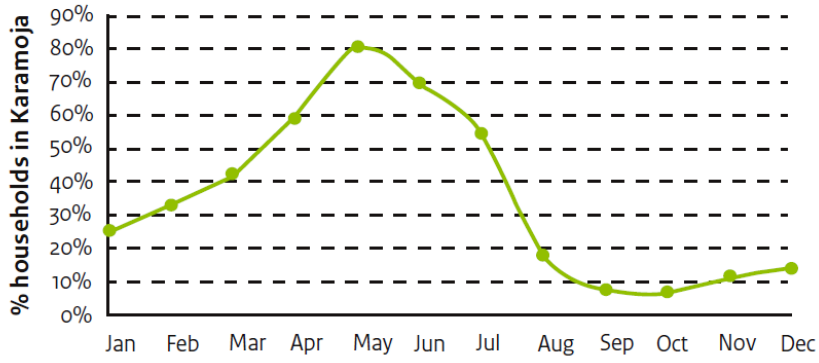
Sector and Indicator	DATA			Findings	Specific factor related (SFR) Hypothesis Risk Factor
Under Nutrition Children U5 Wasting (GAM) Stunting Food access HDDS Low	National Uganda 2011 5% ICF 2011 33% ICF	Regional Karamoja Sept. 2010 9.3% Dec. 2015 12.4% (FSNA) 2011 – 40.3% (ACF) Dec. 2015. 39.5% (FSNA) 2012 4.3 Score (ACF) Dec.2015 **50.%** (FSNA)	District Moroto 2009 11.1% (ACF) Dec. 2015 - 13.2% (FSNA) 2009- 52.7% (ACF) Dec. 2015 - 46.8% (FSNA) 2012 3.0 Score (ACF) Dec. 2015 **43.5%** (FSNA)	 **Figure 35:** Association between stunting, underweight and GAM with household food consumption scores HDDS was low in 50% of the households in Karamoja, worse than in the June 2015 assessment where the regional average for low HDDS was 40%. Household food security assessed by food consumption scores was significantly associated with malnutrition. Children in food secure households were significantly less likely to have malnutrition compared to those belonging to food insecure households Providing milk for young children is the priority across all livelihood zones as emphasized by both men and women, and sour milk is the preferred form of milk for feeding children. Although the portion of total available milk given to children increased across the two time periods, the total *amount* of milk in children's diets dropped dramatically due to the overall decline in milk supply within households" Milk Matters in Karamoja: Milk in Children's Diets and Household Livelihoods, October 2011, Tufts Univ. *Nearly 30% of children have no access to milk, WFP and UNICEF (FSNAs), ACF nutrition*	SRF. Household food access and intake **Hypothesis 1**: Inadequate access to milk and animal products by the children and mothers

HFIAS[17] Food security index[18] Severely insecure IPC index[19] Population MAHFP [20]	 National Uganda N/A	 Regional Karamoja N/A Dec. 2015 14.1% (FSNA) June 2015 24% (phase 3) April 2014 18% (phase 3)	 District Moroto N/A Dec. 2015 16.9% (FSNA) June 2015 24% pop (phase 3)	*Surveillance, Milk Matters (Save the Children). Dec 2015* In Karamoja, 30% of the population is in crisis; 54% are stressed, 17% are faced with minimal to no food insecurity. In Moroto District, two-thirds (67 percent) of the households reported having harvested less food compared to the previous season. The lean season was therefore forecasted to start as early as February 2015. (FSNA, June 2015) Causal Factors 1. Food utilization was found to be a major limiting factor and the causes are: Majority of households have poor sanitation and hygiene practices e.g. open defecation. Poor Post harvest handling lead to poor quality of food. Poor food preparation methods that lead to lose of nutrients. 2. Food access is a major limiting factor to food security Most households have depleted their own food stocks hence heavy reliance on food from the market. Most households are constrained by limited purchasing power. Limited access to nutritious food such as milk, eggs and meat by the children and mothers. IPC Index Population, June 2015.	

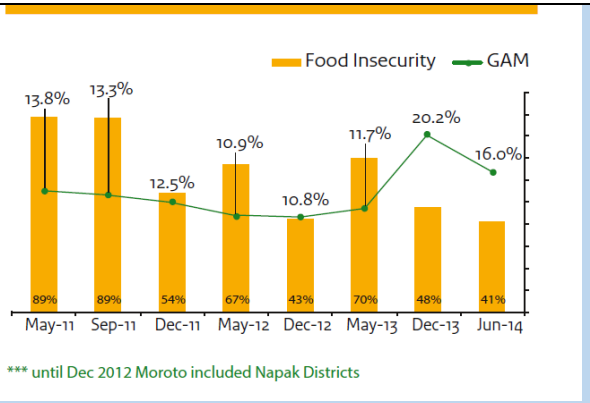
17- It is complementarily with HDDS provides a global view of food insecurity in the survey area. HFIAS is more qualitative and relies on perception. A food secure household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely. A mildly food insecure (access) household. A moderately food insecure household. A severely food insecure household

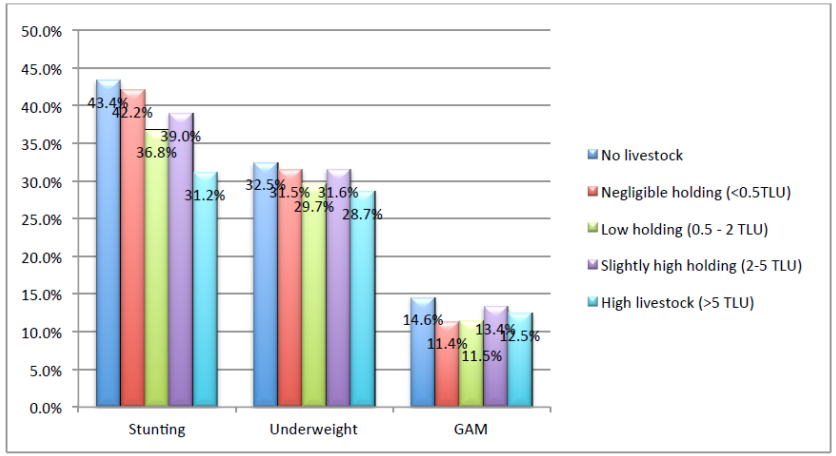
18- A food security index was calculated at household level using i) the share of food expenditure ii) the food consumption score and iii) livelihood coping.

19- The IPC is a set of protocols (tools and procedures) to classify the severity of food insecurity and provide actionable knowledge for decision support. The IPC consolidates wide-ranging evidence on food-insecure people to provide core answers to the following questions: i) How severe is the situation? ii) Where are areas that are food insecure? iii) How many people are food insecure? iv) Who are the food-insecure people in terms of socio-economic characteristics? v) Why is the people food insecure?

Food insecurity Month, 2013 Households % Assets, land, livestock and poultry ownership	National Uganda N/A	Regional Karamoja N/A	District Moroto N/A	 Figure 9. Months when households in Karamoja reported difficulties in accessing food (Source: FSNA May 2013) (Resilience Context Analysis Resilience to food insecurity and malnutrition in Karamoja, Uganda. April 2015.) *5 months reported of difficulties in accessing food in Karamoja*	SFR: Food access instability **Hypothesis 2:** High food access instability

[20] Months of Adequate Food Provisioning: The MAHFP is the only NCA indicator that looks specifically into seasonality. A number of factors can affect the ability of a household to meet its food needs, from insufficient crop production as a result of poor soils or lack of labor, decrease in income due to the employment status, a conflict or natural disaster. The MAHFP is able to capture changes in this vulnerability.

	National Uganda	Regional Karamoja Dec 2015 No livestock 40.1%HH (FSNA)	District Moroto Dec 2015 No livestock 59.4.% HH (FSNA)	 In pastoral civilizations, access to land usually means that the household is not wealthy enough to own livestock. Livestock ownership is here used as an indicator of socio-economic status, but it is also an indicator of household food access since it improves access to animal source foods. *In **2008**: Karamoja represents some 33 per cent of Uganda's rangelands, 16 per cent of its human population and 25 per cent of its livestock (UBOS 2008).* ***In 2015:*** *Only about 1 in 3 households own cattle in Karamoja, which was once the main source of livelihood. As far as all the livestock was concerned, up to 40% of the households in Karamoja did not own any livestock, including chicken. Less than 20% had a tropical livestock unit (TLU is equivalent to a household owning 10 goats or sheep or pigs. "Household with livestock have less risk to undernutrition" FSNA, Dec 2015*	SFR: Socio-economic status **Hypothesis 3**: Low Household livestock ownership

Income, expenditure and share of food expenditure Main difficulties Faced by Households	National Uganda	Regional Karamoja Dec. 2014 Expenditure Food: 91%	District Moroto Dec. 2014 Expenditure Food:96%	 **Figure 37:** Association between stunting, underweight and GAM with household livestock ownership "That is evident from trends that show decreasing numbers of livestock per household and also in community perceptions. Livestock ownership was one of the most significant factors distinguishing resilient households. Those households which were resilient in the face of aftershocks or stresses have, on average, significantly more animals in terms of tropical livestock units than those which were not resilient. Livestock provide them with food and economic security, as well as perhaps social and cultural status. In hard times livestock can be sold for cash to help absorb the shock. Livestock ownership as a key determinant of resilience is prominent in qualitative data too. Asked what had helped him during the many hard times he was describing, an agro-pastoralist in Amudat explained: *"Having livestock is important and helps me in a crisis. You can sell livestock in hard times to raise cash. During the last two years when the harvests failed it was very clear that households without animals did worse."* Resilience Context Analysis Resilience to food insecurity and malnutrition in Karamoja, Uganda. April 2015.	**Hypothesis 4**: Low purchasing power

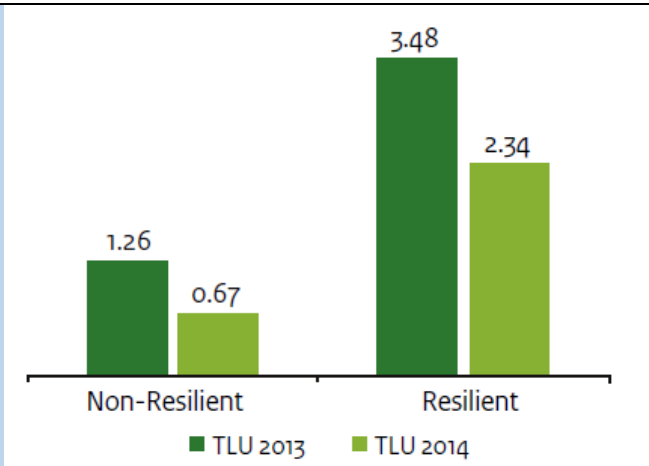
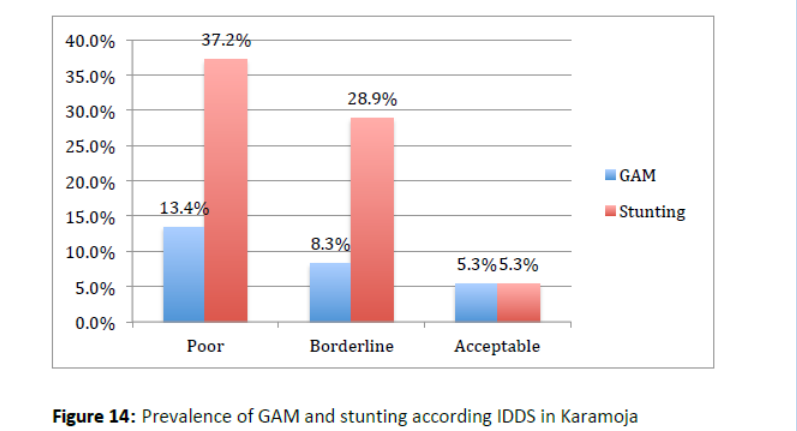
		Dec. 2014 High Food prices	Dec. 2014 High food prices	 Figure 24. Livestock ownership in tropical live-stock units (Source: FSNA May 2013 and June 2014 As expected, the main expenditure for 91% of households was on food, highest in Moroto (97%) (FSNA, Dec.2014) IPC June 2015 "*Food access is a major limited factor: Major most households are constrained by limited purchasing power*", Moroto was worst off with only 30% having acceptable FCS while 43% had borderline and 27% poor FCS. This is mainly due to reduced ability to purchase food by households	

Table7. Undernutrition and CPMH: Hypothesized Risk Factor for Moroto District, Karamoja, Uganda

Sector and indicators	DATA			Findings	Specific factor related (SFR) Hypothesis Risk Factor
Under Nutrition Child Under five	National Uganda 2011	Regional Karamoja Sept. 2010	District Moroto 2009 - 11.1%	In rural areas in Uganda: *The causes of malnutrition in children are many and diverse, but it has been recognized that poor feeding practices by*	

years Wasting (GAM) Stunting **1. Infant and Young Children Feeding** **Children 0-6 months** Early breastfeeding Mothers initiated breast feeding within 1 hour : Exclusive breast feeding **Children 6-23 months**: 6-8 months: Introduction of solids 6- 23 months Among breast	5% ICF 2011 33% ICF 2011 Urban: 59.6% Rural: 51.3% (DHS) 2011 63% (DHS) National Uganda 2011 68% (DHS) 2011 Urban:17.2 Rural: 9.6	9.3% Dec. 2015 12.4% (FSNA) 2011 – 40.3% ACF Dec. 2015. 39.5% (FSNA) 2011 70.4% (DHS) June 2015 15% (FSNA) Dec.2015 94% (FSNA) Regional Karamoja 2011 3.3 (DHS) 2011 5.6	(ACF) Dec. 2015 - 13.2% (FSNA) 2009- 52.7% (ACF) Dec. 2015 - 46.8% (FSNA) 2013 67.5%, (FSNA) June 2015 5% (FSNA). Dec. 2015 87.3% (FSNA) District Moroto	*caregivers are a major contributing factor*. (Nakumbi 2012) *"whereas the others initiated breastfeeding after 1 hour (35%), The initiation period varied significantly with maternal age ($\chi 2 = 67.76$; $P = .00$).* In Rural areas (rural district located in Central Uganda), 57% of mothers started before six months, *mainly point to the mother's own perceptions that their child is not getting satisfied with breast milk alone. (Nakumbi and all. 2012)*  **Figure 14:** Prevalence of GAM and stunting according IDDS in Karamoja *"Children with high dietary diversity score (IDDS) had less risk of GAM*	SFR: Breastfeeding and complementary feeding practices **Hypothesis 5**: Initiation of breastfeeding severely delayed

feeding **IDDS** 6-23 months Among non breast feeding	(DHS) 2011 Urban:30.7 Rural:19.4 (DHS)	(DHS) 2011 3.5 (DHS)		*compared to those with low IDDS*" (FSNA, May 2013)	
IDDS 6-23 Among all IDDS	2011 Urban: 21.3 Rural:11.6 (DHS)	Dec. 2015 5.6 (FSNA)	Dec. 2015 6.7 (FSNA)	Among children 6-23 months there were many who had received zero meals or had only been exclusively breastfed in the 24-hour preceding the assessment. On average up to 63.5% of the children received less than the minimum meal frequency (three meals), which was worse than 58% reported in May 2014. FSNAFSNA, Dec. 2014	**Hypothesis 6**: Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding)
Responsive feeding **Meal frequency** Among breast feeding:	N/A 2011 Urban:42.8 Rural:43.9	2011 26.8	N/A		
Among non breast feeding (4 meals)	2011 Urban:30.8 Rural:19.4	2011 66.5			
	2011 Urban:49.1 Rural: 44.5 (DHS)	2011 30 (DHS)			
Among all 6-23 months		Dec.2015 34.3 (FSNA)	Dec. 2015 18.6 (FSNA)		
	National Uganda N/A	Region Karamoja N/A	District Moroto N/A	Karamoja: Underweight mothers were significantly more likely to have children with malnutrition compared to normal, overweight or obese mothers. FSNA, Dec.2015 Report	
2. Care for women **Maternal Nutritional status**		Dec 2015 2.8% (FSNA)	Dec.2015 4.2% (FSNA)	One in five households is being headed by females. Moroto (31.1%),. Polygamy (40%) of households, means nearly 4/10 households. **Female headed households were more likely to have been enrolled on the** Extremely Vulnerable Households (EVH) program. For Karamoja, 19.7% of female-headed households received assistance, and for Moroto, 16.5%	SFR: Health and nutrition status

Mother food intake during pregnancy Severely underweight (non pregnant woman) Perceived social capital Caregiver's perceived workload	N/A N/A National Uganda	. N/A Dec. 2012 Number of Hours/Per day: 3.3 Non agricultural work (FSNA) Region Karamoja 2011 38.3%	N/A Dec. 2012 Number of hours/Per day: 4.0 non agricultural work (FSNA) District Moroto N/A	(level of vulnerability for females). (FSNA, Dec.2015) *"Women are often responsible for much of the work at home, from collecting water and firewood to doing the groceries and taking care of the children. When they also work outside of the home, this reduces tremendously the time they can spend with the children. In many districts there were statistically significant differences in how time was used by men and women concerning non-agricultural work, household work, and leisure. The day preceding the assessment, more men were significantly involved in non-agricultural work and leisure while women were significantly more engaged in household and care work." Dec. 2012. FSNA* 2014 60% HH occupied for firewood and charcoal, Resilience, *"According to some commentators, nowadays people in Karamoja are more concentrated at a level of nuclear family units, and perception of social responsibilities has become more heavily associated with the nuclear family rather than extended families. But on the other hand control over resources has not been relocated to the nuclear family and still involves wider kin groups, creating additional societal pressures."* In Karamoja, "The men tended to own and control most assets but most of the savings and income were generally jointly owned". Dec. 2012. FSNA The main structural factor identified as affecting women's psychological well-being was gender inequality, particularly as it affects the woman's role in the family and her circumstances if she loses her husband (through	**Hypothesis 7**: Low maternal nutritional status during pregnancy SFR: Social capital **Hypothesis 8**: Mothers are not supported, especially when women are headed households **Hypothesis 9**: Limited male-involvement in child care practices SFR: Caregiver's workload **Hypothesis 10**: High workload, mothers are also occupied with non-agricultural work. SFR: Women empowerment **Hypothesis 11**: Lack of caregivers' empowerment

Violence: Neglect the children	2011 33.1% (DHS) N/A	(DHS) N/A	N/A	death or abandonment) or he takes a second wife. *Acceptance of wife beating varies by women's age and is highest among the youngest age group (62 percent) and lowest among women age 30-34 (53 percent).* ***Rural women are much more accepting of wife beating*** *(61 percent) than urban women (46 percent). Nearly three of four women residing in East Central region are accepting of wife beating for any reason, in contrast with women living in Kampala who are least likely to accept wife beating (39 percent).* Women who accept all the reasons for wife beating have the highest mean ideal number of children at 5.3 compared with 4.7 children for women who do not justify wife beating for any reason.(DHS 2011 Uganda)	SFR: Maternal well-being
WHO5 Well-being Index and MDI (Major Depression Inventory)	2011 18.9 (median) (DHS)	2011 19.2 years (median) (DHS)	N/A	This indicator is an interesting proxy for **women's empowerment**. It is considered a risk factor of undernutrition because young women are often not ready, motivated and mature enough to take care of a child, which leads to less care, attention and patience provided for the child's development	
Child Bearing 20-49 years	2015 24% UNICEF	2015 30% UNICEF	N/A	**Teenage pregnancy** has been persistently high over time with a slight decline from 43% in 1995 to 31% 2001, to 25% in 2006 and **to 24 % in 2011** (UBOS 1995; 2001; 2006, 2011)	**Hypothesis 12**: Poor maternal well-being (violence and alcohol)
Teenage pregnancies	National Uganda	Region Karamoja	District Moroto	Teenage pregnancies are high in the East Central, Eastern, and Karamoja regions (30%) compared to other regions, with the Southwest region being the lowest (15%) and Central 1 the second lowest at 19%. Statistics show a positive relationship between poverty, women's education and teenage pregnancy with girls from the poorest households and no education having higher rates of pregnancy (34% and 45% respectively) compared to those from the wealthiest households and with secondary education (16% and 16% respectively). WHO: By 15yrs, 4 in 10 (43%) of girls are sexually active and 6 in 10 (62%) of these have already begun child bearing by 19yrs. THE NATIONAL STRATEGY TO END CHILD MARRIAGE AND TEENAGE PREGNANCY. June 2015. UNICEF	SFR: Child Bearing **Hypothesis 13**: Early child bearing, high prevalence of teenage pregnancies SFR: Reproductive health
		2011 27 months (DHS)	N/A		

Birth spacing Family Planning	2011 30.2 months (DHS) 2011 23.6% Any method) 45.8% (urban) 26.9% (rural) (DHS)	2011 7.8% (any method) (DHS)	N/A	Health facilities with family planning services 50% (10/20**)** **(**Wilunga, 2015). Reproductive Health Uganda (RHU) : Inability of girls to access SRH information, counseling and SRH services . Demand for limiting the family size: 10.7 %	**Hypothesis 14**: Poor status of reproductive health (birth spacing and family planning)

Table8. Undernutrition and Health: Hypothesized Risk Factor for Moroto District, Karamoja, Uganda

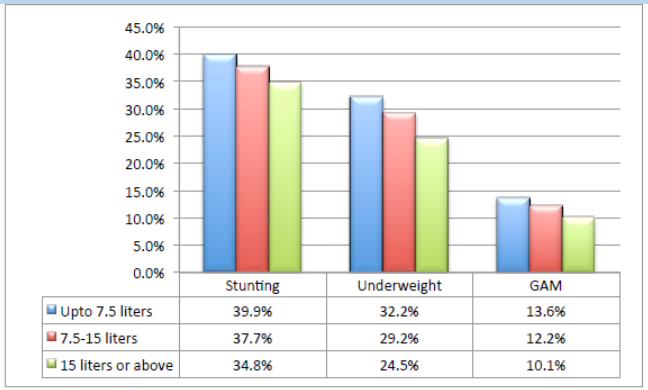
Sector and indicators	DATA			Findings	Specific factor related (SFR) Hypothesis Risk Factor
Under Nutrition Children 0-59 months	National Uganda	Regional Karamoja	District Moroto		

Wasting Stunting Access to Health ARI Prevalence Diarrhea Prevalence Fever Prevalence Exposure to mosquitoes Children under 5 or HH Antenatal Care 15-49 years 4 visits Barriers from going to the health center	2011 5% ICF 2011 33% ICF 2011 15% DHS 2011 23.4% 2011 40.4% DHS 2011 53.3% DHS 2011 48% DHS National Uganda 2011 41% of	Sept. 2010 9.3% Dec. 2015 12.4% (FSNA) 2011 – 40.3% ACF Dec. 2015. 39.5% (FSNA) Dec.2015 31.2% FSNA Dec. 2015 46.2% (FSNA) 2015 31.7% HH with children bed net N/A Regional Karamoja 2011 87.0% get	2009 - 11.1% (ACF) Dec. 2015 -13.2% (FSNA) 2009- 52.7% (ACF) Dec. 2015 - 46.8% (FSNA) Dec. 2015 47.6% (FSNA) Dec.2015 39.5% (FSNA) Dec. 2015 47.6% (FSNA) Dec.2013- 5.5% HH with children bed net 2015 31.7% (Wilunda et all) District Moroto	"*Children with ARI had prevalence above average for GAM and above average for stunting* " *"History of diarrhea was associated with increased prevalence of GAM (p=0.002) and underweight (p=0.001)"* (Dec 2013) "*History of suffering from malaria in the two week prior assessment was associated with high prevalence of GAM (p=0.06), stunting, (p=0.05 and underweight (0.04)", Dec 2013* "*Not having used a bed net was associated with increased risk of GAM, stunting, and underweight compared to those who reported to have slept under bed net the night of the survey*" Moroto, SLEAC 2015, ACF: "*Because of poverty, seasonal changes and negative attitude, communities have a preference* ***to traditional healers*** *as the first point of treatment before reaching the health facilities* "	SFR: Child health status **Hypothesis 15**: Poor health status of children under 5 (Ari and Diarrhea prevalence) **Hypothesis 16**: High prevalence of Fever/malaria **Hypothesis 17**: Poor utilization of bed net SFR: Access and utilization of health services **Hypothesis 18:** Low utilization of maternity and postnatal services **Hypothesis 19**: Insufficient income to cover

Location of delivery Last delivery in Health center	women said the distant was a problem DHS 2012 38.2% Ministry of Health	money and 41.9% women said the distant was a problem DHS 2012 11% Ministry of Health	2015 15.4% Wilanda and Al.	The location of delivery is a proxy for delivery service use, but also for women's reproductive health and it is important for the health the newborn to have a sanitized environment with health workers. This allows for the weighing of the child, assistance in case of complications during delivery, and the provision of advice on childcare, e.g. on breastfeeding practices	transport costs to the nearest Health Center

Table9. Undernutrition and Unhealthy Environment: Hypothesized Risk Factor for Moroto District, Karamoja, Uganda

Sector and Indicators	DATA			Findings	Specific factor related (SFR) Hypothesis Risk Factor
Under Nutrition	National Uganda	Regional Karamoja	District Moroto		
Wasting	2011 5% ICF	Sept. 2010 9.3% ACF Dec. 2015 12.4% (FSNA)	2009 11.1% (ACF) Dec. 2015 -13.2% (FSNA)		
Stunting	2011 33% ICF	2011 40.3% ACF Dec. 2015. 39.5% (FSNA)	2009 52.7% (ACF) Dec. 2015 – 46.8% (FSNA)		
Water quality					SFR: Drinking water quality
Water treatment HH		Dec.2015 13.5% (FSNA)	Dec. 2015 9.5.% (FSNA)	In Dec. 2015, most of the water treatment was done by boiling (41%), chlorination (27%) and letting water to stand and settle (25%). In 2011, the prevalence as 8% for Moroto district.	**Hypothesis 20**: Poor quality of drinking water (treatment)
Water quantity Water storage		Dec. 2015 June 2015 19% (15 liters) HH (FSNA)	Dec.2015 11.6 liters/per capita/per day, FSNA June 2015 15% HH (15 liters) (FSNA)	In June 2015, IPC noted that the quantity of safe water is 9 liters per person per day for the Karamoja region, 10 liters for Moroto district. There is also poor food storage.	**Hypothesis 21**: Poor water storage

	National Uganda	Regional Karamoja	District Moroto		
				Amount of water used by household was significantly associated with all indicators of malnutrition. Children in households where the per capita water use was above 15 liters were less likely to be malnourished.  **Figure 31:** Association of stunting, underweight and GAM with percapita water use	SFR: Drinking water access
Distance to collect water Distance 600 meters 1-2Km Time taken 30-60 minutes 61-120 minutes		2011 32.6% HH 20.8% 46% HH 23.4% (ACF)	2011 22%HH 12.2% HH 36.2 HH 18.9% HH (ACF)	*"Water consumption is low partly due to the availability challenge and walking distance of over 2km"* (ACF, 2011.)	**Hypothesis 22**: Distance to water source and time needed to collect water are long
Hygiene Caregiver/food preparer appropriate hand-washing practices		Dec. 2015 30% HH (FSNA)	2012 7.8% HH (FSNA)		SFR: Hygiene practices

	Stunting	Underweight	GAM
Upto 7.5 liters	39.9%	32.2%	13.6%
7.5-15 liters	37.7%	29.2%	12.2%
15 liters or above	34.8%	24.5%	10.1%

	National Uganda	Regional Karamoja	District Moroto		
Presence of soap or ashes in the house	2011 27% (DHS)	2011 12.5% (DHS)	2011 5.5% (ACF)	In 2012, FSNA assessment: Observations were made to determine the presence of hand washing facilities in household premises. In pooled analysis 70.7% of the households had no hand washing facilities after toilet, while 19.7% had water without soap.	**Hypothesis 23**: Insufficient use of soap SFR: Household hygiene
Storage of cooking utensils and food leftovers		2012 17.1% (FSNA)	2012 7.8% (FSNA)	In the fecal oral route, cooking utensils are a point of introduction of pathogens in the food. It is common that they are stored uncovered or directly on the floor in compounds with no drawers for storage. "Household dwelling structures, kitchens and compounds were also observed for the presence of garbage pits, sun rack for drying washed household utensils (plates, cups, spoons, etc) and a rack in the kitchen for storing utensils. Only 17.1% of the households in pooled analysis had garbage pits" FSNA. Dec 2012	**Hypothesis 24**: Poor hygiene practices in the household (food preparation and storage, solid waste management)
Household hygiene animal waste		N/A	N/A	This is an indicator collected only through observation. During the home visit, the observer must look for the presence of excreta in the compound and near the compound, either animal or human.	
Sanitation				The situation of Latrine coverage in Karamoja is slowly improving over the past five years. The regional average is now from less than 10% before. *Ownership of latrine was significantly associated with stunting but not GAM. Households without latrines (37.5%) were more likely to have stunted children compared to those with latrines (31.0%), (p-value <0.001)*	SFR: Sanitation facilities
Use of improved sanitation facilities (not shared) (shared)	2011 16% 19% DHS	Dec.2015 26.9%HH 4.9% (FSNA)	Dec. 2015 11.4% 2.6% ((FSNA)		**Hypothesis 25**: Poor sanitation environment and practices
Safe disposal feces	N/A	N/A	N/A		

1.11 Hypotheses to be field tested

By working in three multi-sectorial groups, technical experts selected hypothesized risk factors and pathways to under-nutrition that were organized in local causal models.

Hypotheses were validated, modified and added as follows[21]:

Validated	18
Modified	7
Added	5

a) Hypotheses modified:

Hypothesis 1: Initiation of breastfeeding severely delayed became **Poor practices for initiation of breastfeeding and exclusive breastfeeding**.

Hypothesis 10: High workload, mothers are also occupied with non-agricultural work became **High workload for mothers**.

Hypothesis 18: Low utilization of maternity and postnatal services; ANC added and became **Low utilization of the ANC+ maternity and postnatal services.**

Hypothesis 17: Poor utilization of bed net; maintenance **added** and became **Poor utilization and maintenance of bed net**.

Hypothesis 21: Poor water storage (**modified** for chain, quantity of water **added**) became **Poor chain water and quantity**.

Hypothesis 23: Insufficient use of soap, local substitutes **added** and became **insufficient use of soap and local substitutes**.

Hypothesis 25: Poor sanitation environment and practices; environment **removed** and hygiene practices **added** became **Poor sanitation and hygiene practices.**

b) Hypotheses added:

Added Hypothesis	Sector	Indicator NCA	Links with Specific Risk factor
Hypothesis 26: Open defecation	Unhealthy environment	Use of improved sanitation facilities	Sanitation facilities

21- Among the 25 participants, 18 participants voted to select hypotheses that can be tested in the survey field. A total of 30 hypotheses have been submitted to the vote. Original hypotheses (17) mainly got a very good confidence note with an average rating score of 3.57.

Hypothesis 27: Mental Health Hypothesis 28: Poor Agricultural products (harvest) Hypothesis 29: Role of education Hypothesis 30: Dependency	MHCP: Care of women FSL: Food access MHCP: Care of women MHCP: Care of women	WHO5 Well-being Index and MDI (Major Depression Inventory) HFIAS Caregiver's completed years of education Perceived support	Maternal Well being Household food access and intake Caregiver's level of education Social capital

c) Major causes of under nutrition

Participants identified mainly care of children (H6 and H1 MHCP) as major causes of child malnutrition. To this is added the hypothesis 10 on the length of time mothers spend on daily household and domestic tasks compared to the daily timetable they have for maternal care of children.

d) Important causes of under nutrition

A large number of hypotheses (25) found within this range. This enables us to say that the causes of malnutrition evolve over a complex dynamic. Indeed, the 25 significant hypotheses obtain very close scores, and for some of them, scores are the same, i.e. 16 identical scores for 22 hypotheses.

e) Minor cause of under nutrition

Two hypotheses have emerged as "minor", these specifically "Insufficient use of soap and local substitutes" (H23), and "Insufficient income to cover transportation costs to the nearest Health Center."(H22)

f) Nutritional vulnerable groups

Identification of vulnerable groups was the first activity of the three working groups of the initial workshop. At the presentation by the team leader to the three groups, all participants highlighted the importance of including specific vulnerable groups: young children and adolescents, and the group of elderly people.

It was then agreed that the two groups (B and C) would be covered through the qualitative survey. In the specific group of teenagers, two focus groups were to be set up (10–14 years and 15–18 years) in each of the four villages so as to explore the vulnerability of adolescent girls (10–18 years). By exploring their nutritional vulnerability, we could also address the hypothesis "Early child bearing, high prevalence of teenage pregnancies" (H13). For children aged between 6 and 10 years, we would conduct further

interviews with the teachers of schools for children and orphans, again through the qualitative survey. Also, for teenagers, orphans and the elderly, a focus group would be held in the villages of the qualitative survey when, according to the village leader's nutritional vulnerability assessment, it would seem important to explore the causes of malnutrition for these particular groups. The three following groups (A, B, C) were identified as nutrition vulnerable groups:

Table10. Nutrition vulnerable groups in Moroto District, Karamoja, 2016

1 Children under 5 (A)
2 Children under 59 months
3 Mothers pregnant and lactating
4 Mothers pregnant and lactating with chronic disease
5 Young and teenagers (B)
6 Children 6-10 years
7 Adolescent girls (10-18 years)
8 Orphans under 18 years
9 Close to children under five (C)
10 Elderly (as defined by the community)
11. Disabled

2. CHARACTERISTICS OF THE STUDIED POPULATION

In 2014, the total population in the Moroto District was 104, 539 (50,521 men and 54,018 women). The most recent census was conducted in 2014 and mentions 160 villages. To locate a village, one should refer to the parish where it belongs. In the district, there are 22 parishes for four sub-counties: Tapac (17,106 inhabitants), Katikile (8,133), Nadunget (38,733), and Rupa (26,089). There is also a semi-urban population residing in the county municipality (14,801), which is divided into two sub-counties (South and North Division) with 5 parishes, and 14 villages.

Also, it is by the category of "sub-county" that one can easier determine the geographical space and particularities. For example, the Nadunget sub-county is the most populous with 45 villages and 6 parishes, but also the largest in geographical area. This is broad lowland irrigated by small rivers that fill in the rainy season. The Rupa sub-county although less populated is the north continuation of this great plain. There are also in populations with a mountain lifestyle, including the Tapac sub-county and the Katikile sub-county, respectively in the Southeast and in the Southern District. Finally, almost in the district center, there is a more urbanized population whose villages (14) combine to form the town of Moroto.

For the Link NCA study risk factor survey, 30 villages (clusters) among the 160 villages compose the sample. These villages were randomly selected from the 6 sub-counties. It is important to mention that in all 30 villages, teams of investigators first made an assessment of water points and drew by hand the spatial structure of villages. It is from these representations that we can describe here the living spaces of the people of Moroto District.

Thus, it is observed that in the lowlands (Rupa and Nadunget), the village population is housed in a "manyetta." The principal characteristic of this habitat structure is wood branches arranged in a well-shaped circumference. To enter the manyetta, there are several gates. Inside, each family has its own house with a small yard. The center of the manyetta is empty, and it is reserved for animals. After grazing during the day, animals return to shelter for the night in the village center.

In the mountains, one can find the same type of habitat. However, for certain villages settled uphill, it is not possible to reproduce the encirclement, but the houses are located near one another hidden in the trees with animal shelters. In the villages surrounding the center of Moroto, there is a more varied habitat, some neighborhoods reproduce the "manyetta" style while others lie on straight streets, and finally some villages stand as an allotment enclosed by huge fences.

2.1 Household composition

As it can be seen on Table 15, we can draw a portrait of the composition of an average resident family of Moroto District. First, its size of 5.47 is relatively small and very close to that appearing in the FSNA (December 2015 HZ: 5.1).

Some highlights: nearly 75.7% of households involve families headed by a father (68.9%, FSNA, Dec. 2015). Those fathers define themselves in the survey as "workers only" (37.3%) or seeking a job (31.9%). The spouses define themselves as "housewives" (69.3%) and married (88.9%). The average number of children under 5 years is 1.42. Almost half of the households live in polygamous conditions with the average number of wives at 1.72.

By looking at these few data, one could have thought that they correspond to a Ugandan family living in a Kampala suburb or a small town in a developing region. In fact, this is far from reality, as these data mostly involve rural communities with an essentially pastoralist lifestyle.

On the one hand, we have men defining themselves as heads of household, which is consistent with the Karamajong culture. On the other, we have women defining themselves as married, which is its corollary. However, marriage is not a simple and clear institution in the traditional sense of the Karamajong culture. According to the customs, the finalization of a marriage requires a donation from the future husband. The donation gives rise to negotiations on a fixed number of animals (cows or goats) between the families. Now, in order to compensate for the lack of livestock, men give a dowry in several installments, and couples can thus come together and have children without having been married, which is a lifelong status. However, it is very important to note the paradox that at the same time it is unthinkable for a "Karamojong" female to be pregnant without having the status of a wife.

Polygamy remains important. Men and women maintain this practice for half of households. The maintenance of polygamy impacts on many aspects of life for co-wives, such as equity among the wives, and the financial capacity of the husband to maintain two domestic facilities as we have observed during the qualitative survey.

Also, statements by husbands on their integration in the labor market reveal a strong transition from their recent pastoral past. They report that they are workers and not occupied in the kraal guarding livestock, or otherwise unemployed. This is also true for women, who declare that they are at home although during the dry season at least the majority among them is busy cutting firewood and getting charcoal, two items that they regularly sell in the city. We will see more thoroughly via the qualitative survey what the points of resistance of the studied communities are as well as the forced or negotiated lifestyle amendments that gradually become part of the daily life of the parents in the Moroto district.

Table11. RFS Indicators: Household composition, Moroto District, Karamoja, Uganda, 2016

Risk Factor Indicators Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016				
	Indicator			95% CL
Population				
	Value : Mean or Proportion	Lower	Upper	Sample, NCA
Household Level Indicator				
Household Size	5.47 (Std: 1,9467)			597
Household head age	34.17 (Std: 9,8058)			583
Father	35,28829			444
Status of head of household				607
Father	75,78%	72,13%	79,10%	460
Mother	21,91%	18,73%	25,46%	133
Grand parents	2,14%	1,19%	3,73%	13
Other	0,16%	0,01%	1,06%	1
Father Occupation				451
Farmer or/and pastoralist only	15,96 %	12,77 %	19,75 %	72
Farmer and Worker	10,64 %	8,02 %	13,95 %	48
Pastoralist and worker	4,43 %	2,80 %	6,88 %	20
Worker only	37,03 %	32,59 %	41,69 %	167
Unemployed	31,93 %	27,69 %	36,48 %	144

Number of wives	1,7212 (Std : 1,1094)			312
Main caregiver occupation				594
Housewife	69,36%	65,45%	73,01%	412
Farmer only	7,24%	5,35%	9,70%	43
Farmer part-time job	3,70%	2,39%	5,64%	22
Other	19,70%	16,62%	23,17%	117
Main caregiver marital status				589
Married	88,96%	86,08%	91,32%	524
In an union	5,43%	3,80%	7,67%	32
Separate	1,02%	0,41%	2,32%	6
Single	0,34%	0,06%	1,36%	2
Widow	4,24%	2,82%	6,29%	25
Main caregiver age	29.4 (Std : 8,1802)			589
Number of children U5	1.49 (Std: 0,6322)			577
1	55,11%	50,32%	59,21%	318
2	39,51%	35,52%	43,65%	228
3	3,64%	2,32%	5,60%	21
4	1,04%	0,42%	2,37%	6

2.2 Background characteristic of qualitative study participants

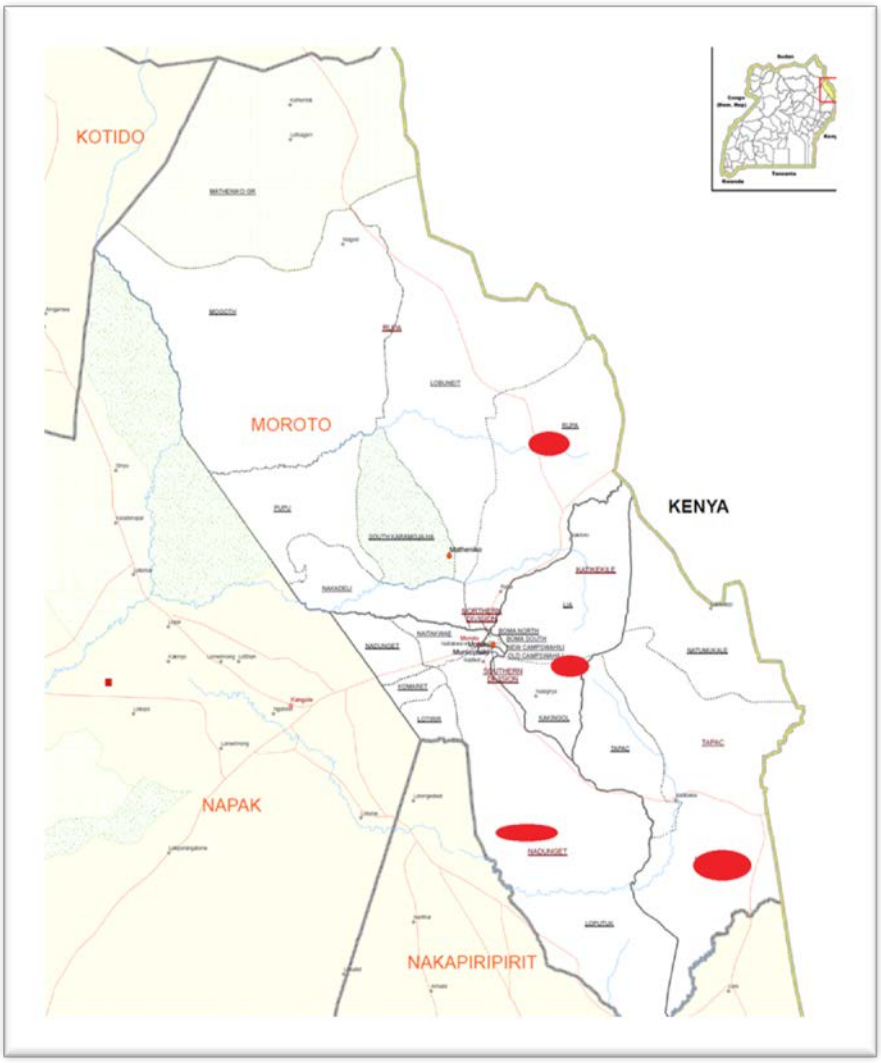
Four villages have been drawn from the random selection of 30 villages needed for the Link NCA study risk factor survey. The draw result is interesting because it covers three major spatial characteristics relating to the population of Moroto District. First, the villages are located in three sub-counties out of four. Out of the four villages, two are located in the plains and one in the mountains. Finally, a village is within the urban landscape of the city of Moroto (see Table16 and map). Selection villages following geographical determinants allowed the study to be representative of the population. Although one can think the population being heterogeneous, the covered area being small, such selection was thought to be homogeneous in terms of causes of under nutrition. Findings confirmed this tendency, therefore the study is following the two main criterion: being local and studying an homogeneous area in terms of under nutrition.

Table12. Sampling of the clusters for Qualitative Survey, Moroto District, Karamoja, Uganda, 2016

Cluster (village) Sub-county, Parish	Population,	Number of Household
Alamae Sub-County; Tapac Parish: Loyaraboth	612	HH:126,
Lokeriut Sub-county: Nadunget Parish: Nadunget	1915	HH:371

Akapuwa Sub county: Rupa Parish: Mogoth	2739	HH:452
Kakolye Sub county: South Division Parish: Camps Wahali	3163	HH: 817

Map1: Moroto District, geographical location of the 4 villages, qualitative survey NCA, in March 2016.



According to Link NCA study methodology, community beneficiaries fit into 4 groups: community leaders (1) key informants (2) mothers and fathers of children under 5 (3) women based on nutritional status of their children (4). The team asked the Chairman (LC1) to provide us with a list of 15 families with children less than 5 years' old.

Table13. Data collection, Qualitative NCA Survey, Methodological tool for participants

Target stake	Community	Key informants	Fathers and	Mother with SAM

holder in village	leaders		mothers	Child
Methodological tool	Individual Interview	Individual interview	Focus Group	Individual interview
Term of data collection	1/2 day/village	1/2 day/village	4 days/village FGW ½ day/ village FGM	2 hours for each interview
Number of days: 24 days	2 Days	2 Days	18 Days	2 Days

Besides these four groups, we must add a new group of participants; it is teenage girls between 10 and 18 years. In each village, half a day was reserved to discuss with adolescent girls in two separate sessions: a group of teenage girls without children, and a group of teenage girls with children. For each group, there were 10 participants. As we have already mentioned, the objective of these meetings was to establish a measure of nutritional vulnerability for these adolescents as well as their young children under 5.

2.3 Overview of villages from the qualitative enquiry

In this chapter, we briefly describe each of the villages studied. Thereafter, we will present the findings on identifying the causes of malnutrition by village. The result achieved on the causes of malnutrition takes into account the last visit to the villages (May 10-12, 2016) which aimed to present preliminary findings to all villagers of every village.

Remember that the qualitative survey has been conducted in March 2016. This specific time of the year is very important because it corresponds to the end of the dry season. The impact of seasonality constitutes a significant parameter when analyzing the causes of child malnutrition in Moroto District. In fact, on the entire territory two seasons regulate the population occupied in agricultural activities; a dry season which extends from November to April and a rainy season that runs from May to October.

In March, generally, the villagers have no food reserves in the granaries. The level of stock depends largely on the climate (rainfall) during the previous season. In March 2016, households were in great difficulty, the harvest of the previous season was not sufficient, and for most of them, the granaries were empty since the end of December 2015. It is in this context that the qualitative survey was held. Thus, the perceived causes of child malnutrition are heavily impregnated with the food security impact. In discussions with the mothers, the ordeal of bad harvests in 2015 was apparent in all the villages. However, being in the peak of the lean period, it was possible to examine the strategies used by mothers to deal with food shortages in a difficult situation.

2.4 Spatial organization, lean context, and frequency of annual instability of food security

As previously mentioned, the four villages have particular characteristics, including in spatial terms, a village located in the mountains, two villages are located in the plains, and a village belongs to the semi-urban landscape of the small town of Moroto. For example, among mountain people, geographical conditions set them apart because of spatial isolation, which expectedly leads to social isolation too. In lowlands, the population density is higher, which is due to good conditions for access to the roads leading to the town of Moroto. The inhabitants of these two villages have easier access to the town since there are no rivers that prevent them from reaching the town, while the other two villages, although close to Moroto, are more isolated particularly during the rainy season, due to the presence of many rivers forcing people to take longer routes in order to cross the river where it is easier. The following table supplies some informative data on access to basic infrastructure and its use by the mothers of the four villages.

Table14. Infrastructure for 4 villages of qualitative survey, Moroto District, 2016

Infrastructures/Village	Highland Tapac	Lowland Nadunget	Highland Rupa	Municipality South Division
Health center	Yes	Yes	Yes	Yes+ Hospital
Birth delivery	½ women	2/3 women	2/3 women	All
School	Yes	Yes + 3-5 years	Yes (Far)	Yes
Access to water	Very good, Borehole	Good Borehole	Good Borehole	Good Borehole

This table (18) shows a transition in supporting the health of mothers and children regarding childbirth. Only the villagers living in the mountains – where access is difficult – do not follow the increase of birth attendance at health centers for maternity services. However, the mothers said clearly that they preferred delivery at the health centers. Besides in communities, TBA (Traditional Birth attendance) and VHT validated this new behavior, which is explained by the willingness and desire of mothers to give birth at the health center. However, women have less availability or means for pediatric or therapeutic monitoring of children. Even close to the town, women maintain their traditional care customs and continue to consult traditional healers (TH).

In role-plays at focus groups meetings, it was observed that mothers were very skeptical about the effectiveness of TH (Traditional Healer) acts of caring. Thus, children diseases continue to be an unfamiliar field, and the mothers are unable to explain the causes of childhood illnesses. So, they practice a back and forth approach between the health center and consultations with traditional healers, especially when they do not see their children's health improve.

Access to water is easy in all 4 villages. Two issues emerged in the group discussions in this regard: first, families are often near the water point, however, they have not gotten used to taking time for pumping water for all daily needs. They will pump water to drink or prepare meals. In fact, they use their water

source on a case by case basis and do not see the relevance of having provisions for sanitation and hygiene activities.

As shown in Table 18, the quality of maintenance of water points is “good" or “very good". In the mountains, the villagers attach importance to water for themselves but also for the animals, so they ensure proper care of their access points to the water. In the plain, the villagers use the boreholes in the same way, but given the lack of livestock, they abandon the maintenance of their water points. In contrast, in the city, there is a time reserved for pumping water with jerry cans that women bring home for all the family hygiene needs.

Finally, with regard to school, it is through appreciation and roles that one can measure the resistance of the mothers to change. In the mountain village, mothers are still very confused about the role of the school but they appreciate the canteen for children aged between 6 and 12 years old. However, they do not acknowledge the interest and relevance of schooling for their own future. When they mention this, very quickly, mothers enter another dimension on their own identity; they will then be self-defined as traditional women because of their academic deficiencies. In the plain, mothers are positive about the benefits of the school, but not much invested to persevere in pursuit of the education of their children. In other words, they describe themselves as traditional partly because they are not educated and ‘modern’ because they go to town. In town, mothers nostalgically evoke their recent abandonment of school. They have left the school to found the family. Often dissatisfied with their current plight, they seek to make complete schooling possible for their children.

- *Lean context and strategies to provide food*

In traditional daily organization of the sexual division of labor, women are the ones who have historically held the following roles: farmer (rainy season), guardian of the granary and small livestock (goats), and cook for the family. Men are occupied with guarding the livestock in pastures and making a small transhumance during the dry season.

If harvests are good, women rest after that period, which gives them more time for child care. However, once the reserves are depleted, the mothers will take steps to secure food for the family. Mostly, they will go to local markets where they can easily find cereals, vegetables, fruits and meat. The food is available, but to get there, they necessarily need to have money to buy food.

It is from that point that things start to get complicated. Indeed, to purchase food, they must conduct daily, individual negotiations over their labor. In the mountainous region, mothers leave home in the morning to travel to the mining villages which employ labor for breaking stones. In the lowlands, they will go into the bush to prepare the charcoal along with a part of the family (teenagers, children). Sometimes the husband joined the family members for these income-generating activities, including the production of charcoal. At the end of the day, women were occupied with the production of charcoal but their work is not finished since they must go to town to sell their produce. For women occupied in breaking stones, if the day goes on, they sleep on site, and return with provisions a day or two later.

There is also another activity, which is the production of firewood. Women will also sell that in the market, but they get no monetary benefit. They barter with local beer producers who in return give them the residue of the fermented beer, recent foodstuff now integrated in the diet food for children.

These food survival activities strongly impact the organization of family life. First, mothers, their little children and teenagers are busy outside their normal environment, i.e. their village. So, it is grandmothers and young children who guard children aged between 1 and 5 years. During this period, mothers reduce the number of meals as they return in the evening with food. At the same time they have little time for child care.

One might think that these activities are sufficiently remunerative to ensure the welfare of a family. Unfortunately, there is volatility in the price of charcoal, and often a fluctuating labor demand for breaking stones. For example, sometimes when women sell their charcoal in the market, they leave empty-handed because the demand is saturated. If that is the case, they often accept a lower price wanting to ensure their family's only meal of that day. Also, they may resort to the exchange of firewood in order to get the 'residue'.

- *Frequency of the annual instability of food security*

During meetings with participants, community leaders, mothers and fathers of the four villages, a question arose persistently; was that recurrence systematic in the past? We can summarize the discourse of the participants in these terms: "*Now, there is one main source of income for most families, i.e. selling charcoal, or a daily allowance for breaking stones varying from 2 to 5 months depending on the quality of the crops; but in the past there was an alternative, men could sell animals and get to the market with pocket money to buy food, and we did not need to cut firewood since we had enough milk to feed the children.* And they concluded by saying that *"today we are impoverished and left at the mercy of the climate*".

Perceptually, the participants see the erosion of their conditions of life. Not having enough cattle is a sign of poverty, and not having one at all means clearly impoverishment. Thus, poverty is introduced gradually in their village by the loss of their former way of life, since the pastoral mode of life, including food survival, depends jointly on livestock and on a good annual harvest.

2.1.1. Causes of under nutrition for FGW in four villages

We had the opportunity to present all causes of malnutrition mentioned by mothers during collective meetings in the 4 villages during the presentation of the results of the 30 hypotheses tested in the field. Here there is a brief presentation of the causes of malnutrition which were common and identified as priorities by the mothers of 4 villages. During the final session when preliminary results were presented to the villagers, mothers validated this list, and ranked the four causes of malnutrition.

Table15. Four causes of under nutrition, NCA Qualitative Survey, March 2016, Moroto District

Low nutritional status of mothers and children (1)	Low purchasing power (2)	Hygiene (3)	Poor child spacing (4)
New diet during the dry season for mothers and	Captive market for income-generating	Mothers have inappropriate practices for	Mothers believe that husbands are no

children.	activities for women.	personal and domestic hygiene.	longer able to respect a correct interval of births.
Residue for children, Intensification of the local beer consumption during the dry season for parents.	Fluctuations in food prices in the food market during the dry season	The basic hygiene rules are not integrated into the daily management of the care of children and mothers.	Reduced livestock leads men to settle at home.

3. FOOD SECURITY AND LIVELIHOODS

During the last seven years in the seven districts of Karamoja, the biannual survey FSNA (WFP, UNICEF, MoH) monitored the evolution of many indicators for food security and livelihoods (FSL) in relation to the evolution of prevalence rates of malnutrition. Also, other platforms such as IPC followed step by step the level of crops since 2014, as well the changing food prices on local markets, especially in the dry season, so as to provide a picture of the food situation in all districts of Karamoja. Because we had plenty of information on this issue, and to avoid repeating all the work already done, we used the RFS household survey with a complete description of the FSL context via three core indicators in the Moroto District, emphasizing the problematic access to food. In the second section of this chapter we discuss the results of our analyses concerning this sector, as well as the five hypotheses specific to that sector.

3.1 Description of FSL Context in Moroto District

It appears that the center of gravity of any reduction of the prevalence of child malnutrition is the risk factors around food security, at least for the participants of the four villages of the qualitative survey. Mothers, fathers and community leaders perceive the lack of food, lack of income, lack of animals as being the causes of malnutrition, not only for their children but for themselves.

As shown in Table 16, the HDDS indicator shows that in March 2016, 62% of households had a dietary diversity score lower than 4, and 73% of households reported living in conditions of food insecurity (moderate and severe). Households reported having faced this situation over an average of six months during the previous year. We refer to data collected by FSNA and IPC investigations during 2015 on three specific risks: Household food access and intake (1) Food Access instability (2) Socio-economic status (3) show that the population of Moroto District is highly vulnerable (see 4.2).

Table16. NCA-RFS Core indicators, FSL sector, Moroto District, Uganda, 2016

Indicator		95% CL		Population
	Value	Lower	Upper	Sample, NCA
Food security and Livelihoods				
HDDS: Household Dietary Diversity Score	3.47 (Std Dev : 1.64)			590
	32,20%	28,48%	36,17%	190
HDDS<3	42,03%	38,03%	46,14%	248
HDDS 3-4	20,68%	17,53%	24,22%	122
HDDS 5-6	5,08%	3,51%	7,26%	30

HDDS > 6				
HDDS: Milk				600
No	87,50%	84,52%	89,99%	525
Yes	12,50%	10,01%	15,48%	75
HFIAS: Household Food Insecurity Access Scale	16.86, (Std Dev: 4,7228)			600
Secure	2 % (11, 2, Std Dev : 4,722811)			
Mildly	23% (17,16, Std Dev 4,1144)			
Moderately	46% (17,25, Std Dev : 3,9612)			
Severely	27% (17,62, Std Dev :3,5141)			
MAHFP: Months of Adequate Food Provisioning	6.075 (Std Dev: 3.13)			587

3.2 Hypotheses from the initial workshop

Five hypotheses were addressed by the FSL sector. Three of them were treated as risk factors behind child malnutrition[22].

a) H1: Inadequate access to milk and, animal products by children and mothers

Between the years 2011 and 2016, it appears that the milk as a dietary essential for children has been in serious decline. According to the FSNA investigation, in December 2014, IDDS data show that 30% of children did not have access to milk, while in March 2016, the RFS-NCA survey shows that the prevalence is 70%. The daily amount is substantially scarce; no child (0.4%) receives a ration of milk (FSNA, Dec. 2015). Among adults, access to milk, but also to animal proteins is low, only 12% of households reported eating these foods in March 2016. Previously in 2011, an extensive analysis on the specific question of the contribution of milk showed that "the portion of total available milk given to children increased across the two periods, however the total *amount* of milk in children's diets dropped dramatically due to the overall decline in milk supply within households."

Among the participants of the 4 villages, in two villages, mothers identified this risk factor as a major cause of child malnutrition. The mothers explained that they had no milk because there was no more livestock to their villages. To this they added that historically, goat milk is a shared foodstuff amongst all neighboring mothers. Goat or cow milk can be bought or sold but it remains in the village for children.

22- At the analytical level, the plausibility of the hypothesis is based on the triangulation between data sources (primary, secondary and targeted literature review on studies of Karamoja), and the results of analysis of qualitative survey, and the consideration of time aspects contained in the seasonal (historical trends and the apparent changes on each of the risk factors). If there was plausibility, then the risk factor would be selected as a cause of child malnutrition.

For example, on every new birth, relative families offer to the mother milk for personal consumption. This practice is still current, but it is rationed and mothers receive sole rations as a gift for the birth.

It is very surprising as the FSNA report emphasizes (FSNA Dec. 2015) to see pastoralist communities faced with rationing the amount of goat milk for children. We then asked the question in a focus group: what replaces milk in the diet of adults and children? Among men, a unanimous answer: they eat or rather they feed on the local brew, on a daily basis. Among women, a response was also almost unanimous, with the exception of the village located in the city, they also feed on beer but less frequently during a normal week, but they also drink this beer for food.

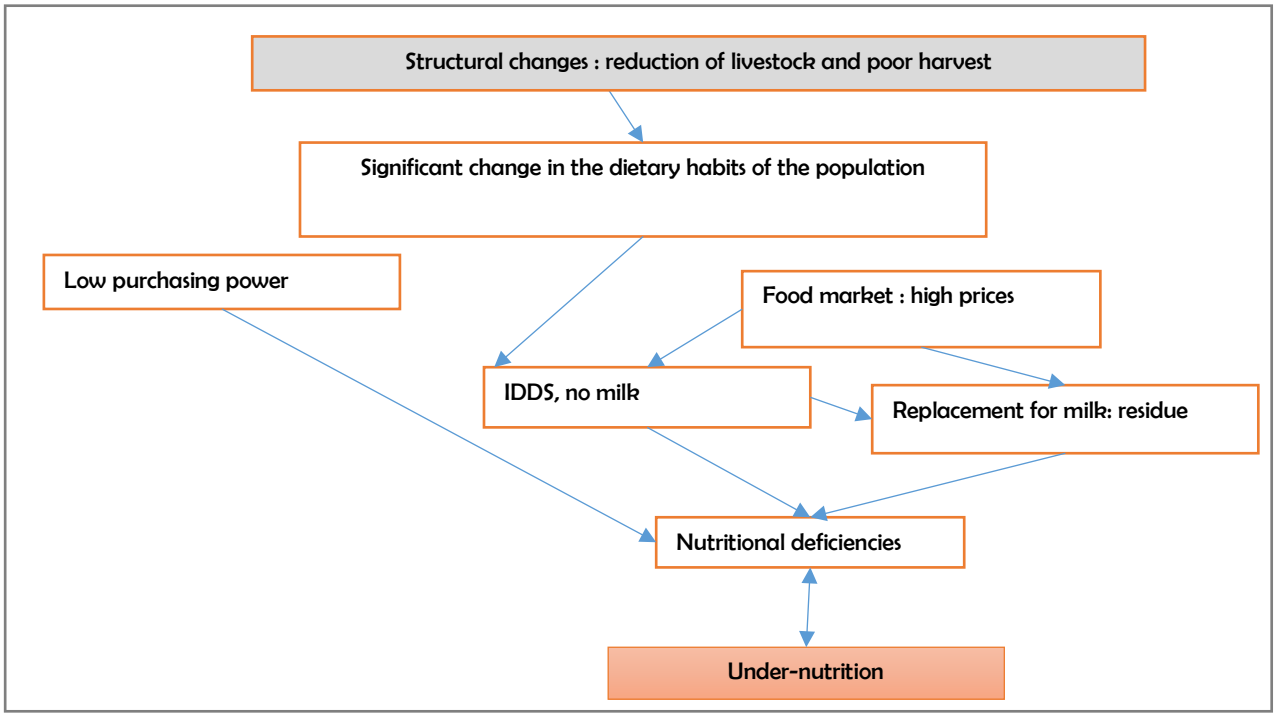
As for children, they even feed regularly on the "residue" of the fermented beer. This is as it were a new food habit. However, it is difficult to know whether this substitute provides sufficient nutrition for children so as to have a food diet and avoid the risks of malnutrition. We wonder if we should use the term "nutrition transition" in reference to this residue which is somewhat unusual. It is difficult to answer this question since it would have food survey analysis results giving us all parameters such as the amount consumed per day according to the age group of children, and the recipe type practiced by the mothers. What appears more likely and is reported by participants is that the consumption of the residue and the local beer clearly does not satisfy them as parents and want the milk to reappear in the diet of adults and children, and local beer and the residue no longer to serve as a basic foodstuff.

Chart1. H1. Inadequate access to milk and animal products by mothers and children: triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March 2016 HDDS (HH 12% with milk) IDDS (6-23 months, 30.2 % with milk) Secondary data: FSNA December 2014 IDDS (6-23 months) 30% of children have no access to milk. FSNA: December 2015 6-23 months: meets at least 2 milk feeds: 0.4% Literature review: *Milk Matters in Karamoja: Milk in Children's Diets and Household Livelihoods,* October 2011, Tufts Univ.	Cause of under nutrition in FGW in 2 villages Changing the diet food of the population Adults: increased consumption of the local brew FGM: men confirm FGW : Mothers (local brew) and Children (residue)	Seasonality: constant Historical trends: the milk as a dietary supplement for children has been in serious decline. Changes: food diet modification for adults and children

Data Triangulation: plausible with source of data and the qualitative survey H1 hypothesis confirmed	Consistency: by historical trends and changes H1 hypothesis validated

Figure 3: H1- Causal Pathway: Important - Inadequate access to milk and animal products by the children and mothers.



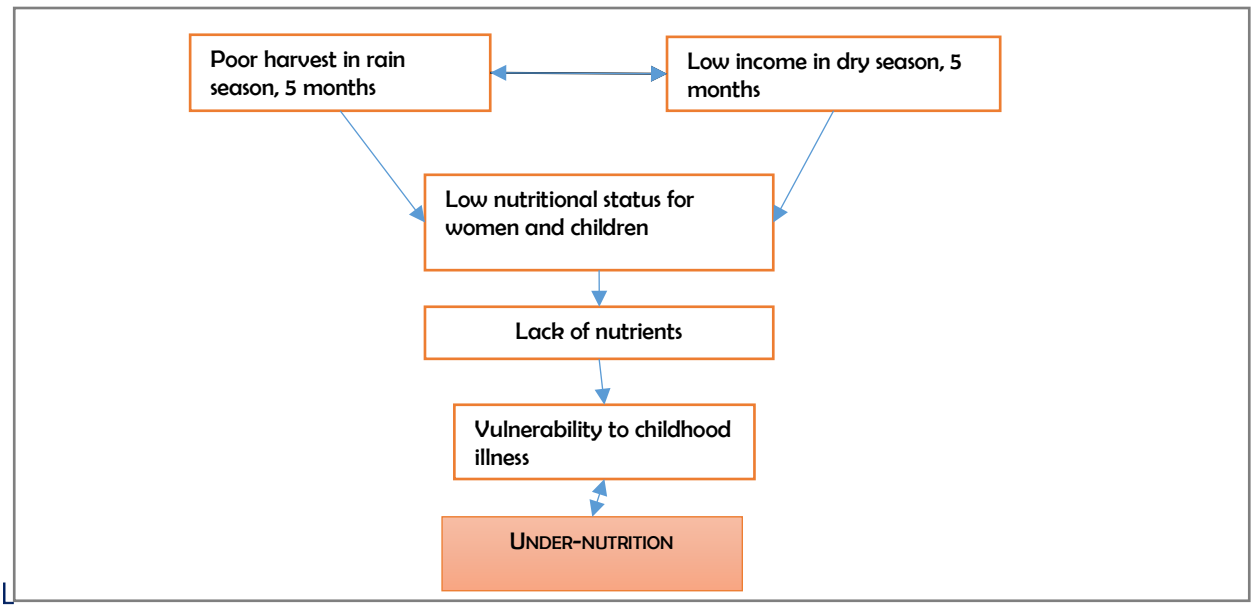
b) H2: High food access instability

The MAHP indicator is based on the perceptions of households on monthly stability of food security. Here, the number of months is relatively high (6 months on average) among households. In April 2015, the estimated average was at 5 months (*Context Analysis Resilience to food insecurity and malnutrition in Karamoja*, Uganda. April 2015). The period perceived covers essentially the range of the dry season. Moreover, this instability seems to fit in time. In Moroto District, there would have been an annual instability in previous years dating back to the year 2011 explained by a cycle of poor harvests. In August 2015, the Technical Group (IPC—Uganda) notes that the instability in food security characterized by" *declining food security due to depletion of food stocks at household level. Only 31 percent of households own food store, and 20 percent own seed stores* in Moroto District.

Chart2. H2. High food access instability: triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March 2016 MAHP (6 months) Hunger Gap In nutrition unit Moroto Hospital: peak admission April-May-June Secondary data: IPC: Moroto district was generally classified in phase 3 (crisis). June 2015 Literature review: *Resilience Context Analysis Resilience to food insecurity and malnutrition in Karamoja*, Uganda. April 201	Food instability is not a cause of malnutrition for mothers. However, mothers say start growing soon their income generating activities because of poor harvests. For men, agricultural work is done with archaic tools, so that the amount given by the crops is not enough.	Seasonality: Dry season (access to food market) Historical trends: since 2011, poor harvests Changes: depletion of food stock during dry season
Data Triangulation: plausible with source of data and the qualitative survey H2 hypothesis confirmed		Consistency: by seasonality, historical trends and changes H2 hypothesis validated

Figure 4: H2- Causal Pathway: Major- High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap).



c) H4: Low purchasing power

This risk factor has been identified in the focus groups with mothers as *the main cause of child malnutrition in the four villages*. This factor is automatically activated when mothers regularly frequent the food market during the dry season. Two realities led them to this conclusion. Firstly, they do not manage to properly sell the contents of income-generating activities (charcoal), they are prisoners of captive markets. Secondly, commodity prices often fluctuate during this period, so that revenues appear insufficient for food survival of a family.

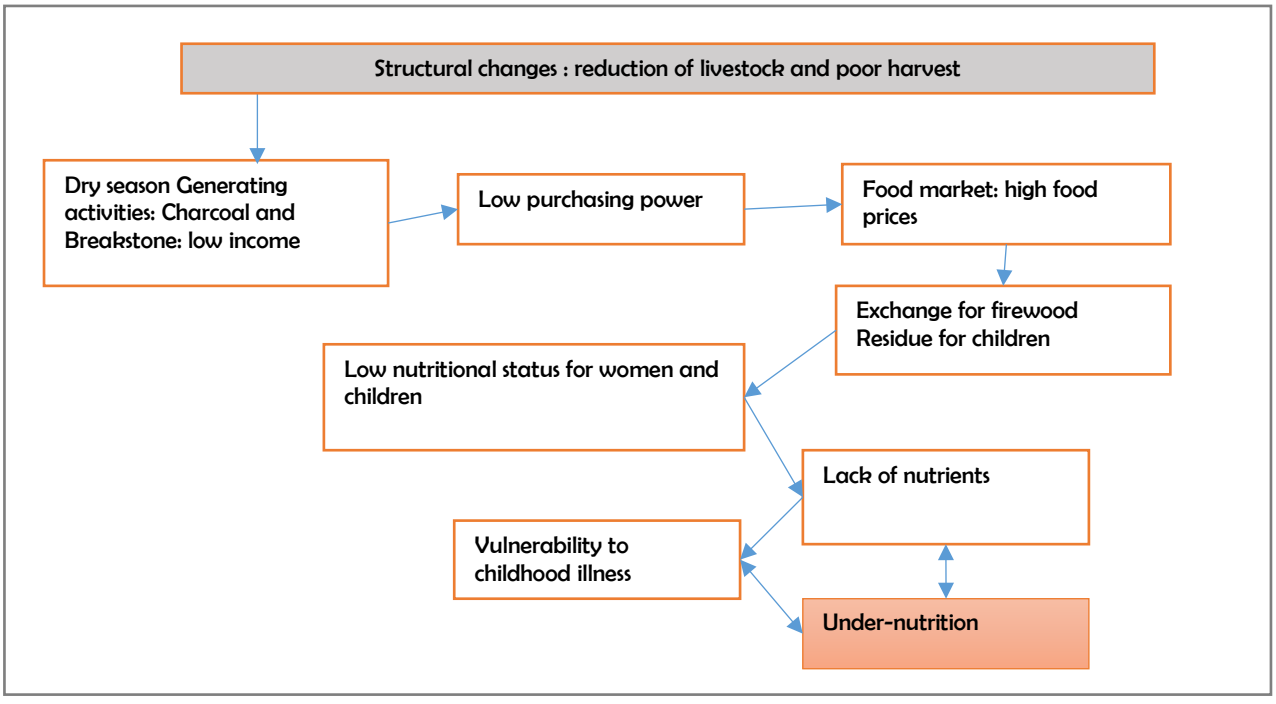
We also explored the issue of the income of men as a complement to low-income mothers. In the men focus groups, men explained that they made themselves available for the production of charcoal or days at breaking stones but they refuse to go and sell the quantities produced on the markets located in town. Men consider that the round trip between the village and the town is not a male activity.

For men adopting a more urban lifestyle, employment from day to day is gradually introduced in the daily organization. However, for most men away from the reality of the urban labor market, resistance remains strong. Women take into account that resistance and decide that they have to do what is necessary to ensure the survival of the family. We will see that for mothers, the cost to pay to hold alone the food security of the family is high, and that there other risk factors relating to health and hygiene will impact more strongly on child malnutrition.

Chart3. H4. Low purchasing power, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 HFIAS (27% HH are severely insecure) Secondary Data: FSNA: Expends: 97% of households were on food, (FSNA, Dec.2014) Literature review: IPC: June 2015 "*Food access is a major limiting factor: most households are constrained by limited purchasing power*"	Major cause of under nutrition in 4 FGW villages Mothers are alone to go to food markets. Two markets connecting: selling the products of income generating activity and the purchase of food. FGM: men are available for occasional work (mining, construction) but refuse to go sell in the markets the product in income-generating activities.	Seasonality: dry season and hazards Historical trends: Poor income during the dry season Changes: using more Food market during dry season (lean season)
Data Triangulation: plausible with source of data and the qualitative survey H4 hypothesis confirmed		Consistency: by seasonality, historical trends and changes H4 hypothesis validated

Figure 5: H4-Causal Pathway: Major-Low purchasing power



4.3. Structural changes

For ten years the pastoral communities of Moroto District have been destabilized by two major changes: the significant loss of livestock and climate fluctuations that have played more often negatively on the amount of crops. These two changes have been perceived by the whole population of the district.

These two hypotheses constitute thereby as potentially major causes of child malnutrition. For example, the FSNA investigations show a significant link between the GAM prevalence and livestock. Another survey also shows that the most resilient households are households with livestock, compared with those who lost their livestock. But in the light of discussions with mothers and fathers, this is more linked to two major changes in their lives. In addressing this question, participants estimated that these risk factors had a negative impact not only on malnutrition but across all social and economic relations.

These two joint factors were identified by participants as the foundation of their economic status. According to villagers, a Karamajong household is poor if its livestock is limited (less than 10 cows), and has not had enough crop to ensure food survival. For ten years, destocking is ongoing. Participants report two reasons for this gradual reduction of livestock, i.e. diseases and or raids[23] that depleted the cattle in many villages.

a) H3: Low Household Livestock ownership

All analyses show that this factor has a negative impact on the prevalence of malnutrition, and even more on household resilience in the face of recurrent shocks.

Participating mothers and fathers in the three villages (mountains and plains) insisted on this. What is stunning in their speeches relates to their determination to increase the number of animals in future years. How do they hope to go about doing it? Participants responded that they rely on good harvest years to sell the produced quantity of cereals on the markets. Thus, they were prepared to live again in food insecurity over the next dry season in order to increase the number of animals.

Chart4. H3: Low Household Livestock ownership

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 HDDS and IDDS	In 3 villages (mountains, lowland) FGW and FWM: the livestock is a	 Seasonality:

23- Between 2006 and 2012, the villagers were victims of raids, explained by a wave of army pastoralist populations throughout Karamoja. To reduce these raids, the Ugandan army got mandate to intervene and also disarm the villagers. The human losses of these operations were considerable. It was ultimately with the intervention of elderly people that the villagers gradually agreed to surrender.

Links: with H1, H2, H4 Secondary Data: No livestock 59.4.% HH (FSNA, Dec. 2015) *Link under nutrition and livestock* Literature review: Powell, J . Karamoja - A literature review SAFERWORLD, March 2010.	component of economic well-being of families. If the number decreases, households feel they have become poorer.	Historical trends: Disease and Raids, disarmament Changes: Impoverishment

b) H28: Poor agriculture products

Crop husbandry is also a pillar of economic stability in Moroto District households. Moreover, a positive factor is on their side as "*soils are relatively fertile Plinthosols characterized by mountainside rocky loamy and sandy types. The average land cultivated is approximately 1.5 acres per household using hand tilling methods especially among the poor group and increased usage of animal traction and tractors among the better-off group*" (June 2015, IPC, p. 40). It is therefore possible to increase agricultural production. However, what remains fragile is the uncertainty about the climate that has been fickle for several years.

Mothers and fathers, as we have just seen, anticipate increasing their livestock with their crops. One interesting fact that appeared during meetings with the men in the villages was the enhancement of this activity by men. Formerly in Karamajong pastoralist communities, men do not feel invested in the agrarian operations. It is at least what many authors show (Kagan, S. 2009 and Knighton, B. 2006) regarding the traditional role of men in this environment. The men in three villages (mountains and plains), mentioned the importance of their role with the introduction of primary techniques such as hitching of animals for plowing. This is indeed an important change that alters the organization of life during the rainy season. Although men hope to sell their agricultural products to restore their livestock, the fact remains that a transition to a sedentarization of the rural population is underway which also changes the consideration of the agricultural holding as a capital which determines the economic status of households.

Chart5. H28: Poor agriculture products

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Links: H1, H4 Secondary Data: FSNA: hash weather or	In 3 villages (mountains, lowland) FGW and FGM: agriculture product is a component of economic well-being of	Seasonality: Rain season, hazards Historical trends: a process of sedentarisation

massive crop failure in 2015. But, for the households that were involved in cultivation, there were notable increases in the amount of harvests for certain crops. (Dec. 2015) Literature review: IPC, June 2015	families. Mothers, as fathers wish increase the amount of agricultural products, but consider that for several years, because of the climate, they are impoverished.	Changes: for three years, impoverishment of households explained by poor harvests.

4. MHCP: MENTAL HEALTH AND CARE PRACTICES

Care practices and mental health is the second-largest sector affected by child malnutrition. If the food security sector provides insights on the well-being of households, the MHCP sector is instructive on the nutritional status of children (0–59 months), and that of mothers, as well as interactions between children and mothers.

Nutrition experts are particularly interested in the prevalence rates in this sector, including the development of best practices that allow children from birth to grow well in their environment where the mother is the primary referent. Consequently, the conditions surrounding the welfare of the mother throughout the growth of children must also be taken into account and the risk factors related to it directly impact on the increase or reduction of prevalence rates child malnutrition.

In Moroto District, contextual description MHCP sector relies on the RFS-NCA survey (March 2016). All specific risk factors (LINK NCA STUDY) were measured using 22 indicators (core and optional).

4.1 Description of MHCP Context

The RFS survey was able to assess the risk factors prevalence rates among 840 children aged between 0 and 59 months. With this large number, we have a very good statistical representation for all age groups (0–6 months—6–23 months and 24–59 months). In addition, we have an excellent portrait of the issue of "infant and young children feeding" on breastfeeding practices and complementary feeding (see Table 22).

According to the findings of the RFS, in Moroto District, 34.81% of the children were breastfed within the first hour of birth, and 43% have benefited from exclusive breastfeeding (no liquids) during the first six months of life. Among them, 36% had continued breastfeeding after their first year of birth. We will see by studying the hypothesis 5 that the practice of proper initiation is related to cultural practices that

have the effect of changing the initiation of breastfeeding. However these can be modifiable if they are properly understood by midwives in maternity health centers. Exclusive breastfeeding, appears to be a rather marginal practice (24%). Most of the mothers tend to introduce semi-solid foods during the first six months of life of the child. Furthermore timely initiation of complementary feeding for children aged between 6 and 8 months, appears adequate for only 46% of children.

It clearly appears that almost three quarters (74%) of children aged between 6 and 23 months were in a precarious situation, first in regards to the diet diversity score then on the appropriate number of meals per day. Children receive more assistance from the mother when they are aged between 9 and 23 months (72%) and are left to themselves when they are older (31%). The hypothesis 6 relates to this issue. We wondered therefore if the indicators on mother-child relationships in Moroto District could be potentially relevant for understanding this low prevalence. It was then observed that the role of child care is often outsourced to children under 12. Even when children are very young, only 37% (0–23 months) remain with their mother, and when they are aged 24 - 59 months 43% of them are alone all day. The compliance measures related to mother-child interactions for all children under 5 years was deficient (72%).

For the RFS survey, 543 mothers answered questions relating to the conditions of women in order to ensure the nutritional protection of their children (Table 23). The conditions described by the prevalence rates are: physiological status, level of education, social support, the workload in addition to child care, their psychological state and their capacity to decide in their married life, access to family planning, respect for appropriate birth spacing, and the age when they had their first child.

The findings of the RFS survey show that nearly 66% of women are breastfeeding and 14% are pregnant. This means that a significant proportion of women with children under 5 years are in a state that required them in a role dedicated to the care of children. Unfortunately, during their last pregnancy, they said they ate less than usual (60%). 23% of district mothers have an average level of education of seven years of schooling. Overall, they report (74%) that they are supported very little or not at all in their social environment, as almost half of them feel they have too heavy a workload to give adequate care to their children. Despite this, it seems that their mental state appears satisfactory since only 26% of mothers are at risk for depression.

We also learn that majority had had their first pregnancy during early adolescence (75%, first pregnancy before the age of 18) to take the mother status, they are now faced with an intensification of the number of births without interval (61%), and consequently they do not practice modern contraceptive methods (79%). However, they say they have a decision-making power regarding the medical care of children (92%).

Table 17. RFS-NCA: Infant and young children feeding and psychosocial care, Moroto District, Uganda, March 2016

Indicator	95% CL
Population	
MHCP	

Infant and Young Children Feeding	Value	Lower	Upper	Sample, NCA
Care of children				
Adequate initiation of breastfeeding (1 hour) 0-23 months	34,81%	29,37%	40,57%	293 (361) 102
(0-6 months) Exclusive breast feeding No liquids No solid, semi-solid, or soft foods	43% 24%			103 44 25
Continued breast feeding after 1 year (12-15 months)	36,21%	23,99%	49,88%	58 (69) 21
Complementary feeding (6-8 months) Correct introduction of complementary feeding IIDS, group 1 (cereals, root, tubers)	46,67% 64,44%	31,66% 48,78%	62,13% 78,13%	45 21 29
IDDS 6-23 months				274
Proportion of Children with minimum IDDS (≥4) foods groups	26,61%	21,05%	32,77%	233 62
Proportion of children IDDS Food group 3: dairy products: milk, yogurt, cheese)	30,29%	24,91%	36,11%	274 83
Proportion of children IDDS Food group 4: meat, fish, poultry, liver	12,36%	8,72%	16,85%	275 34
Proportion of children with correct meal frequency 6-23 months Four meals or more per day	17,88%	13,53%	22,94%	274 49
Child feeding Behavior 9-23 months (help) 24-59 months (help)	72,49% 31,20%	66,22% 27,06%	78,17% 35,64%	 166 (229) 146 (468)
Behavior adopted by the caregiver when the child doesn't want to eat 0-23 months Play with, Change food Forcing Nothing 24-59 months Forcing Play with, Change food Nothing	 56,77% 8,30% 31,44% 9,83% 37,39% 46,79%	 50,08% 5,07% 25,49% 7,36% 33,03% 42,21%	 63,28% 12,65% 37,89% 12,98% 41,97% 51,43%	 229 130 (229) 19 (229) 72 (229) 468 46 (468) 175 (468) 219 (468)
Table Baseline Indicators NCA Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016				

Indicator Population		95% CL		
MHCP				
Children psycho social care	Value	Lower	Upper	Sample, NCA
Leave alone or in the care of other children younger than 12 years				479
Children 24-59 months	43,01%	38,54%	47,58%	379
Every day	34,66%	30,43%	39,13%	206
Several times a week	1,46%	0,64%	3,12%	166
Less than once a week				
Children 0-23 months	37,12%	32,16%	42,35%	134(361)
No	27,15%	22,69%	32,10%	98 (361)
Every day	24,38%	20,10%	29,21%	88 (361)
Several times a week	9,42%	6,70%	13,03%	34 (361)
Less than once a week				
Children with appropriate child-care interaction				
Children 24-59 months	35,67%	31,37%	40,20%	168 (471)
Children 0-23 months	38,35%	33,19%	43,78%	130 (343)

Table 17. RFS-NCA: Care of women, Moroto District, Uganda, March 2016

Indicator Population		95% CL		
MHCP				
	Value	Lower	Upper	Sample, NCA
Care of Women				
Caretaker's physiological status				576
Pregnant	13,89%	11,22%	17,05%	80
Lactating	66,84%	62,81%	70,65%	385
None of above	19,27%	16,18%	22,78%	111
Food intake during last pregnancy				576
Less as usual	59,72%	55,58%	63,74%	344
Same as usual	14,58%	11,86%	17,79%	84
				572
Illiteracy	74,48%	70,66%	77,96%	426

Level of Education Average level of education	(25, 73%) 7,732 years(Std: 0,4375)	22,26%	29,54%	148
Perceived social capital Mothers who feel supported				576
Extremely	13,37%	10,75%	16,49%	77
Somewhat	21,70%	18,45%	25,34%	125
Not very much	38,02%	34,06%	42,14%	219
Not at all	26,91%	23,37%	30,77%	155
Workload Mothers who feel they have too much work to take care of their child	44,61%	40,40%	48,89%	547 244
Mothers at risk of depression WHO 5<13	26%			594 152
Mothers at risk of depression MID 10				107
Mild	14,02% (107)	8,06%	22,07%	15
Moderate	15,89%	9,54%	24,21%	17
Severe	55,14%	45,22%	64,77%	59
Current use of family planning				581
All methods to delay (including traditional method)	68,67% 20,83%	64,70% 17,64%	72,40% 24,40%	399 121
All methods (except traditional method)				120
Methods (except traditional method)	66,67%	57,48%	75,01%	80
Lactation Sterilization, pill, IUD, Implants, Condom	33,33%	24,99%	42,52%	40
Early first pregnancy (<18)	36,15%			559 202
Short birth spacing Less than 24 months	39,30%			229 78
Woman Empowerment Decision				592
No decision power: children should go to school	25,00%	21,60%	28,73%	148
No decision power: child has to consult medical services	7,09% 24,79%	5,22% 21,39%	9,55% 28,52%	42 146
No decision power: spend the household's money				

4.2 MHCP Hypotheses from the initial workshop

Among the 30 hypotheses in the initial workshop, more than a third directly concern the MHCP sector. Twelve hypotheses were tested during the collection of data with the household survey and the qualitative survey. The hypothesis on dependency was not tested[24].

It is useful to stress that for the assumptions directly related to childcare, we have enough secondary data including the FSNA biannual survey to monitor changes in relevant risk factors (2012–2015). However, for certain risk factors relating to the care of mothers, the RFS prevalence survey provided the first published data to investigate these issues for the district. The qualitative survey also highlights the reasons for maternal behavior that causes, or at least can lead to highly prevalent child malnutrition.

a) H5. Poor practices of breastfeeding initiation and exclusive breastfeeding

Concerning the initiation of breastfeeding, the RFS survey gets a prevalence rate of 34.8% (March 2016), while in June 2015, the FSNA survey shows a very low prevalence rate (8%). However, in May 2013, the FSNA survey obtained a rate of 65%. We are faced with very different prevalence rates recorded by FSNA annual surveys (2013–2015). Unfortunately, the authors do not mention what are the reasons for this difference in prevalence over the years.

The qualitative survey can help us understand this difference. When mothers talk about this practice they differentiate their discourse according to the place of delivery. In fact, mothers who give birth in a health center, they are required by the care protocol to initiate breastfeeding, while for a home birth, they only begin breastfeeding after choosing the name of the newborn. At home, the delay is more than one hour and can go up to 36 hours.

In recent years, health centers are attempting to address this cultural demand and mothers are being asked to provide a name before giving birth so that more and more newborns benefit from the practice of breastfeeding initiation. Thus, according to the findings of the RFS survey (March 2016), the prevalence of mothers who gave birth in a health facility (68%), is a probable explanation for the prevalence of this risk factor at more than 8% (FSNA 2015). However, there may be a number of primaparous women that do not have the time to choose a name before their arrival at the health center, which in this case would explain why the prevalence rate cannot exceed 68%, but is close to the prevalence obtained by RFS survey; the confidence interval is between 30 and 40%.

Regarding exclusive breastfeeding, the RFS survey (March 2016) obtains a prevalence rate of 43% while the FSNA survey shows a higher prevalence, 75.2% in 2015, and slightly lower in 2012 - 70%. The measures related to exclusive breastfeeding may be different depending on the choice of

24 —This hypothesis has been explored in the qualitative survey with participants in the villages, community leader and key informants. We did not get positive or negative results on the impact of dependency on child malnutrition. A series of questions was asked to check whether the parents had a wait and see approach relative to outside help. Little information or statements emerged from group sessions on it. Because this was an exploratory approach for opening a future avenue of research, we cannot reject this hypothesis but should rather classify it as an untested hypothesis.

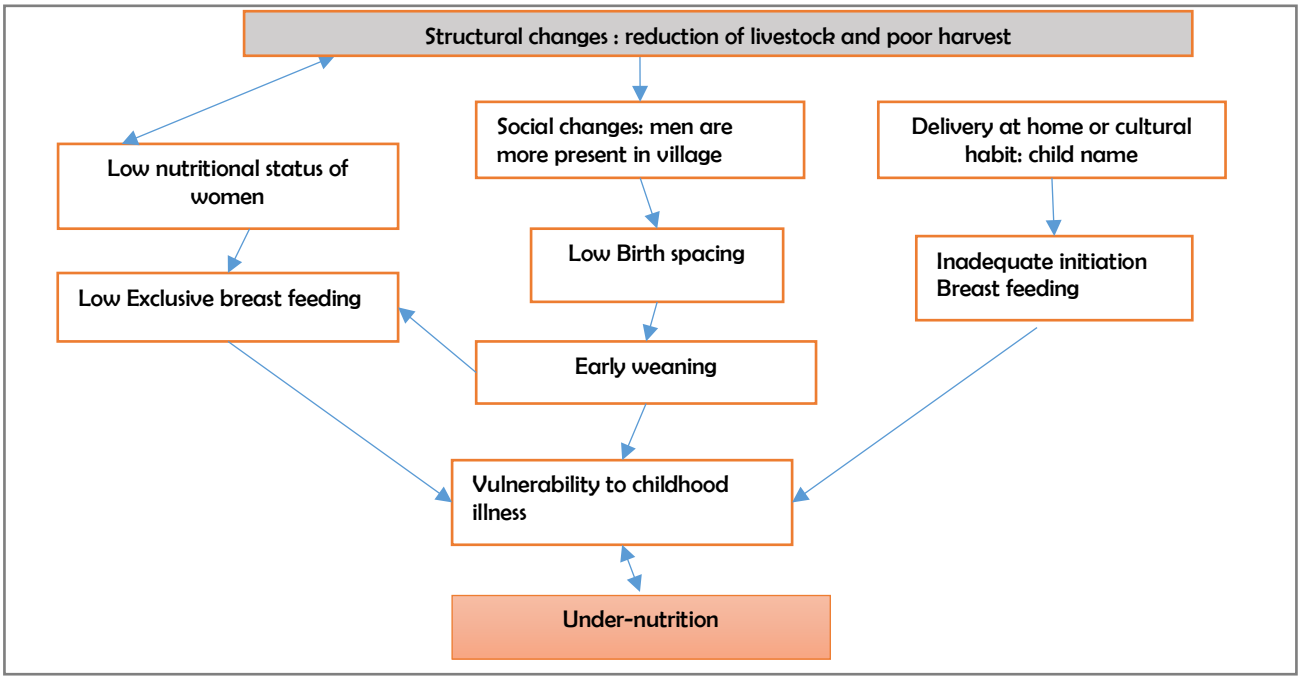
questionnaire. The RFS questionnaire asked mothers to indicate if in the last 24 hours the child ate or drunk; that does not mean that the child is not breastfed by the mother.

In addition, many mothers reported during the discussion sessions that they did not practice exclusive breastfeeding. They introduced early enough semi-solids before the age of six months, explaining that often the child wants more of other foods. This practice of introducing an early stage food was also confirmed in interviews with nurses in health centers. The prevalence on early introduction of foods is 53% (see the following hypothesis). This would explain why the prevalence obtained by the RFS investigation is much lower than the one obtained in the FSNA survey.

Chart6. H5. Poor practices of initiation of breast feeding and exclusive breastfeeding, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 0-6 months Early initiation of breast feeding: 34.8% in one hour Link: Delivery Health center, (68% of women) Exclusive breast feeding: 43% (no liquids) Link: introduction of complement 6-8 months: 46.7% (RFS) Secondary Data: Early Initiation of breast feeding in one hour : (from mothers) : 8% June 2015 Exclusive breast feeding FSNA: 2012 FSNA:2015 70.7 % 75.2%	FGW: Initiation of breast feeding: related to the practice of child's name, and the attendance of mothers in health centers for childbirth. Exclusive breast feeding: a picture remains mixed Key Informants: Health workers in 4 health center Early initiation of breast feeding: link with the visit expectant mothers for giving birth Exclusive breastfeeding: Mothers attend very few health services for child monitoring between 0- 6 months (pediatric monitoring)	Seasonality: Historical trends: decrease of prevalence rate of exclusive breast feeding Changes: early breast feeding: Utilization of maternity unit for women
Data Triangulation: plausible with source of data and the qualitative survey and literature review H5 hypothesis confirmed		Consistency: by changes H5 hypothesis validated

Figure 6: H5- Causal Pathway: Major- Poor practices of initiation breastfeeding, and exclusive breastfeeding



b) H6. Inadequate infant and child feeding practices

Three main indicators build this hypothesis. These are the introduction to complementary foods, food diet (IDDS) by including the number of daily meals, and the indicator on response feeding.

- *Introduction to complementary food:* The practices are divided into two groups, the first group, 46% (RFS, March 2016) of children, mothers properly introduce foods to the recommended age of 6 to 8 months (FSNA: 54%, June 2015). For the second group, there would be 35% of children (FSNA, June 2015) who eat foods prematurely, and 10% (FSNA June 2015) of mothers introduce later complementary foods. According to the FSNA survey, compared to other districts in Karamoja *"Early introduction of complementary food was particularly prevalent in Moroto" (June 2015, p .36).*

- *IDDS* : If we look at the evolution of IDDS for Moroto District between 2012 and 2016, little change is observed between the prevalence obtained in March 2016 27% (RFS) and that of September 2012, which was 26.2% (ACF) for the proportion of children who received a minimum ((≥4) food. Regarding the number of daily meals, in March 2016, only 17.8% (RFS) of children were fed four times a day. In December 2015, they were very slightly higher in proportion i.e. 18.6% (FSNA). Moreover, in 2010, very few children had 4 meals (1%), 52% of children eat an average of two meals a day, and 20% of them three meals a day. The FSNA survey gives in 2013 for children aged 9-23 months, an average of 2.8 daily meals. Since 2013, the FSNA survey uses a composite indicator, the MAD[25]. In Uganda, the national average was 5.7% in 2015, while for the Karamoja Region, the rate was 2.7% in December 2015, but very different in June 2015 at 14%[26]. For the year 2015, it also applies for Moroto District in December 2015; the rate was 1.6% in December and 11% in June 2015. Finally, we should add that according to the FSNA survey the MAD indicator "had a weak negative correlation with stunting "(Dec. 2015).

- *Response feeding*: the RFS survey also provides a good score; mothers are good caregivers for their children when they give food to children aged between 9 and 23 months (79%). They are far less so with older children (24-59 months), only 26% of children are helped by the mothers.

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The question of food practices were addressed by two components during the group sessions with mothers. The first focused on the nutritional status of children, and the second was on the number of daily meals prepared by mothers.

25- Minimum Acceptable Diet (MAD): the combination of children who had minimum/ acceptable diet diversity and those who had minimum meal frequency was computed as well.

26 - This percentage difference between two months of a year is important (11%). One might think that during the rainy season of 2015, at least in June, children were able to receive better food diet. But this is probably an exception given the results for the month of June the previous years.

Regarding food diet, mothers explained that the children had an undiversified food diet because of their poor financial means. But this is only the beginning of a long narrative about the significance of the poor quality of the food diet of children. Mothers introduce daily diet in food children via a preparation of fermented cereals, the "residue", which they get in exchange for firewood. During the dry season, they give that systematically to children from the age of 6 months. However, this diet appears more frequent in the two villages of the plains (Nadunget-Rupa sub-counties, Moroto District). Mothers living in the mountains do not practice the production of firewood, so that the residue appears in the diets of children at the time when they will make local beer themselves. As for children living in the city, the residue is not included in their diets. Mothers being in proximity to the food market, manage to find cereals, and thus avoid the residue for children. Sometimes it even happens that urban mothers produce local beer and make exchanges with mothers from surrounding villages offering the residue part against firewood.

Regarding the number of daily meals, mothers reported that they prepared one meal a day, and throughout the dry season. They said they did not have enough food to make a meal in the morning, and that's after a day in the bush or after having returned from the city with their purchases, that they cook the only meal of the day. An explanation could be due to the annual changes (December and June) and to the composite indicator MAD. In June, children eat more often than in December due to the reduction in time spent by mothers in the bush during the rainy season.

In the process, we asked mothers how they organized the evening meal. Who eats first? Does it have to be husbands or children? A strong distinction is observed between older and younger mothers. Older mothers have established this rule: First children then parents. Younger mothers apply the customary norm of feeding the husband and children after.

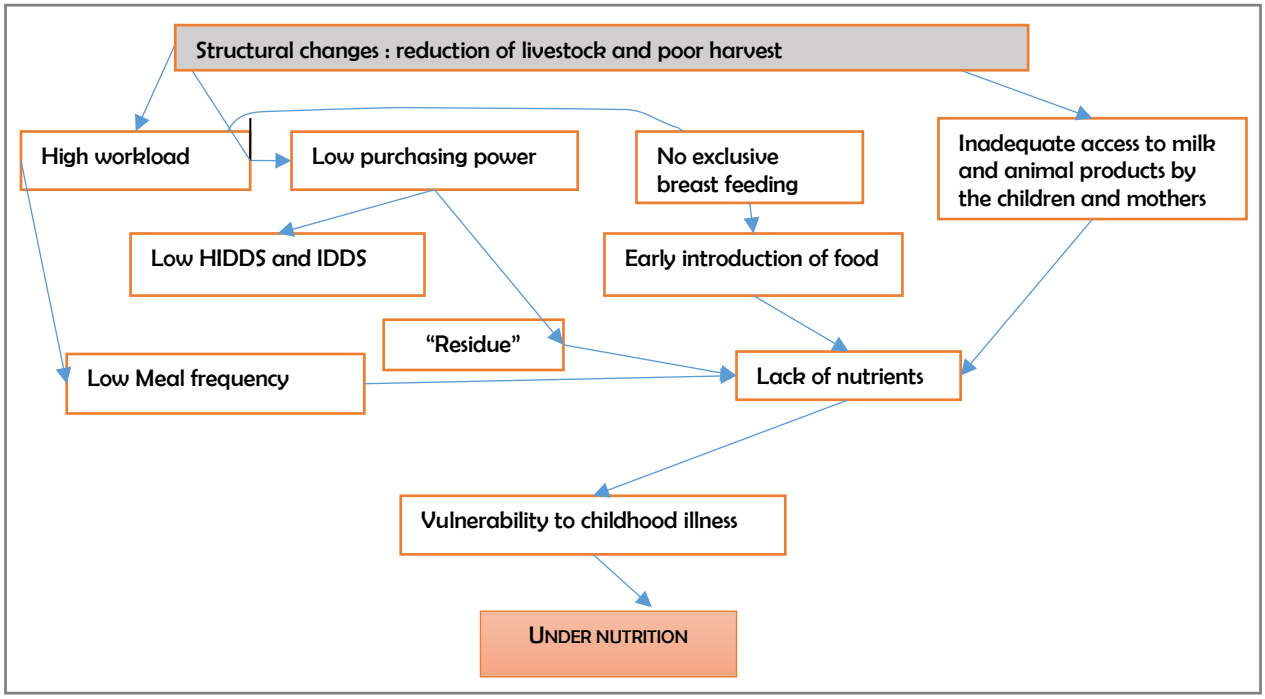
Finally, with regard to the early introduction of semi-solid food for children under 6 months, mothers have listed the reasons that motivate them to do regularly: not enough breast milk, pregnant again and often when the child cries, and when pressed by work outside the village.

Chart 7 H6. Inadequate infant and child feeding practices, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 6-8 months Good Introduction to complementary food: 46.7% 6-23 months IDDS: with minimum IDDS (≥4) foods groups: 26 % of children Meal frequency: 17.8% Responsive Feeding: 78% (help) Secondary Data:	One major cause of under nutrition in 4 villages: Low nutritional status for women and children FGW: The focal point of the daily life of children during the dry season. Too rapid introduction of	Seasonality: Dry season Historical trends: no variation with IDDS between 2012 and 2016 Changes: nutritional

6-8 months Good Introduction to complementary food: FSNA 2015 (June): 54% IDDS (6-23 months) FSNA 2012: : with minimum IDDS (≥4) foods groups: 27.2% FSNA 2015: MAD: 1.2% (national average, 5.2%) Meal Frequency: FSNA 2010 : 52% (2 meals) 2013: 9-23 months: 2.8 (Average) 2015: 18.6%	complementary food, daily use of fermented cereal, a deficit in the number of meals. Link to food diet of mothers, and high workload.	transition with residue during the dry season
Data Triangulation: plausible with source of data and the qualitative survey and literature review H6 hypothesis confirmed		Consistency: by seasonality, historical trends and changes H6 hypothesis validated

Figure 8:H6 – Causal Pathway: Major - Inadequate infant and young children feeding practices



c) H26. Role of education

In Uganda, it is significant to take into account the risk linked to education. The Ugandans attach great importance to education. In fact, in 2006 nearly 68% of Uganda's population could count on their

educational background in order to have access to jobs and skilled positions potentially getting them to be more attentive to children's needs. In Karamoja, the same year, the percentage of educated people remained far behind at 12%. For 10 years, there is a percentage increase in the number of educated mothers. According to the data of the FSNA survey in 2012, 18.3% of mothers in the Moroto District had a minimum level of education (primary level). In 2015 (June) that proportion rose to 24%. Finally, in 2016, the RFS survey gets a proportion slightly higher than in June 2015 at 25.2% (March), the average level is 7.73 years.

Obviously, the mothers of Moroto district are still very far from the national average, but now more likely to be minimally educated, which could possibly imply that their children could be better protected from malnutrition. Moreover, since 2012, the FSNA survey maintains that there is a significant link between chronic malnutrition and the education level of parents' "*education is a factor that correlates highly with stunting status* "(May 2013), and recently, "*Any level of mothers' education status was advantageous to their children's nutrition status* "Dec. 2015).

It seemed therefore appropriate to go to the women to initiate a discussion about their perceptions of the value of education as a vehicle for better care for children. An important fact must be considered: the educated do not live in the rural area, they are in town, that is namely in Moroto. Moreover, this urban space is heterogeneous; there are richer and poorer neighborhoods.

As part of the qualitative survey, we were in a poor district of Moroto. Most of the mothers present in collective sessions had attended a school curriculum but did not go beyond primary level. Moreover, they called themselves girls who dropped school and chose to start a family. In their discourse of educated women, for example, there was a constant concern to retain risk factors relating to health and hygiene in order to explain the causes of child malnutrition. Also, they presented the situation of malnourished children, not as a fatality, but through a critical approach. For example, they emphasized the irresponsibility of some parents as a cause of malnutrition. They did not base that judgment on a comparison between rural and urban mothers but on their own urban environment.

As for their proper educational background, they reported using them as a very positive asset in enabling them to go with confidence in the Moroto hospital when their children were sick. For these women, education played a positive role, allowing them to have a more fluid communication with health workers or people that may support their specific needs such as medical care. On the contrary, mothers in rural areas with no education were more reserved about the type of communication they might have with the health workers. Also, they presented their lack of education as an obstacle that sometimes prevented them from going to health services, at least services provided in the city, preferring to consult traditional healers.

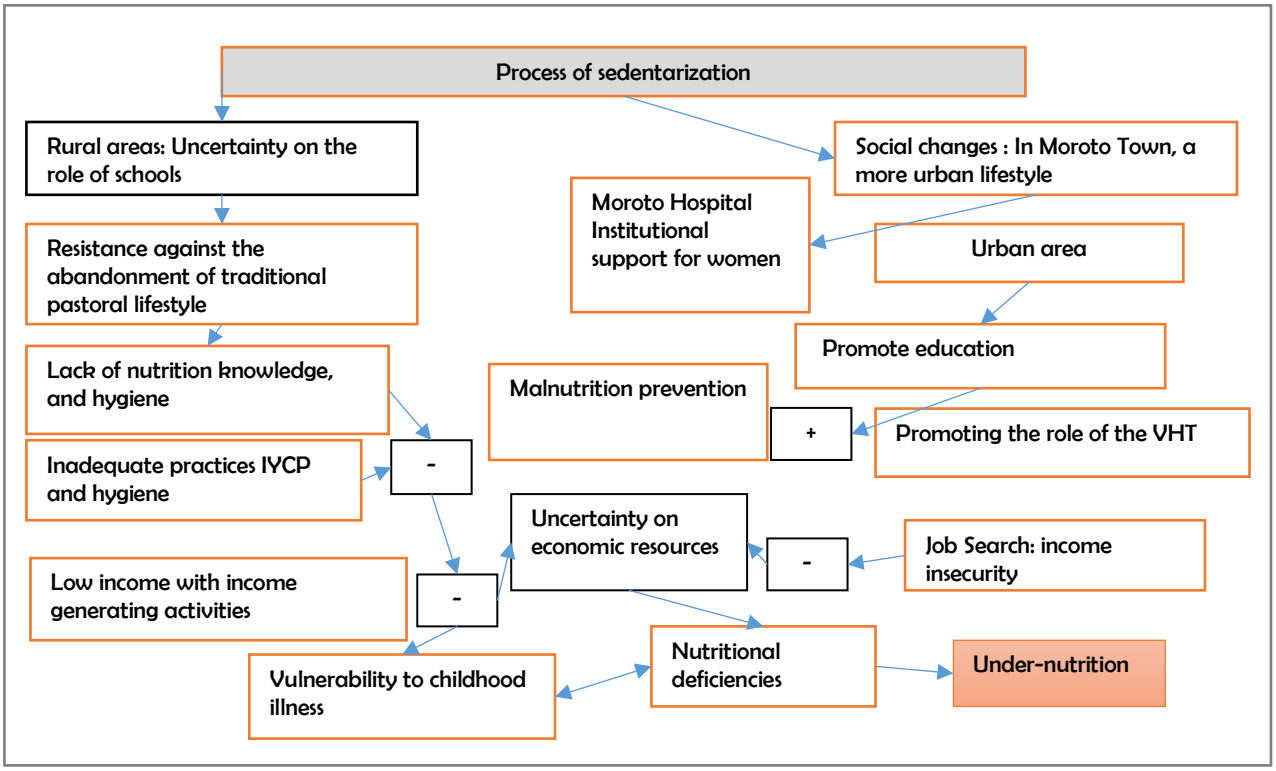
With male participants, it is in rural areas that the men discussed the importance of the role of education with regard to malnutrition. In one village, all the men were asked to put their names and

sign a petition requesting further sessions or meetings on the causes of child malnutrition and the techniques they had to learn to mitigate the risk of malnutrition.

Chart8. H26. Role of education, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 74.8% (no education Secondary Data: FSNA 2012: 81.7% (no education) FSNA 2015 (June): 76% (no education) Link with malnutrition (stunting) Literature review: *"There is strong and generally consistent evidence that maternal education has a positive impact on child stunting.* NCA Pathway	FGW: positive role of education promoting the use of health centers. FGM: high demand from fathers to receive education on child nutrition	Seasonality: Historical trends: Changes: continual improvement of the level of education that plays positively on reducing under nutrition stunting
Data Triangulation: plausible with source of data and the qualitative survey and literature review H26 hypothesis confirmed		Consistency: by changes H26 hypothesis validated

Figure 9: H26- Causal Pathway: Important- Role of Education



d) H7. Low maternal nutritional status during pregnancy

In December 2012, the proportion of pregnant women in the Moroto District was 10%, it was 11.9% in May 2013 and 14.4% in December 2015 (FSNA). In March, 2016 (RFS), the percentage was similar to that of December 2015 at 13.9%. We can observe a gradual rise in the number of pregnant women since 2012. This increase is, however, in line with the fact that almost half of the population of the region is under 20 years old. Note also that 67% of mothers are breastfeeding.

In the RFS survey (2016), more than half (59%) of pregnant women eat less than usual. In 2012, FSNA obtained a prevalence of 11% (pregnant and lactating women) who are malnourished. In group discussion sessions, women chose that as one of the first causes of malnutrition not only for pregnant women but of all mothers, even those who are not breastfeeding or pregnant. For example, the FSNA survey (December 2014) shows that the risk of having malnourished children is important for undernourished women who are not pregnant "*Status of mothers (BMI) was significantly associated with stunting and underweight GAM. Mothers' who were wasted were more likely to have wasted children*", (p. 61), in the Karamoja Region.

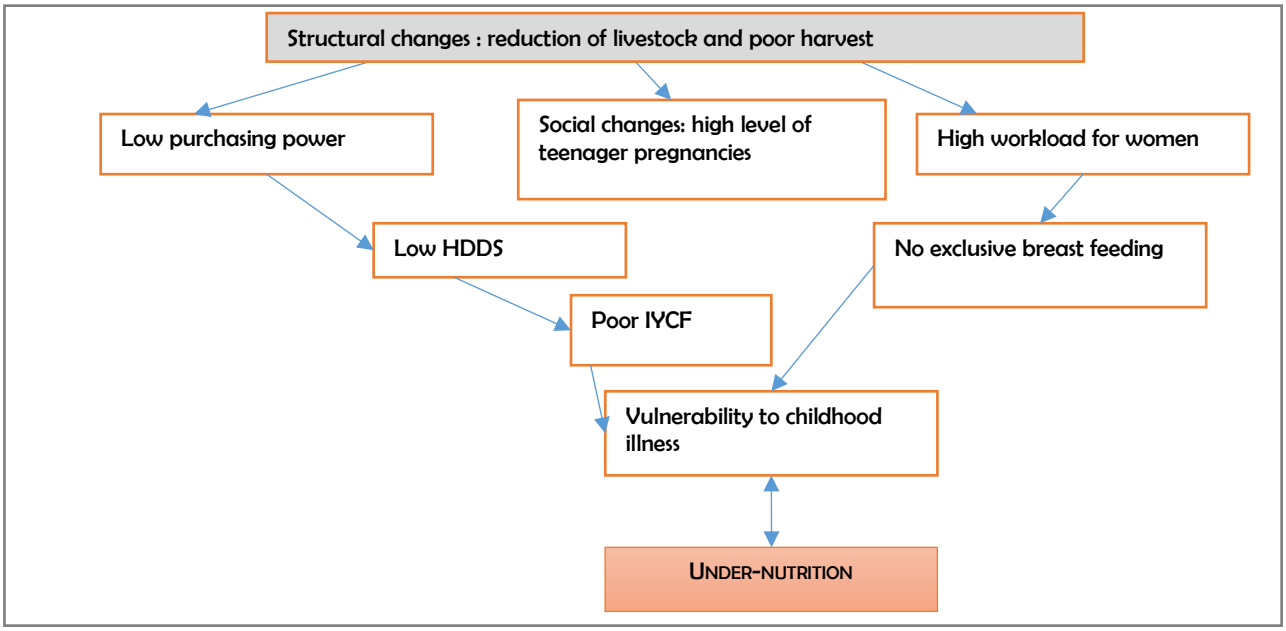
It is therefore not surprising in a district where nearly 70% of women are pregnant or lactating mothers in the 4 villages also believe that the problem is also experienced by these two categories. Mothers explained the reasons for them to keep this risk factor as a cause of malnutrition. Despite the fact that food is easily accessible, due to the low purchasing power of households in the dry season, pregnant women eat less. To feed, they also substitute local beer for a proper diet food. Finally, as they are busy in the bush or breaking stones, they do not have time to eat properly during the day.

Chart 9. H7. Low maternal nutritional status during pregnancy, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Eat less than usual: 59.6% Secondary Data: FSNA (Dec. 2012) Moroto: MUAC (pregnant and lactating women) Using a cut-off of less than 22.5 cm: 11.4% of women have wasting status. Literature review: "*Being pregnant increases energy needs by 13%, protein by 54% as well as mineral needs 0-50%. If a mother's reserves have been depleted, the succeeding child is at risk of foetal malnutrition and a compromised gestational period. However, this model of maternal depletion does not take into account breastfeeding; lactation is an even greater nutritional burden than pregnancy.*" (NCA Pathways Module p.93).	FGW: "*Low nutritional status for mothers and children*" One cause of malnutrition in all 4 villages Reasons: food access and high workload	Seasonality: dry season Historical trends: consistent increase in the number of pregnant woman Changes: workload

Data Triangulation: plausible with source of data and the qualitative survey and literature review H7 confirmed	Consistency: by seasonality, historical trends and changes H7 hypothesis validated

Figure 10: H7 Causal Pathway: Major- Low maternal nutritional status during pregnancy



e) H14. Poor status of reproductive health (birth spacing and family planning)

The WHO recommends two to three years between pregnancies to reduce infant and child mortality and also benefit maternal health (Marston, 2005). 30% prevalence is obtained (RFS, 2016) of children described in an interval of 24 months in the household of Moroto District. In 2011, the proportion of Ugandan children for the same period was relatively lower, 25%. At the same time, the proportion was 35.7% for the Karamoja Districts (DHS).

If we refer to the DHS (2011), there are 27.3% of currently married women of ages 15–49 who want no more children (by the number of living children) in the Karamoja Region, while the national average was 42.5%. This necessarily leads us to address access and use of family planning. If one compares DHS data of 2011, 7.4% of mothers were using a contraceptive method (modern and traditional) in the Karamoja Region, while in 2016, the RFS survey obtained a larger proportion, 20% (modern contraceptive methods) in Moroto District. That means that over the last four years, more women in the district use contraception. Likely, this could be explained by increased access to this service. For others (80%), we need to know if these women do not have access, or may be more in demand for spacing.

In group meetings, it appears that this is the second reason that has emerged. For them, there is an inability of parents to manage an appropriate birth interval. In the four villages, mothers perceive this failure as a cause of child malnutrition.

In the background, mothers are challenging the behavior of men, too eager to have sexual intercourse. They report that men now afford to abandon their wives if they do not accept their demands. Women are somewhat pulled between the fear of abandonment and failure to manage the spacing of children.

Here are some remarks on this subject that appears a challenge for mothers and teenage girls with children: first the desire for children is shared by all mothers, in general, when asked how many children they wish, they give a specific number. They have the desire to have children in conjugal harmony. They seek a union that does not pass through a dowry based on the livestock but stands on an emotional basis. At the same time, they believe that male protection remains the cornerstone of the foundation of a family (mother and child).

But through all these changes, they are worried by the dilettante attitude of men, by their commitment to a free choice of a husband who unfortunately manifest in an impoverished environment. Finally, they observe that the loss of livestock brings men to be more present in the villages while before they practiced transhumance, allowing the women to manage appropriate spacing.

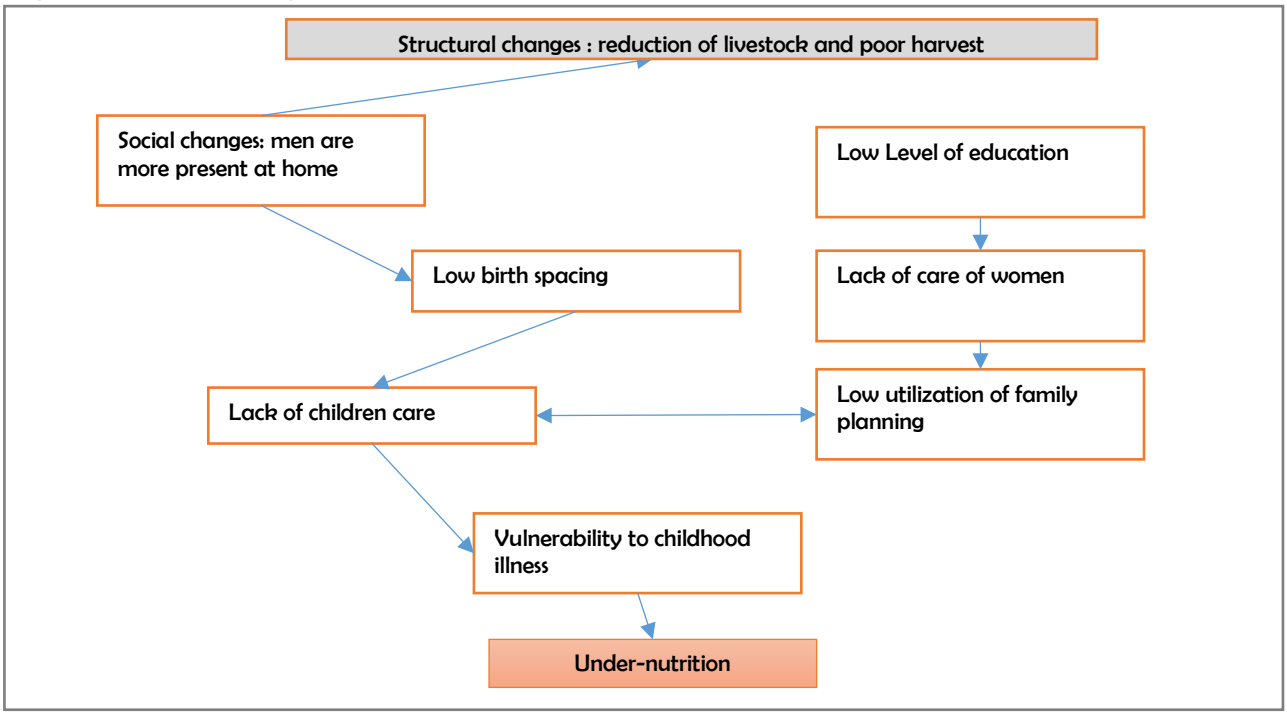
Men strongly resist the abandonment of polygamy for the nuclear family. When men are asked what the number of women they want to marry is, they report an average of 3 wives per man. They argue that equity remains a safe bet for the wives. They share their income equally, not counting the number of children per wife. The role of fathers and the type of support they offer to mothers for child care in this configuration is discussed in detail under hypothesis 9.

Chart 10. H14. Poor status of reproductive health (birth spacing and family planning), triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Birth spacing: 30% less than 24 months Family planning: 22% of women (except traditional methods) Secondary Data: FSNA: There was a statistically significant trend of malnutrition with the number of live birth a mother had had (Dec. 2014) DHS 2011, Karamoja Birth spacing: 35.7% less than 24 months Family planning: 7.4% (any method) Karamoja, Literature review: *the scientific literature supports that both short preceding birth intervals (<18 months) and long preceding birth intervals (>60 months) pose risks to child health in the prenatal, neonatal, early post neonatal and* *Post neonatal stages (Conde-Agudelo et al., 2006; Whitworth, 2002).* NCA Pathway	Cause of undernutriton in four villages FGW: they are worried by the dilettante attitude of men, by their commitment to a free choice of a husband who unfortunately manifest in an impoverished environment. Finally, they observe that the loss of livestock brings men to be more present in the villages while before they practiced transhumance, allowing the women to manage appropriate spacing. FGM: resistance is very strong against abandoning polygamy for the nuclear family.	Seasonality: Historical trends: access to family planning, but prevalence of low birth spacing is relatively important Changes: social changes, wedding

Data Triangulation: plausible with source of data and the qualitative survey and literature review H14 hypothesis confirmed	Consistency: by historical trends and changes H14 hypothesis validated

Figure 11: H14 Pathway: Major- Poor status of reproductive health (birth spacing and family planning).



f) H12. Poor maternal wellbeing (violence and alcohol)

As noted in the literature review of the NCA Pathway Module, the problem of the welfare of mothers can be a cause of infant malnutrition but it is important to connect the prevalence obtained in the corresponding indicator and the particular situation of the local context.

At the initial workshop (March 2016), the three subgroups of experts had incorporated the issue of alcohol consumption as a risk factor that can produce an effect on maternal well-being and prove to be a cause of child malnutrition in the Moroto district. The qualitative survey was therefore more suitable to provide insight into this problem already identified by experts.

The indicator on depression prevalence is relatively high with 26% of women being at risk for depression. We know that in a recent study on resilience[27] that the population of Karamoja suffers high stress and needs to adapt to recurrent shocks caused, for example, by climatic disturbances. In these circumstances, one would expect a higher prevalence of depression risk. We will see this prevalence may be higher in villages located especially in more isolated areas (mountain) district.

27 - Resilience Context Analysis Resilience to food insecurity and malnutrition in Karamoja, Uganda. April 2015.

We also had to test the more specific question of the impact of alcohol consumption and domestic violence on child malnutrition. Do problems such as domestic violence or alcohol would impact enough for the children to be neglected and exposed to malnutrition?

We have already mentioned the significant amount of the "residue" of fermented beer that children eat regularly during the dry season. In this cycle, there is therefore a significant amount of local beer produced in the villages and the city of Moroto. According to a recent article (Dancause, 2010) on the subject, it seems certain that mothers and fathers drink local beer for food. Accordingly, the issue was whether the regular consumption of local beer could have an impact on the care of children. This problem came up in both the female and the male discussion groups, as well as in our contact with key informants such as teachers and health workers. The first point is that the local beer has always been a favorite drink; it symbolizes hospitality and reunion, and accompanies festivities and celebration rituals in the communities of the district. But in recent years it has become banal, and it is part of almost every daily meal for both men and women.

Generally after the activities of the day, but especially in the late afternoon, the villagers will consume local beer. Beer consumption spans all age groups from the age of 12 years. The city has even become easier as many women prepare and sell local beer. For the better-off fortunate living in town, bars and restaurants offer a range of spirits and beer from the capital or major cities in Uganda. Participants of the qualitative survey from the villages are unanimous on this point. The daily consumption of beer is important, and it is the abuse of or addition of strong alcohol (waragi) to the beer which leads to disputes between spouses or co-wives. But participants also recognize at the same time that this is an agreeable means of support which allows them to hold on and face the uncertainties of everyday life.

When we asked the mothers if this could affect the care of children, they accepted that children could be affected, but they did not discuss the issue any further. In any event, during the free exercise on the causes of malnutrition, they did not select alcohol consumption as a risk factor for child malnutrition. Thereupon we asked them how they felt emotionally, they mostly responded that they felt good, and declared to be in good mental shape (see the case of a minority village, under hypothesis 27). However, they were less convinced of the good mental health of their husbands. For them, men are possessed by a feeling of melancholy because of the loss of livestock. For their part, men unreservedly acknowledged that they consumed beer daily but also laced it with strong alcohol and could become abusive towards their wives and family.

In the role-plays, we asked two women to script an evening with the family (father and mother) with a sick child. The short scene played in all villages showed that the father (played by a mother) annoyed by her alcoholic state complained in front of the traditional healer or health worker. The DHS survey (2011) shows that in the Karamoja region, women who reported being beaten said that the reason put forward by their husbands was that women neglected their children (38.3%). At least the role plays validate this feminine perception of domestic violence.

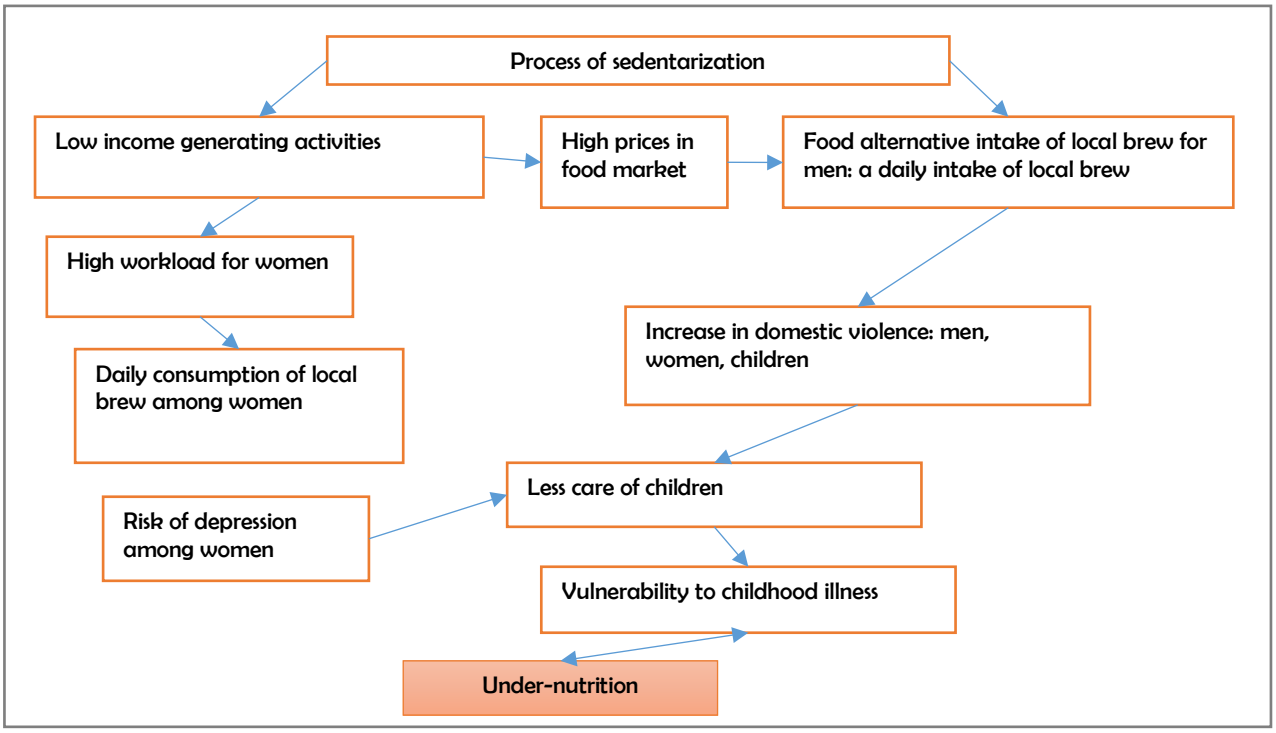
Among males, perceptions differ on the reasons that lead to alcohol abuse and violent behavior towards their wives. The men reported consuming alcohol for food, but also because their wives sometimes were exasperated and wanted them off the house. Then they would often go meet with

friends in the same situation and seek to forget their marital altercations by drinking alcohol. We will further discuss the impact of the fatherhood with hypothesis 9, and return to the issue of the risk factor of deteriorating mental health of mothers under hypothesis 30.

Chart11 H12. Poor maternal well being (violence and alcohol), triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary Data : RFS, March, 2016 Risk of depression: 26% of women Secondary Data: DHS 2011 Domestic violence Women: 43.9% Argues: 14% Neglect the children: 38.3% Men: 42.7% Argues: 33.4% Neglect the children: 28% FSNA June 2015 Moroto: adoption of hazardous ones like consumption of alcohol. Literature review: *The literature reviewed here suggests that the relationship between maternal wellbeing and child nutritional status likely exists, though it appears to be largely contextual.* NCA Pathway	Violence and alcohol Local beer production: source of income for women in the city of Moroto All age groups (including children) drink beer frequently FGW: the abuse of beer consumption is a source of domestic violence. FGM: Daily consumption of beer (often laced) further endangers the harmonious relations with the wives as well as with children	Seasonality: more in dry season Historical trends: Changes: inclusion of local beer in daily life habits of men and women.
Data Triangulation: plausible with source of data and the qualitative survey and literature review H12 hypothesis confirmed		Consistency: by seasonality and changes H12 hypothesis validated

Figure 12:H12- Causal Pathway: Important- Poor maternal well-being (violence and alcohol)



g) H9. Limited male involvement in child care practices

To test this hypothesis, we used the indicator on the perception of mothers for receiving support built via the qualitative inquiry with both men and women group sessions in the villages. This hypothesis covers the absence of the father in the care for children. It is also new within the NCA analysis that focuses more on the lives of women, and little on those of men.

In December 2012, the FSNA survey showed that men spend very little time with children (Men: 1.2 hours / Women: 6.2 hours). However, the sexual division of labor in traditional pastoralist societies corresponds to this picture. Women take care of children, and men are busy guarding the cattle.
As already mentioned, there are major changes on the side of men's work since they are almost in a situation of "technical unemployment", at least men in rural areas. In town, men experience a transition in which their life story certainly begins by abandoning transhumance for school. They diverge more and more from the traditional pattern, and seek to integrate into the Ugandan labor market. So, they learn to become a parent in the modern sense that is to say assuming shared "responsibility." These men, individually given the changes that have initiated their parents and their schooling, consciously or unconsciously accept the rules of a market economy.

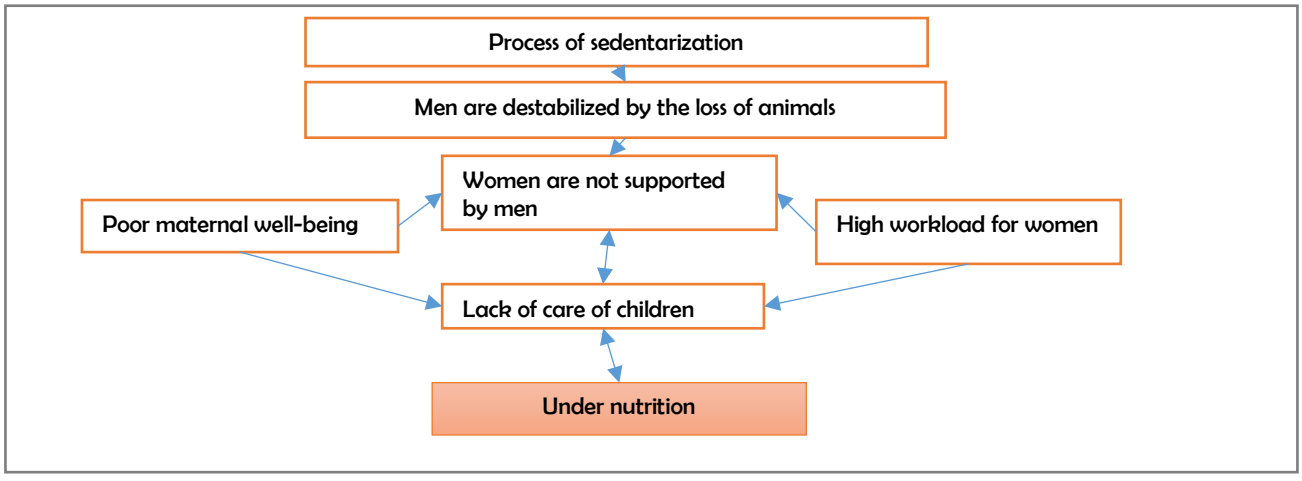
In the urban area, men have concerns related to the labor market; they want jobs, work and earn income to ensure a decent life for their families. Furthermore, urban women have the same commitment; they want to have the financial capital to start businesses. However, for rural men, their description of parenting remains very basic, they evoke support for mothers to bring children to the

hospital, and a marginal support to mothers to help with the housework. It seems that traditional masculinity dominates their view of their parenthood life. We will also see that masculinity is also protected by their wives (see hypotheses 8 and 10).

Chart12. H9. Limited male involvement in child care practice, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
RFS, March, 2016 Perceived capital 65%: not very much, not at all Secondary Data: See H12 and H8 FSNA: Dec. 2012 housework and care of children for Women 6.2 Hours: Men: 1.1 hour Literature review: Link with local context (see bibliography)	Parenthood and masculinity FGW: women complain, while protecting their husbands FGM: males can be distinguished: some maintain the traditional model and others push for more responsible parenthood	Seasonality: Historical trends: Changes: social changes, and urban life and rural life.
Data Triangulation: plausible with source of data and the qualitative survey and literature review :H9 hypothesis confirmed		Consistency: by changes : H9 hypothesis validated

Figure 13: H11- Causal Pathway: Minor- Limited male-involvement in child care practices



g) H27. Mental Health

This hypothesis has been added at the end of the initial workshop (March 2016), we had two indicators on the risk of depression in the RFS investigation included in this analysis. To this we added questions on maternal mental health (see hypothesis 12). Moreover, it is through the case of a specific village that

we could further explore the question of the welfare of mothers and their mental health. It was via the free exercise of identifying the causes of malnutrition that the issue of mental health was identified as a major cause of child malnutrition by mothers in this village.

In this highly traditional village when all seemed quiet and peaceful, the women were in fact well worried. They were concerned by the state of degradation of their marital relationships, geographical isolation that made it difficult to access medical services, long daily walks to go to the mining villages. In addition, they had their livestock decimated by disease two years before, and finally their land in the mountains demanded a lot of work against little return.

At the final session, during the return visit for the presentation of results of the NCA survey, we asked women to detail their psychological distress, as well as its impact on the nutritional health of children. What is interesting here is that we may have additional information to complete the first analysis where women generally were more positive about their own mental state (see H. 12).

The women described depressive signs as follows: a latent state of confusion reported the exhaustion or discouragement with a consequent incapacity to project themselves into the future. When speaking of the future, they expressed apprehension without having solutions other than going to break rocks to maintain a minimum level of subsistence during the dry season. Defining themselves as traditional women they said that they did not have a choice. The future is uncertain. But what is revealed over the health of children and their husbands is still disturbing. Very discreetly, they communicate the feeling that they lose on both counts, regarding both children and men.

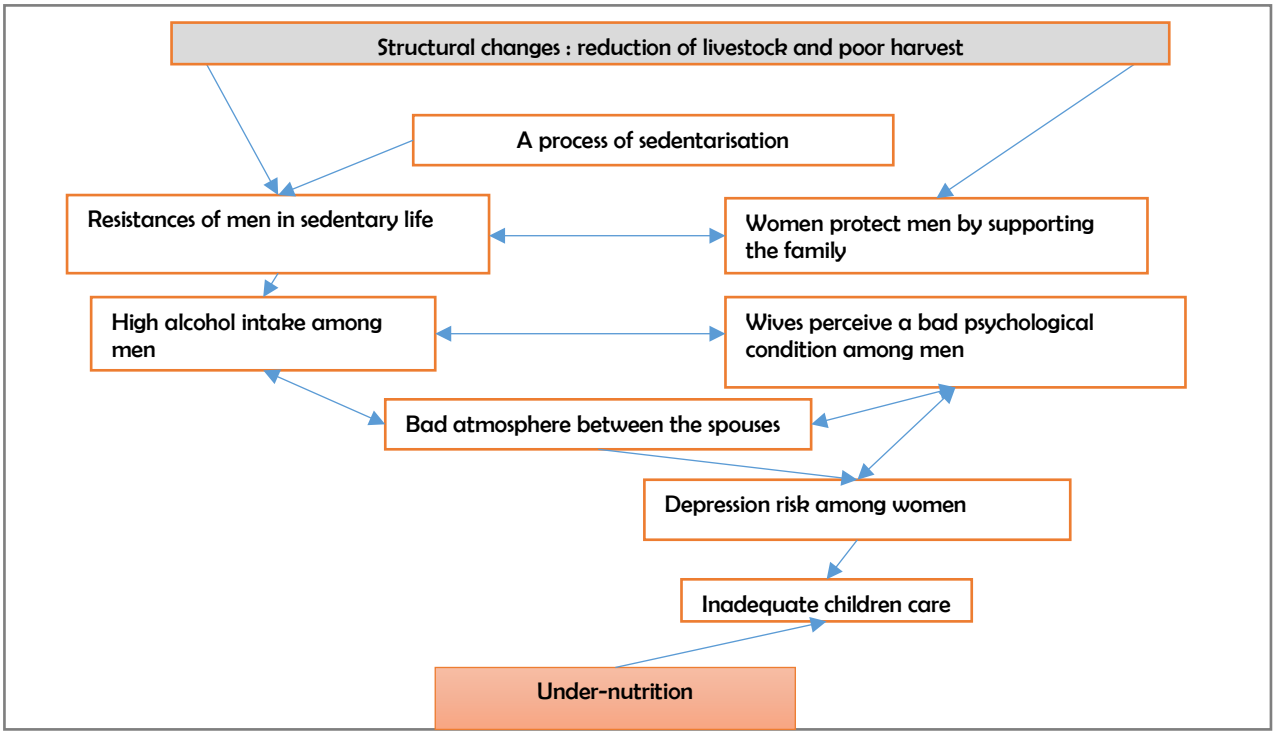
For several years in the district, women's resilience is tested by recurrent shocks (crop failure, livestock loss). We have seen this throughout the analysis of hypotheses on the "well-being of women". In other words, women have worn year after year their resilience to face these changes.

First, they cannot take care of the children as much as they would like, and year after year, they see the well-being of children in the community deteriorate. Secondly, as they protect the men from the deterioration of their chief pastoralist status, leaving them doing nothing, while becoming themselves almost the single breadwinners of their families, conditions are not up to their expectations. They do not have the feeling of being understood by their husbands who tend to show less respect for the rules of traditional marriage (see Hypothesis 14) and at the same time do not offer help by coming with them to the mining town to ensure the subsistence of the family (H.10).

Chart 13. H27. Mental Health, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data RFS, March, 2016 Serious risk depression: 12% MDI Secondary Data: N/A Literature review: see Maternal well-being (H 12)	One cause of under nutrition in 1 village (Highland) FGW: deterioration of children's health status year after year.	Seasonality: Historical trends: Changes: uncertainty, resilience deterioration
Data Triangulation: plausible with source of data and the qualitative survey and literature review H 27 hypothesis confirmed		Consistency: by changes H27 hypothesis validated

Figure 14: H30- Causal Pathway: Important- Mental Health



h) H8. Mothers not supported especially when women are heads of households

Since the hypothesis 8 was not restricted to women heads of households, one initial hypothesis has looked at the issue of support for all women. The prevalence of women who gave negative scores on support (not very much, and not all) is 65% (RFS March 2016).

Who supports mothers in their daily activities? And why so many women are in this situation in Moroto District? The results of the qualitative survey show that there are several factors that explain this feeling

of loneliness. An initial feeling of loneliness is related to the difficulties of current changes (shocks and stress), and a second, harder to live with, hurt the dignity of mothers, and also exposed them to chronic nutritional insecurity because of the loss of their husband.

Severity of current changes: In the qualitative study, older women said that the main figure of their social status holder was their husband. But most often, the majority of them were disappointed at the negative attitude of their husbands, who left them deal alone with all necessary tasks. Among the youngest mothers, another configuration appears, it is important because it concerns the negotiation of the dowry of young brides. For these young mothers, support is still meant to come from the mother of the young mother. For example, by taking care of the children, the grandmother will allow the girl to go and work at the bush all day. This practice is less common in the city. In poor neighborhoods, it seems that parents are more eager to marry their daughter, and are often willing to discount a final dot. In all cases, the status of mother is necessarily associated with the status of wife. Women cannot be single mothers, at least when they have their first child. The husband becomes the central support of the wife with the exception of young wives who receive support from their own mother.

Departure or death of the husband: Sometimes wives are left alone, for example, because of the death or the permanent abandonment by their husband. This type of marital holder completely changes the degree of security enjoyed by women and their children. In the RFS survey, the prevalence of female heads of household is slightly lower (21%) than that obtained by the FSNA survey (31%). But even more important is to see how this status can have a negative impact on child malnutrition. In the FSNA investigation, the authors give special attention to the situation of women heads of households, particularly in the food security sector. One fact appears recurrent since 2012; women-headed households are more likely than other households to experience food insecurity.

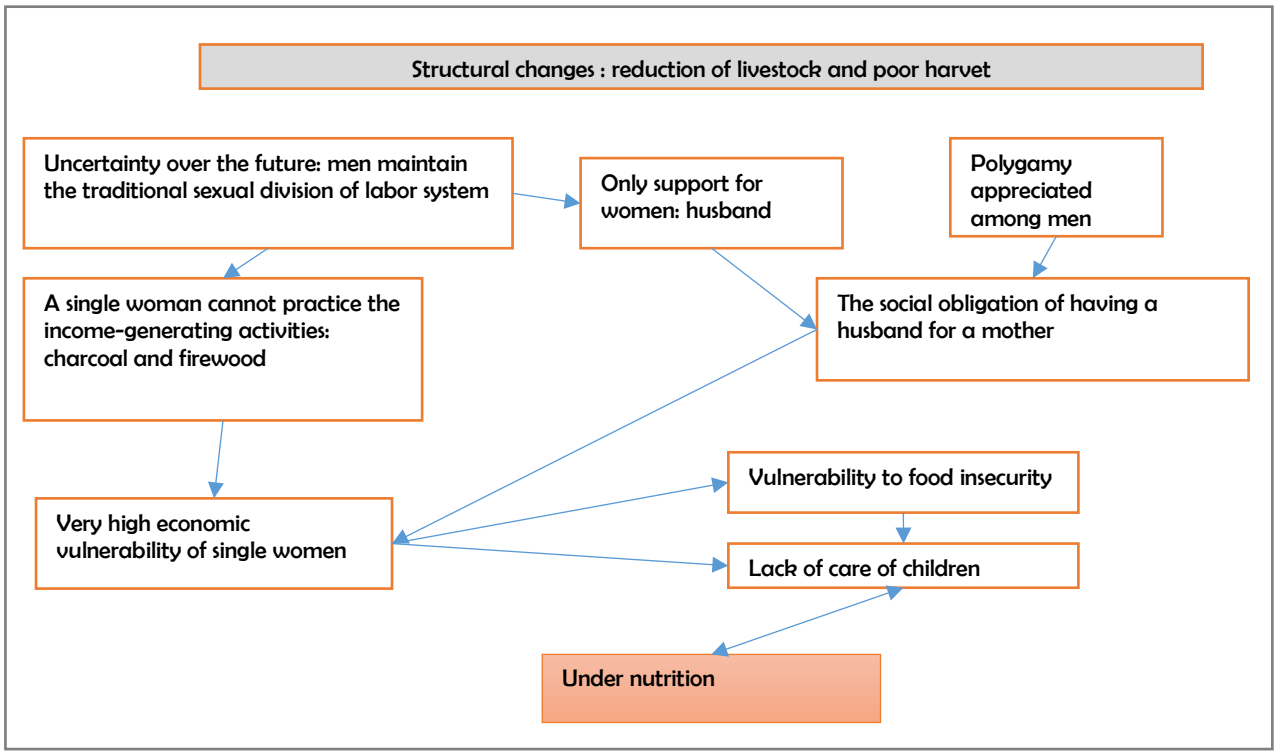
In Moroto District, according to established social rules, it is not acceptable to be a single woman, especially when you are of childbearing age.

In support of the survey data, a fairly strong result of the qualitative survey on four life stories of mothers having experienced an episode of severe malnutrition with one of their children shows that the trigger that leads to malnutrition is the loss of the husband. The loss of the marital holder completely destabilizes the lives of mothers and children, left to themselves, and not helped by the community. That is when they finally decide to go to health centers, where they can find support.

Chart14. H8. Mothers not supported especially when women are heads of households, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary data RFS, March, 2016 Female Head Household: 21.19% Perceived social support 65% of women : not very much, not at all Secondary Data: Female Head of households: 31.1% High vulnerability on food security FSNA: Dec. 2015 On Social support See FSNA, 2012 (H9) Literature review: *Findings were generally positive and revealed that maternal social capital, as it was defined in these studies, can have a positive impact on child health outcomes.* NCA Pathway	FGW: Older mothers: only the husband Younger mothers: support of the mother (grandmother) Narrative of life story Link with mothers with SAM children	Seasonality: dry season Historical trends: Changes: female Head of household and food insecurity
Data Triangulation: plausible with source of data and the qualitative survey and literature review H8. Hypothesis confirmed		Consistency: by seasonality, by changes H8 hypothesis validated

Figure 15: H8 – Causal Pathway: Important- Mothers not supported, especially when women headed households.



i) H10. High workload for mothers

At the first workshop, this hypothesis has been ranked as one of the three major causes of child malnutrition in Moroto District.

As can be seen with the NCA pathway, working women can also have a positive impact on the nutritional status of children. But in Moroto District, the impact would be rather negative. In fact, 44% of women estimated that they had too much work. From the qualitative survey, there are findings to indicate that women had indeed multiple occupations, particularly during the dry season. The FSNA report (2012) shows that women have little leisure time, and have many hours of work compared to men.

Also, it seems that what creates a real challenge for rural women is that they had to leave their children and their homes to go to the bush, and to the city. In fact, they are often absent all day. Under these conditions "*Working women with proficient substitute caregivers demonstrated the benefits of a larger income effect, over time a negative effect. However, when preteens were substitute caregivers, child nutrition was compromised* "(NCA Pathway). In the RFS survey, the indicator on this subject shows that this is the case. Mothers leave their children every day with 27.5% of children aged between 0 and 23 months and 43% of children between 24 and 59 months being left to the care of children aged under 12.

As we have already pointed out, mothers do not consider that women work, they say they are providing support to men in order to have an income to feed the family. This perception of their contribution is in line with their traditional role as wives. In recent years, due to poor harvests, they are the longest in months and days over a year.

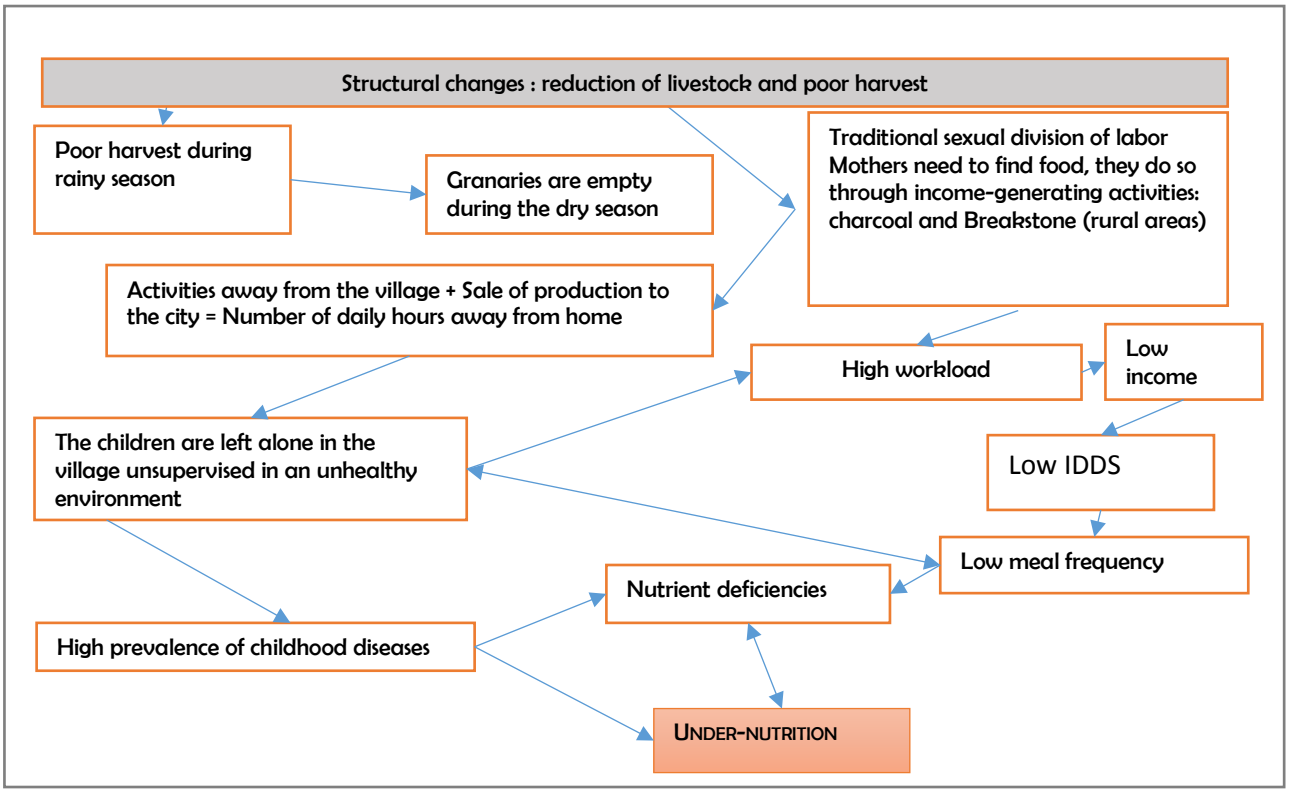
In two villages (qualitative survey), mothers have selected this risk factor as a cause of child malnutrition. This is the first village in the mountains, and another located in a fairly remote lowland city of Moroto. The remote location of these two villages crucially limits access to the workplace for the mothers, i.e. to the mine for breaking stones, as well as the bush, the city and the village of the plain.

Among urban women, there is a more positive view about the work they want to do in the labor market. This is a genuine motivation to work and even to develop a small scale business. To this they add that the best action to reduce malnutrition is to give women of their neighborhood access to financial capital to start businesses.

Chart 15. H10. High workload for mothers, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary Data RFS, March, 2016 Perceived workload: 44.6 % of women Leave alone or in the care of other children younger than 12 years Every day 24-59 months: 43% 0-23 months: 27.5% Secondary Data FSNA: 2012 (Dec) Number of hours/Per day: 4.0 non agricultural work (see H8) Literature review: *"International evidence, but most is contextual (i.e. agricultural rural labour vs. urban labour in different countries)"* NCA Pathway	2 villages: major cause of under nutrition Rural areas Distancing their place of work (bush) Long distance to go to work In town: Positive view of work with a will to integrate into the corporate market.	Seasonality: Dry season Historical trends: poor harvest Changes: Prolonged instability of food insecurity.
Data Triangulation: plausible with source of data and the qualitative survey and literature review H10 hypothesis confirmed		Consistency: by changes H10 hypothesis validated

Figure 16: H10- Causal Pathway: Major- High workload for mothers



j) H13. Early child bearing (teenagers pregnancies)

Here we focus on young adolescents in order to better understand their situation and how they could ensure the well-being of children given their young age.

We know that in 2011, the prevalence of women who had their first child before the age of 19 in the Karamoja region is 29.7%, while in 2016, in Moroto District, the prevalence is 36% for women under 18 years. During roughly six years, there seems to be a constant prevalence in the district, with about one third of the girls who become mothers between 15 and 18. Moreover, in the UNICEF strategy, Karamoja is part of a geographical target to reduce early marriages and pregnancies. Compared to the national average which is currently 15%, Karamoja stands at a double percentage (30%).

In the context of the qualitative survey, we met in the four villages young girls (a group having at least one child, a group with no children) from the age group 15-19 years. In terms of their general background, girls with no children are waiting to start a family. When they were younger, they were the caretakers of their siblings and participated in household chores. In fact, they do not have other projects than starting a family.

In rural areas, they are called upon to work in the bush and at the mine. For the youngest group, those aged 15 and 16 years, do not want to engage immediately in married life, (even in a year or two) and respecting the choice of husband that their parents will make in the future. What they expect is to have a husband of their age. They do not want an old husband. Girls, who have children, say that they have chosen their husband, sometimes without the formal agreement of the parents. Many live with their parents until the husband completes his dowry. They say they are protected by their parents who come to accept their union. In urban areas, most of the young girls who have no children help their mothers with housework while the rest go to school.

In our meeting with community leaders (VHT, LCL1, TBA), we asked whether early marriage has an impact on child malnutrition. In rural areas, over three villages, two community leaders have rejected this hypothesis. According to them, the girls have good physical strength (more than breast milk) and they learned very young to care for their brothers and sisters. We asked girls with children the same question. They said that with the support of their mother and the health center, they felt able to take care of their children. They strongly emphasized the importance of the health facility and they go regularly there for them and for their children. Besides both girls with and without children believe that the best guarantee to protect children from malnutrition is to go immediately to the health center when the child is sick. One can see a form of implicit criticism leveled towards the mothers of their villages who wait too long before going to the health center when children are sick.

In the rural areas where community leaders were more likely to state that children of an early marriage were more vulnerable, their crucial point was about the generational change that was taking place in the village where in their view teenage girls were less obedient to the traditional rules on the choice of husband. In talking with young girls, we could understand that they wanted a husband of their choice,

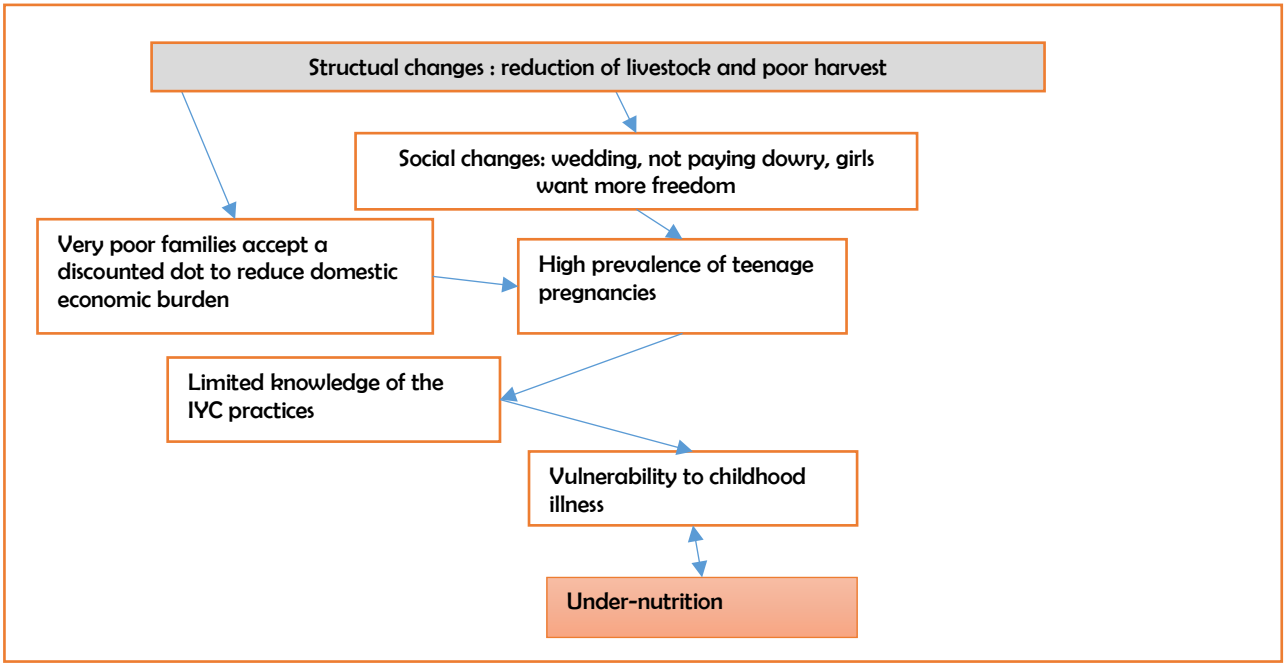
rather than imposed by parents. So, when they had children with a man of their choice, their parents, albeit unhappy with this choice, welcomed the new couple in their home.

However, we got the opposite result in urban areas. Community leaders perceived a higher prevalence of malnutrition of children with young mothers. In the group discussion among the ten girls who had children before the age of 18, 4 of them reported having had problems of malnutrition with their children. The phenomenon of rapid urbanization in poor neighborhoods seems to lead to a prevalence of child malnutrition via early motherhood. Parents do not have the financial means to keep the new couple and their children, as it can be done in rural areas. The cost of urban housing appears to be the explanatory factor for this difference in behavior. In town, households must pay a monthly amount as opposed to rural households where they do not have to face this constraint since they build their own home. However it is important to keep in mind that it is the women who build and maintain homes in rural areas.

Chart16. H13. Early child bearing (teenagers pregnancies), triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary Data RFS, March, 2016 Early first pregnancy (<18): 36.15% Secondary Data Early child Bearing: 2011 DHS, Karamoja Median age: 19.2 years Teenagers: Karamoja DHS 2011: 15-19: 29.7% (with a child or pregnant) UNICEF: 30% (Karamoja) Literature review: UNICEF 2015	FGW with teenagers with children In town: Cases of under nutrition of children In rural areas: hospitality of the husband in his wife's family FGW with teenagers without children In two villages, only one project having children while respecting the parents' choice In one village, only one project: to have children with a man they have chosen Community leaders: rural areas 2/3 rejected this hypothesis Community leaders: in town Perception of under nutrition of children with young mothers (teenagers)	Seasonality: Historical trends: Changes: social changes
Data Triangulation: plausible with source of data and the qualitative survey and literature review H13 hypothesis confirmed		Consistency: by changes H13 hypothesis validated

Figure 17: H13 Causal Pathway: Major- Early child bearing, high prevalence of teenage pregnancies



k) H11. Lack of caregiver's empowerment

As noted in the UDHS (2011), in Uganda "the results of the survey" (empowerment), "*reveal that tradition is likely to play a bigger share in asset ownership than the socioeconomic status of the women*". Based on this observation, this risk factor hypothesis selected in a region such as Karamoja, had to be tested taking into account the cultural tradition which also still has an important influence in the organization of power relations and the modes of sharing within households.

Specific indicators of maternal decision-making power in the RFS investigation mostly show positive results. Mothers (75%) have decision-making power with regard to the education of children, and more power (92%) for their medical consultations. With regard to decision-making power on income and savings, the FSNA survey (2012) and the RFS (2016) essentially get the same prevalence (see table above). Mothers thus appear to hold some control and decision-making power in the household.

The qualitative survey improved our understanding of how control and power of decision in the households of the district are organized. Firstly, it should be reminded that families operate in a context where almost 50% of households are polygamous. Men, therefore, are in a dominant position regarding the needs of women and children. Secondly, previous analyses show that currently, certain cultural components attached to the institution of marriage are changing, young girls do not want to marry older men, men who no longer have sufficient capital (livestock, or revenue) take a wife go through another path which is that the spread out of dowry to marry. They are also very resistant to the idea of not being in a polygamous family pattern although the nuclear family seems to be the new model preferred by men and women with more education.

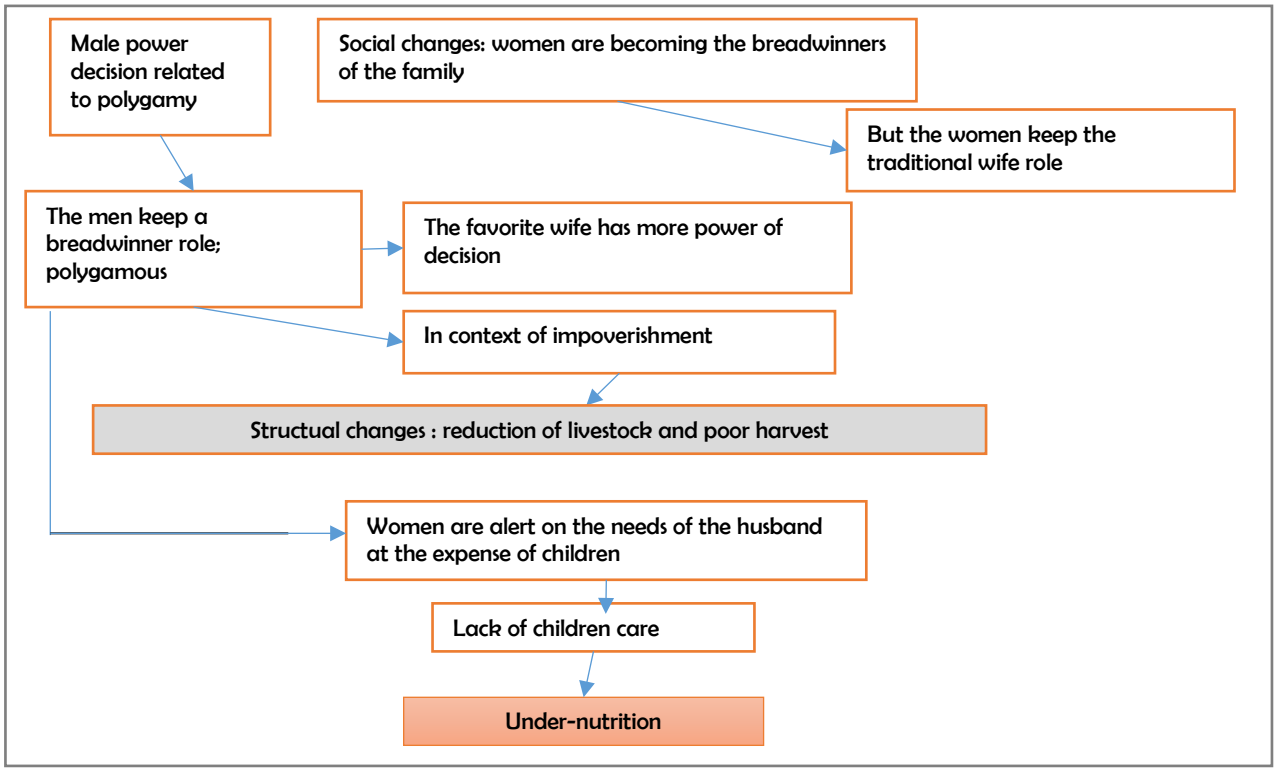
We also saw that the recurrence of domestic violence can be largely explained by the husband's alcohol abuse and sometimes that of the wives of the household too. Those women's complaints against their husbands were on the preferring one wife over another. Women wanted more respect from their husbands and at least an effort to reduce the interval between births. To the contrary, men were strongly affected by the loss of their livestock, and were struggling to adopt, at least among rural men, a more modern lifestyle, leading them to more sedentary lives.

The traditional dynamic of power relations as well as the sharing of decisions between spouses is being entirely restructured. It is doubtful that women have the power to make full and complete decisions. However, of the new economic sphere (income, savings) appears more favorable to women.

Chart17. H11. Lack of caregiver empowerment, triangulation and consistency analysis

Source of data	Qualitative survey	Consistency
Primary Data RFS, March, 2016 Perceived caregiver's empowerment No decision power: children should go to school: 25,00% No decision power: child has to consult medical services: 7,09% No decision power: spend the household's money: 24,79% Secondary Data: DHS 2011, Karamoja Cash earning: 68.6 % women (mainly wife) FSNA: Dec 2012 No control on saving: 18.9% No control on income: 29.6% Literature review: Bibliography	FGW: Paradox of the transition to a more sedentary life New role of women: breadwinner during the dry season Traditional role of women: no decision power, protection of traditional power of men. FGM: resistance of men to enter a monetary economy, conditions of modern life; traditional culture in opposition, so as to maintain male power.	Seasonality: Historical trends: Changes: sedentary lifestyle, and traditional culture undermined by the market economy
Data Triangulation: plausible with source of data and the qualitative survey and literature review H13 hypothesis confirmed		Consistency: by changes H13 hypothesis validated

Figure 18: H11- Causal Pathway: Important- Lack of caregiver's empowerment



5. HEALTH

The third sector under consideration relates to health. It has its importance because « *The causality chain between disease and under nutrition has been thoroughly studied and it is broadly accepted that diseases can affect children's intestinal absorption capacity and appetite, therefore decreasing the nutrient intake and absorption and possibly leading to under nutrition. Inversely, under nutrition, whether it is micronutrient deficiencies or protein-energy deficiency has a strong negative impact on immunity. An undernourished child is much more at risk of getting a disease, and of not being able to recover. This is called the vicious cycle of under nutrition: under nutrition favors disease and disease favors under nutrition, which means that once a child is caught up in the spiral, he needs good health care to get out of it in a durable way"* (NCA Guidelines, 2015).

According to the NCA methodological framework, two specific risk factors are under investigation: the children's health (0-59 months) and access and use of health services (for children and mothers). On these two specific risk factors, we have a secondary data source relatively well documented by the ACF and FSNA investigations from 2009 through 2015. We will attach particular attention to the evolution of prevalence rates of indicators on children's health (diarrhea, acute respiratory infections and fever).

Also, regarding access and use of health services, we will provide a contextual analysis using data collected by the RFS survey (2016), supported by the qualitative survey and focusing on 5 hypotheses relating to the health sector. Note that the meetings with the mothers particularly aimed to address access to health care and barriers that limit their visits to the health center when children are sick.

5.1 Description of health context

If one refers to Table 24, 10 indicators (core and optional) describe the health context of Moroto District. In the foreground of the specific risk factor that is the children's health status, the prevalence of diarrhea[28] and acute respiratory infections[29] is different if we distinguish between children most affected by these diseases by age group, i.e. 0 to 23 months (Diarrhea: 49.2%, ARI: 70.6%) were compared with children aged between 24 and 59 months (Diarrhea: 26.9%, ARI: 54.8%). Overall, prevalence rates are significant because half of the district's children are obviously in a weak state of health if we take into account these three childhood diseases.
The protection against malaria with the indicator (observation) on exposure to mosquitoes shows that the majority (61%) of children are not protected overnight by a mosquito net[30]. Paradoxically according to DPT3[31] indicator (immunization) indicates that the district's children are fairly well protected (90%) and therefore they would have access to care. It appears that how vaccination programs are deployed in the district should be taken into consideration. According to health workers whom we encountered at local health centers, vaccination campaigns deployed in the district involves the health workers coming to the villages and immunizing all children.

For women, the use or access is more unpredictable. They are irregular for their prenatal visits[32], but they are likely to give birth at the health center (67.6%)[33]. In the focus group, the mothers said that they preferred to give birth at the health center. They were aware that many delivery services are offered (food and hygiene kit) for mothers there, which made birth at the health center much more attractive. It seems that this approach has significantly raised the prevalence of mothers delivering at the health center, (DHS, 2011, Karamoja, 27.1%).

"A long distance to the health center, in addition with a great workload that doesn't allow much extra time, and low resources to pay for transportation are an obvious limitation to the access of the health center. The Nutrition and health technical experts within ACF cited this indicator as a proxy access to health services"[34]. In Moroto district, the distance to get to the Health Centre is less than 60 minutes for

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28- Diarrhea is often interpreted as a proxy for an unhealthy environment (poor sanitation, water quality or hygiene). Most cases of endemic diarrhea are transmitted between individuals due to a lack of hygiene (Cairncross *et al.*, 2003). Usually in the countries where ACF works, the cut-off of 20% diarrhea proportion in the past 14 days is used to consider whether there is a major water-related diseases issue or not.

29 -This indicator was selected because it is a commonly used indicator in public health, with a good representativeness of the under-5 children's health status.

30-These mosquitoes are only active at night, so sleeping under an insecticide-treated mosquito net (ITN) is a very effective measure. For this reason, we are looking at whether the child is sleeping under an ITN or not, which is better assessed through observation of a net above the child's bed rather than recorded on parents' statement.

31- DPT3 immunization is a proxy for health services access and utilization.

32- Ante-natal care is an important time for mothers to learn about care for children and health aspects. It is also informative on access to health services. NCA Guidelines 2015.

33- As stated for the previous indicator, whether the woman received assistance during delivery is an important factor for her health and health status of the new-born. Indeed, between 1990 and 2008 the reduction in mother mortality ratio in the world has been attributed to the increase of the proportion of deliveries attended by skilled health professionals (Zere *et al.*, 2011).

34- NCA Guidelines, 2015.

almost 60% of women. Distance also proves to be a barrier that has a relatively low impact on accessing the health center. Only 15% of mothers have noted that difficulty in the RFS household survey.

Health services can be available but not used. In order to identify the reasons why they are not used it is important to ask directly the people what are the constraints or barriers preventing them to use the services. Distance and cost can be the most common reasons, but they should be confirmed. In the district, the two barriers with the highest incidence in mothers with access to care relate to the cost, and transport facilities. As regards transport facilities, mothers explained that the high costs of an ambulance or a *boda boda* (motorcycle) when the child is too sick, and the time takes to arrive while the child needs immediate treatment. We will see that in as much as costs are concerned, they are perceived to be high, but in the light of discussions with mothers, the problem is more the indirect costs of the consultation. The presence of a traditional healer in all villages of the district is an additional factor that helps reduce the use of health services when mothers feel that they do not have the time or money to get to the health center.

Table18. RFS-NCA: Health, Moroto District, Uganda, March 2016

Population	Indicator	95% CL		
HEALTH				
	Value	Lower	Upper	Sample, NCA
Children health status				
Acute respiratory infections				813
24-59 months	54,80%	50,17%	59,35%	257 (469)
0-23 months	70,64%	65,47%	75,34%	243 (344)
Diarrhea in the past 14 days				821
24-59 months	26,91%	23,00%	31,19%	127 (472)
0-23 months	49,28%	43,93%	54,65%	172 (349)
Fever in the past 14 days				816
24-59 months	51,18%	46,55%	55,79%	239 (467)
0-23 months	57,88%	52,50%	63,09%	202 (349)
Utilization of Bed net (0-59 months)				781
Exposure to Mosquito	61%	55,26%	65,57%	438
Access to health service for children				
DPT3 Immunization				184
12-23 months	90,05%	84,90%	93,90%	172
Access to health service Women				
ANC				
Have Antenatal care	96,19%	94,20%	97,54%	556 (578)
With Health worker	97,01%	95,15%	98,19%	551 (568)
ANC: Caregivers who saw a health professional 4 times	49,48%	45,35%	53,62%	288 (556)
Less than 4 times	23,02%	19,71%	26,70%	134

More than 4 times	21,99%	18,74%	25,63%	128
Last delivery at hospital or Health center	67,61%	63,56%	71,41%	384 (568)
Delivery at home	27,64%	24,04%	31,55%	157 (568)
Distance to Health center				578
60 minutes	59,69%			345
Main barriers to the Health center				561
Money costs	44,92%	40,76%	49,15%	252
Transportation	36,90%	32,92%	41,06%	207
Distance	15,51%	12,67%	18,83%	87
Service is not good enough	5,70%	3,99%	8,04%	32
Decision power	2,32%	1,29%	4,03%	13
Culture	1,60%	0,78%	3,14%	9

5.2 Hypotheses from the initial workshop

The 5 hypotheses selected in the initial workshop almost entirely cover the specific risk factors in the health sector. On children's health status: the first hypothesis covers the two major infectious diseases (diarrhea and acute respiratory infections), the second covers fever (malaria) and the third covers prevention through the mosquito net. Regarding access and use of services, the third hypothesis puts into perspective the impact of low utilization of antenatal, delivery and postnatal services for mothers. The last two hypotheses, which concern accessibility issues can be measured by the distance (in fact, the time) to get there, and the factors retention rate limiting attendance (barriers to health services, the prices of transport with regard to income).

All these hypotheses have been enacted as "significant". However, the hypothesis on children's health (diarrhea and acute respiratory infections) is on this list one of the first three most significant hypotheses (S1-S3) of the 16 levels in decreasing order.

a) H15: Poor health status of children (ARI and Diarrhea)

Between 2009 and 2016, the trend of the evolution of prevalence of respiratory infectious diseases and diarrhea showed a decline, compared to the high prevalence of the years 2011 and 2012. It seems that the current prevalence of diarrhea recorded (38.5%) in March 2016 (children, 0-59 months) is in the same percentage range with that of the years 2009 and 2010. The lowest rate (18%) was recorded in December 2015, and the highest rate (58.5%) in May 2011.

For the acute respiratory infections, we note that the prevalence strongly between 76.2% in September 2011 and 18% in December 2015. Three months later, in March 2016, the prevalence was 62.6% (children 0-59 months), a prevalence almost similar to that observed in 2011. However, there is a high prevalence in the age group 0-23 months (70.2%) while the prevalence for the group aged 24-59 months is much lower (54.8%).

In focus groups, mothers did not select these two risk factors as a cause of malnutrition. However, during the special session on children's health, they explained that the good or the bad state of health is associated with the age of the child. On this specific point the mothers of the city and mothers in rural areas strongly differ. The mothers of the town, who live near the hospital, said that they often use

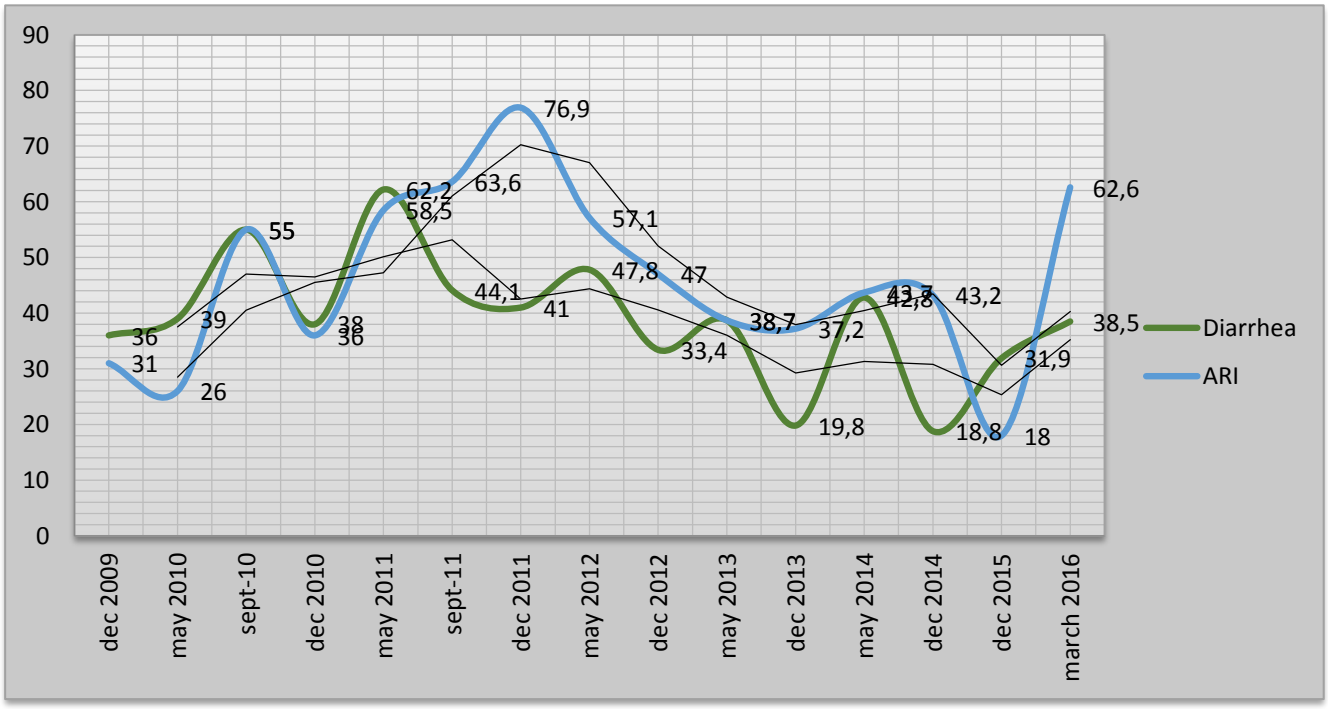
health services and added that the hospital is a source of significant support for them and their children aged 0-12 months.

Mothers in rural areas report that 0-23months children with diseases are common but they go irregularly to the health center compared with mothers in the city.

It is useful to emphasize here that childhood diseases (excluding malaria) is the private domain of the traditional healers in rural communities. In role-play, women have shown what these traditional practitioners do In general, they try to remove from the child's body what is called the "black eye" with smoke and herbs, or else they recommend parents sacrifice a goat for the child to free themselves from the evil spell. At first sight these techniques appear rather harmless. But the traditional second stage of consultation, that is to say when the traditional healer becomes a "healer". This is where everything changes.

We were unfortunately unable to meet any of these traditional healers but through the TBA we could understand why rural mothers are going back and forth between the health center and consultations with traditional healers. Traditional healers have knowledge of plants and use it for all diseases of children and adults. According to the TBA, they have managed to gain the trust of mothers. According to a TBA testimony "*the use of potions is more effective than some drugs in health centers, such as RUTF, we have tried in our village and it is true* ". In other words, if the child has diarrhea or a respiratory infection, mothers remain convinced that there are two solutions, if one does not work, they go towards the other.

Figure 19: Evolution of prevalence of Diarrhea and ARI, 2009-2016, Moroto, Karamoja, Children 0-59 months



Notes: Data from surveys ACF: children aged 0-59 months, 2009-2012 (May); FSNA (Dec. 2012-Dec 2013: children 6-59 months); 2014, 2015 children aged 0-59 months)

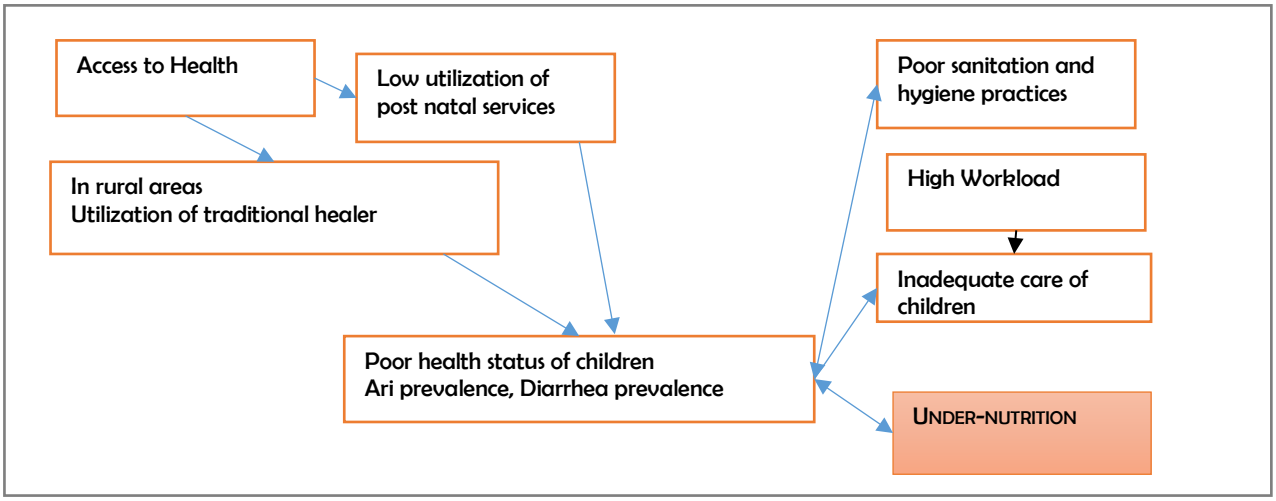
However, this does not fully explain why children are affected by these diseases and the impact thereof on child malnutrition given that "The burden of common childhood Illnesses correlates well with prevalence of GAM in Moroto District "(FSNA, June 2014).

On this point, an interesting fact emerged a statement in every focus group of women in all villages. They do not know why children have a disease[35], especially anything that refers to causes of diarrhea and coughs.

Chart18. H15: Poor health status of children (ARI and diarrhea), triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 ARI 0-23 months: 70.6% 24-59 months: 54.8% Diarrhea 0-23 months: 48.2% 24-59 months: 26.9% Secondary Data: 0-59 months FSNA: ARI 52.4% (Dec.2015) FSNA: Diarrhea: 39.5% (Dec. 2015) Literature review: NCA Pathway	Vulnerable groups: 0-23 months Traditional healer: very important FGW: Switch between the health center and visit to the traditional healer. Deficiencies on the causes of childhood illness	Seasonality: Historical trends: see figure 4 Changes: new support for mothers: Moroto Hospital
Data Triangulation: plausible with source of data and the qualitative survey and literature review H15 hypothesis confirmed		Consistency: by historical trends and changes H15 hypothesis validated

Figure 20: H15 Causal Pathway: Major- Poor health status of children under 5 (Ari prevalence, Diarrhea prevalence)



35-SLEAC 2015, Karamoja: "*Inadequate knowledge on common childhood illnesses by the community*". For further details, it would be useful to consult the SLEAC report, May 2016 which provides more information on this matter.

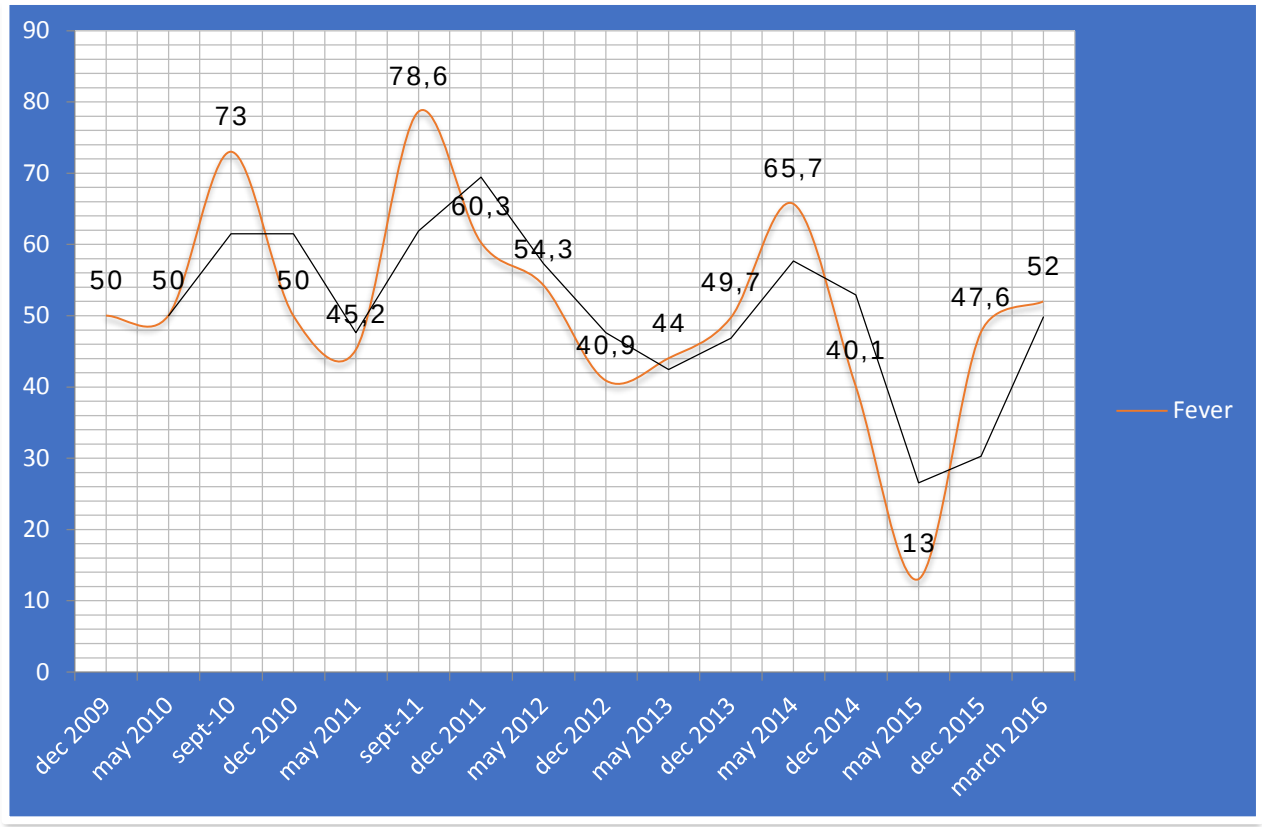
b) H16: High prevalence of fever (malaria)

If one follows the evolution of the prevalence of malaria, there is prevalence varies in a range between 60 and 50%, except that observed in May 2015 (see figure below). In fact, since 2009, almost half of children are affected by the disease. The season is conducive to a high prevalence appears to focus on the month of September (2009-2012), the prevalence thus appearing higher in this period. According to RFS investigation, when comparing age groups, it does not appear to be significant differences between child prevalence aged between 0 and 23 months, and that of children aged between 24 and 59 months. In all districts of Karamoja (46.2% Dec. 2015), it is malaria that appears at the top of prevalence of child diseases. However in Moroto District, it ranks second, after acute respiratory infections, and its prevalence remains higher (47.6%) than the average of Karamoja (FSNA).

Referring to the analysis of the survey FSNA, malaria, unlike diarrhea and acute respiratory infections is associated with chronic malnutrition.

In focus groups, mothers say that fever is a fairly common disease in children. Unlike diseases such as diarrhea and respiratory infections, they are more attentive to the advice of VHT and health center workers to reduce fever in children. Besides, for this affliction, they say that traditional healers have no token, and they are addressed to VHT (Health Volunteer Team) from their villages.

Figure21: Evolution of Fever Prevalence, 2009-2016, Children 0-59 months, Moroto, Karamoja



Notes: ACF (2009-2012 May) - FSNA 2012 (Dec)-21015, RFS NCA 2016.

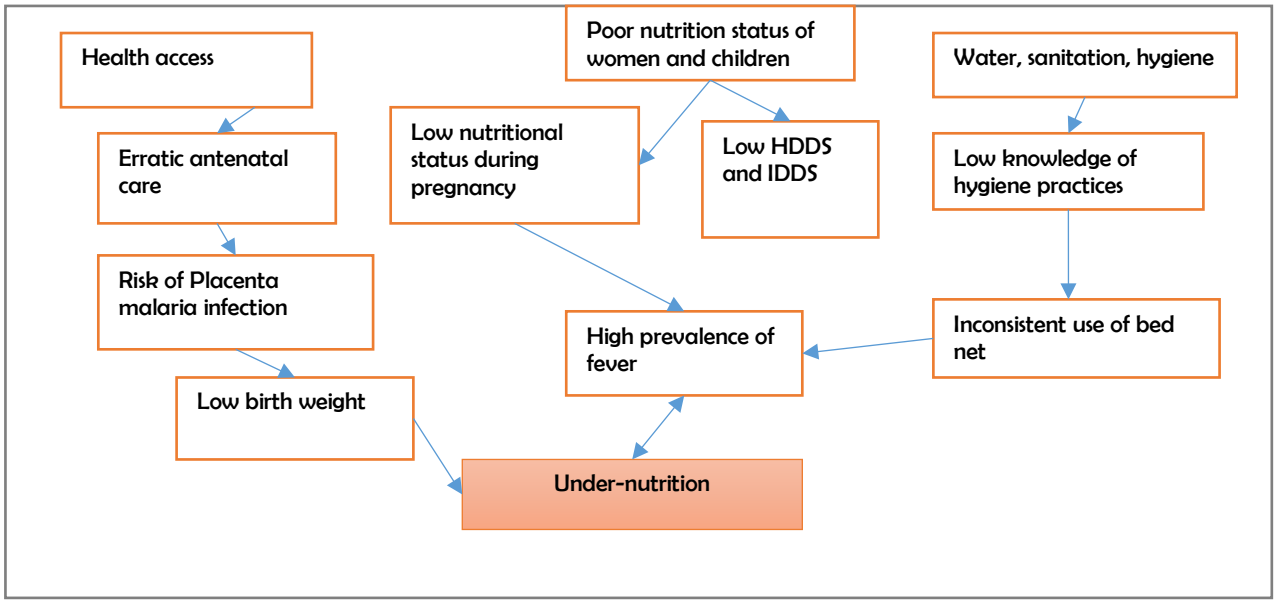
A few words about the role of VHTs in villages: the majority of them (both male and female) are very well accepted in the community. In recent years, local health centers attempt to increase their

professional skills through volunteer training sessions to better track the health condition of both children and mothers. In the villages we visited, all VHT members participated in the focus group. They also act as community leaders and local representatives of NGOs.

Chart 19. H16. High prevalence of fever (malaria), triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 0-23 months: 51% 24-59 months: 57.8% Secondary Data: FSNA Fever: 0-59 months 47.6% Moroto, Dec. 2015 46.2% Karamoja, Dec.2015 Literature review: NCA Pathway	See H15. FGW: they place their trust in the VHT for the treatment of fever. VHT: fever is cause of under nutrition in villages.	Seasonality: August-September Historical trends: see figure5 Changes: VHT's role in villages
Data Triangulation: plausible with source of data and the qualitative survey and literature review H16 hypothesis confirmed		Consistency: by seasonality, historical trends and changes H16 hypothesis validated

Figure 22: H16 Causal Pathway: Major-High prevalence of Fever/malaria children 0-59 months



c) H17. Low utilization of bed net

As shown on Figure 6, children are protected from nearly cyclically overnight in Moroto District. According to ACF reports (2009-2012), the prevalence of children covered depends largely on net distribution. However, a paradoxical remark is made by the authors of the FSNA survey in 2015. After four years of investigation they conclude that "*while fever was reported to be high, use of bed net for children was high*", which does not stop the authors from identifying this factor as being significantly associated with chronic malnutrition[36].

What is shown on Figure 6 is that the use of bed nets decreases from quarter to quarter after the time of the acquisition of the bed net, i.e. when all households are in possession of a mosquito net. This phenomenon is common ground between the years 2009 and 2015. In December 2015, 61.7% of children slept under a mosquito net. In March 2016, the prevalence declined to 39%. It seems therefore quite plausible that the habit of using a mosquito net is not ingrained in the living habits of households.

In the villages of the qualitative survey, mothers were discreet about it. They had no permanent regard for this practice. They say that they rather use the bed net in the rainy season, and very little in the dry season. The heat of the dry season repels them and they often use the bed net for other things.

In a village, mothers were asked to transmit the request of mosquito nets to the authorities of the DHO, because they had no more nets, and with the arrival of rains there were more mosquitoes. This allows us to think that they know the benefits of the net, but they resist incorporating its use into their habits and standard practices. So they may tend to use it during the rainy season, but we have no information about the prevalence during the period from May to October since the FSNA investigations are made early in the rainy season (May) and then in the middle of the dry season (June).

36- FNSA: There were a number of factors that were found to be significantly associated with wasting. Children were more likely to be wasted if they did not use Insecticide Treated Nets (ITNs) or bed nets (June 2014).

Figure 22: Evolution of utilization of bed net in Moroto district, 2009-2016,

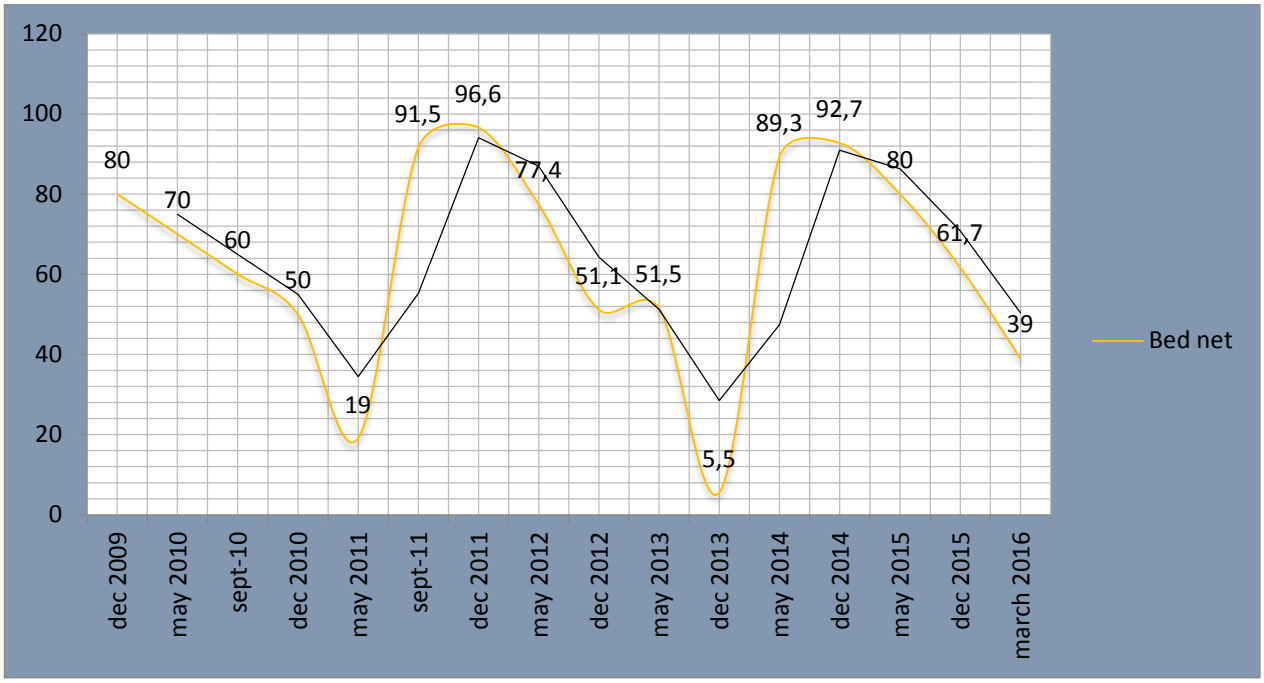
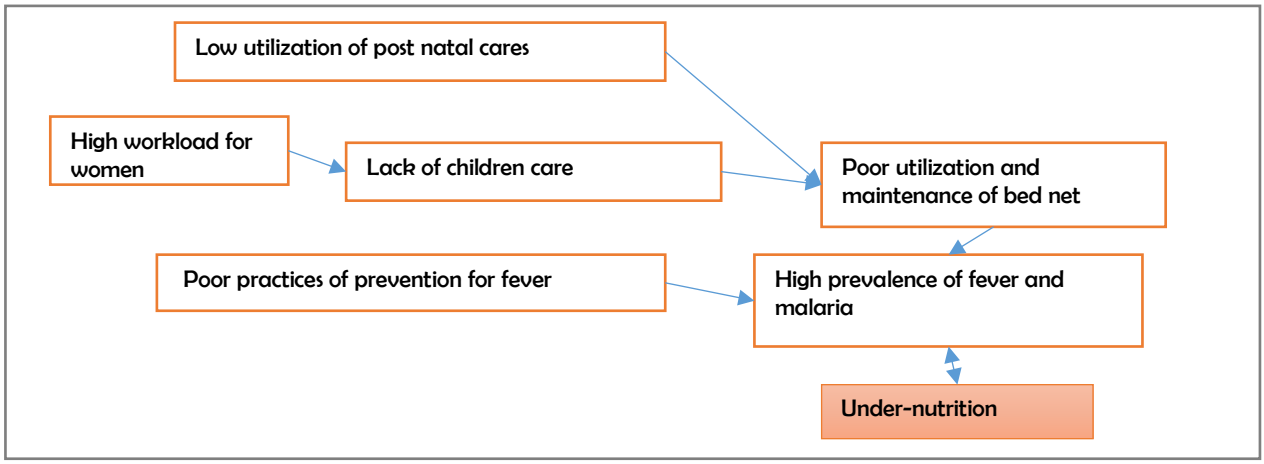


Chart 20. H17. Low utilization of bed net, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Children 0-59 months Exposure to mosquitoes: 61% Secondary Data: FSNA: Children 0-59 months, Dec. 2015 Exposure to mosquitoes: 38.2% Link with stunting (June 2014) Literature review: Randomized control trial of introduction of insecticide treated bed nets in coastal Kenya. Treatment group (received bed nets) included 787 infants and control group included 692; both groups were between the ages of 1-11 months. Intervention followed a repeated cross section design (3 measurements) over a one-year period. Difference between weight-for-age z-scores was significant during the two main malaria transmission surveys in August (difference = 0.46 SD [CI = 0.23,0.70] P = 0.003) and January (difference =0.34 SD [CI = 0.12, 0.56] P<0.001). NCA Pathway Module (p.114)	No difference between the behavior of urban and rural mothers FGW: Yes during the rainy season Not during the dry season Other uses for the net With knowledge of the benefits, but little incentive to integrate into the lifestyle.	Seasonality: rainy season , Historical trends: see figure 6 Changes:
Data Triangulation: plausible with source of data and the qualitative survey and literature review H17 hypothesis confirmed		Consistency: by seasonality, and by historical trends H17 hypothesis validated

Figure 23: H17- Causal Pathway: Important - Poor utilization and maintenance of bed net.



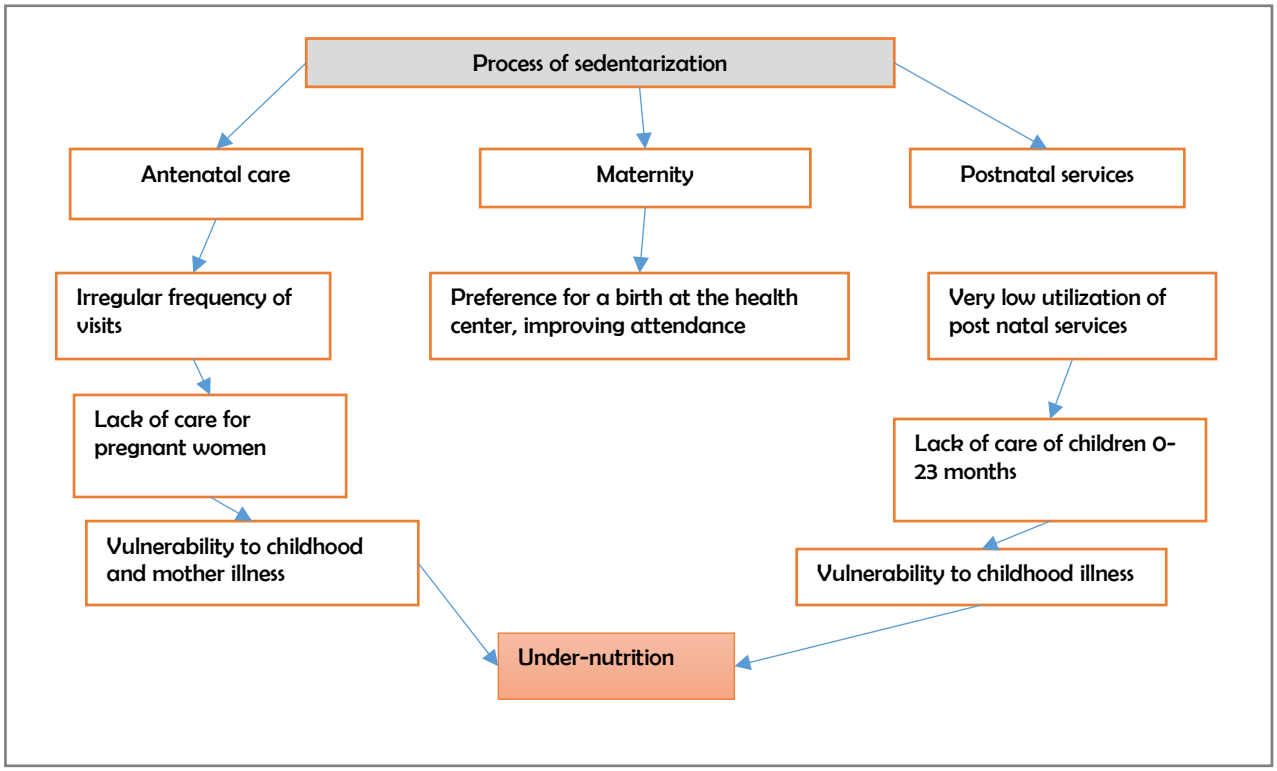
d) H18: Low utilization of ANC, maternity and postnatal services

The access and use of care by mothers have been increasing (2011/2016, see the following table). Half of the mothers continue to go to their antenatal care, and mostly prefer to give birth at the Health Center. We obtained information on the attendance of mothers for post-natal services, particularly as regards the monitoring of children less than a year old. It is clear that the closer the family lives to the health center the higher the motivation of the mothers to put a tracking device for children. This does not mean health centers are not available; they are usually located in the perimeter five kilometers from the villages. However, natural barriers (e.g. rivers or mountains) reduce access and consequently the attendance of postnatal visits.

Chart 21 H18. Low utilization ANC, maternity and postnatal services, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 ANC (4 times): 49.4% Last delivery in Health center: 67% of women Secondary Data: DHS 2011: ANC: Rural areas (4-5 visits): 43.7% Delivery: 27% of women, in Karamoja Literature review: NCA Pathway	ANC: Good Delivery: very good Post natal: Low, in rural areas FGW: Mothers in the towns attend postnatal visits to the hospital	Seasonality : Historical trends: Changes: increase in the number of deliveries at the health center and the use of post-natal services with the nearest health center
Data Triangulation: plausible with source of data and the qualitative survey and literature review H18 hypothesis confirmed		Consistency: by changes H18 hypothesis validated

Figure 24: H18- Causal Pathway: Important- Low utilization of ANC+ maternity and postnatal services.



e) H19: Insufficient income to cover transport cost to the nearest health center

A comparison between the results of the RFS survey (2016) and those obtained in 2011 (DHS) shows that monetary costs are not the main barrier to accessing a health center. Indeed, half of the households select this factor in 2016 (Moroto District), while in 2011 this factor was chosen by nearly 86.3% of households (Karamoja). This development could be interpreted as an improvement of health services. Alternatively, one might suggest that households are able to find solutions to access care[37] (loans for 56% of households, FSNA Dec. 2015

In focus groups, mothers provide insight into how they perceive the access to health care. Firstly, they say they have good access to health care; but they also complain of lack of access to care due to indirect health costs. Mothers in rural areas said they needed an amount varying between 5,000 - 10,000 shillings to cover indirect costs of medical care (drugs and other indirect costs). In general, it is men who seek money to enable women to go to the health center. As we have seen with the preceding hypothesis, mothers in all villages may use the traditional healer or the VHT when they need care. In town, the postnatal monitoring is attended because mothers are close to the hospital, while in rural areas they also tend to save the visits because of their workload.

In a village of the qualitative survey, a mobile clinic visits the village at least once per month. This initiative of the DOH is also appreciated by mothers. The mobile clinic reduces the number of barriers,

37 -FNSA: June 2015: "*The main reasons for debt were to; i) buy food (51%), ii) cover health expenses (17%) and iii) pay school/educational costs (12%)*".

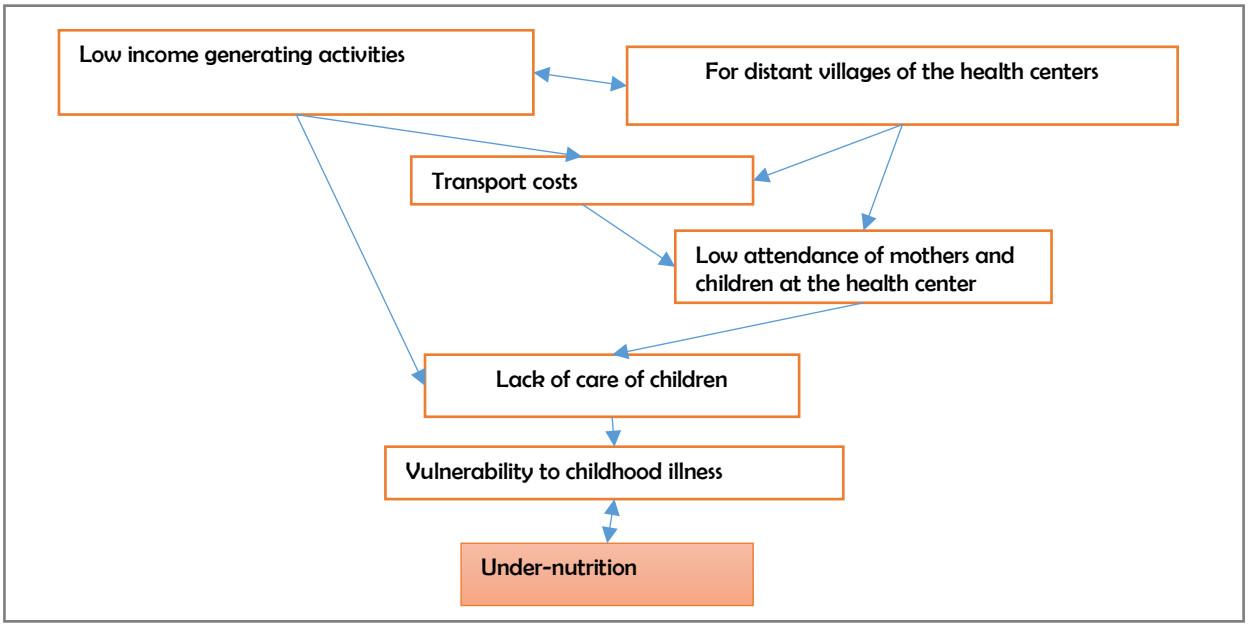
including distance. In fact, the problem of transportation costs is relatively higher in remote villages, which have to cross natural barriers such as rivers and mountains. Families do not have the money to pay the transport costs.

That is how mothers explain why they reduce the number of medical visits, especially when occupied with housework. Also, mothers refer to medical emergencies involving the arrival of an ambulance in the village. In rural areas families do not use this service because of its high cost (50, 000 schillings, amount reported by the villagers).

Chart 22 H19. Insufficient income to cover transport cost to the nearest Health center, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Transport cost: 36.9% Money cost: 42% Secondary Data: DHS 2011 Karamoja Distance: 41.9% Getting money: 86.3% Literature review: "*Health services can be available but not used. In order to identify the reasons why they are not used it is important to ask directly the people what are the constraints or barriers preventing them to use the services. Distance and cost can be the most common reasons, but they should be confirmed".* NCA Guidelines NCA	N/A In urban neighborhood FGW: in rural areas, mothers have to walk. They do not have money to pay for transportation costs. If the travel is difficult, it involves a time of return they would like with a non-paying transport. Conversely, when the mobile clinic visits the village, distance and transportation costs are not considered as a barrier to access care. FGM: Fathers are responsible for finding the money for mothers to go to the health center	Seasonality: dry season Historical trends: Changes: the money barrier decreases since 2011, but the distance is still a barrier for a third of households
Data Triangulation: plausible with source of data and the qualitative survey and literature review H19 hypothesis confirmed		Consistency: by changes H19 hypothesis validated

Figure 25: H22-Causal Pathway: Important-Insufficient income to cover transport costs to the nearest Health Centre.



6. UNHEALTHY ENVIRONMENT

In this sector, three components have been verified[38]:

I. Improved sanitation: The provision of facilities and services for the safe disposal of human excreta. Sanitation also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal.

II. Improved drinking-water: An improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter. Examples of improved sources include piped water into a dwelling or yard/plot, public tap, borehole and protected spring. Unimproved water sources, on the other hand, include unprotected springs or hand dug wells and surface water.

III. Personal and domestic hygiene: Conditions or practices that maintain health and prevent disease, esp. through cleanliness. Specific hygienic behaviour includes: hand washing with soap, bathing, laundering, proper animal practices and proper human and animal waste disposal, keeping animals at a safe distance from sources of drinking water, food handling, preparation and food and water storage.

38 --Definitions by WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation.

From this perspective seven specific risk factors of malnutrition are studied through the household survey and the qualitative survey: water quantity, water quality, water supply, sanitation facilities, hygiene practices, personal hygiene, and household hygiene.

An important point should be emphasized. In the 30 villages of the RFS investigation, all water points were visited by teams of investigators. These observations contribute to enriching the analysis of risk factors on the quality and supply of drinking water in Moroto District. Concerning the risk factors around sanitation and hygiene, the analysis focuses on the environmental enteropathy (which causes diarrhea) in children linked to exposure levels largely characterized by open defecation and lack of sanitation.

6.1 Description of Unhealthy Environment Context

As shown in Table 25, almost all the measurements recorded during the data collection of the RFS survey showed high levels of contamination regarding water, sanitation and hygiene practices on the territory of the district of Moroto. Indeed, for 77% of households, water points have a moderate risk of contamination meaning that the borehole can be contaminated (sanitation score: moderate risk). The indicator "water management score" and that on "good practices" show that households do not clean containers, and that they will not proceed with the treatment of water taken from the water point.

In terms of sanitary conditions, households use very few latrines (18%), only just over 22% of these households have proper latrines. The children's immediate environment is also in poor condition as only 22% of households will properly remove the defecation of children (Disposal of child feces children 0–23 months), and as children often are outdoors, they play or walk on land contaminated with animal waste (77%).

Finally, in terms of hygiene practices, a good score is observed (71% of households have good practices) for the hygiene of the house, but for the corporal practices, only 30% of mothers use soap. As a corollary, households consume little water for all their needs, they are according to the "Sphere" standards on average in the category of basic survival water needs[39], while 78.4% of households travel a short distance to access water (under 30 minutes).

Table19: RFS NCA Unhealthy environment, Moroto District, Karamoja, March 2016

Table Baseline Indicators NCA Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016				
Unhealthy environment (WASH)	Indicator	95% CL		
	Value	Lower	Upper	Sample, NCA
Indicator	Mean or Proportion			
Households observation				600

39- In emergency settings or settings with little water, we are following the Sphere standards. In development contexts, we recommend using the FANTA Measurement Guide. NCA Guidelines

Number of Households with improved water source	90% (1)			541
Safety of the water source	98,15%	96,51%	99,06%	533
1. Ground open well, well borehole with hand pump, well borehole with motorized pump system	0,75%	0,24%	2,05%	4
No Risk	25,14%	21,56%	29,09%	134
Mild Risk	71,11%	67,02%	74,88%	379
Moderate Risk	3,00%	1,78%	4,93%	16
Severe risk				
Water management				603
Good Practices	18,87%	15,88%	22,28%	114
Water Management observation score	15,75%	12,99%	18,97%	603 95
Mild risk	30,18%	26,57%	34,05%	182
Moderate risk	34,05%	43,72%	51,83%	288
Severe risk				
Water needs	(per capita per day)			580
Total Basic needs	9.31 (Std: 8,2249)			
Drinking water	1,3362 (Std :1,1437)			
Food preparation	1,7089 (Std Dev : 1,75)			
Bathing	0,3553 (Std :0,1783)			
Cleaning the house	0,631 (1,7077)			
Latrines				600
Household with Latrines	18,00%	15,06%	21,36%	108
Use of safe latrines	22,22% (HH with Latrines)	14,79%	31,24%	24
Open defecation in compound	1,67%	0,85%	3,15%	10
Open defecation outside houses	80,33%	76,88%	83,39%	482
People using in the household latrine	5,2479 (Std : 6,3976)			117
Disposal of child feces				340 HH
Children 0-23 months				321
Safe disposal child feces	20%			Children 67
				535
Caregiver hand washing good behavior	44,86%	40,60%	49,19%	240 591
	31,47%	27,78%	35,41%	186
Use of soap	30%			176
Observation (have a soap)				
Household Hygiene (food)				600

observation Good Bad	71,67% 28,33%	67,85% 24,79%	75,21% 32,15%	430 170
Household hygiene (animal waste) Observe Animal waste	 77,37%	 77,37%	 80,61%	601 465
Water collection and distance to water point 30 minutes or less 31-61 minutes 61-180 minutes More than 3 hours	 78,41% 15,28% 4,49% 0,83%	 74,86% 12,55% 3,03% 0,31%	 81,58% 18,47% 6,54% 2,04%	602 472 92 27 5

6.2 Hypotheses from the initial workshop

Seven hypotheses arose from the initial workshop work. Due to precise records that have existed for several years (2009) on sanitary conditions, we were able to produce four hypotheses in this area. Also, two hypotheses involved the risk factors (quality and quantity) on the water. A final hypothesis takes into account access to water points measured by distance (time to get there).

Two important indicators of environmental enteropathy were added in the RFS survey, i.e. the prevalence of measures on feces disposal (children 0–23 months), and on animal waste. The inclusion of these indicators has the advantage of exploiting complete previous studies (FSNA, DHS, and ACF) on the state of sanitation and hygiene in the Moroto District.

a) H25: Poor sanitation and hygiene practices (Including H29)

In March 2016, the prevalence of the use of latrines was 18%, about the same as in December 2015 (15%). Compared to 2009, one can note a significant improvement in the reduced prevalence of open defecation (97% 2009). However, in June 2015, the FSNA survey selects this risk factor as a cause of child malnutrition like "poor sanitation" because of the high prevalence of open defecation.

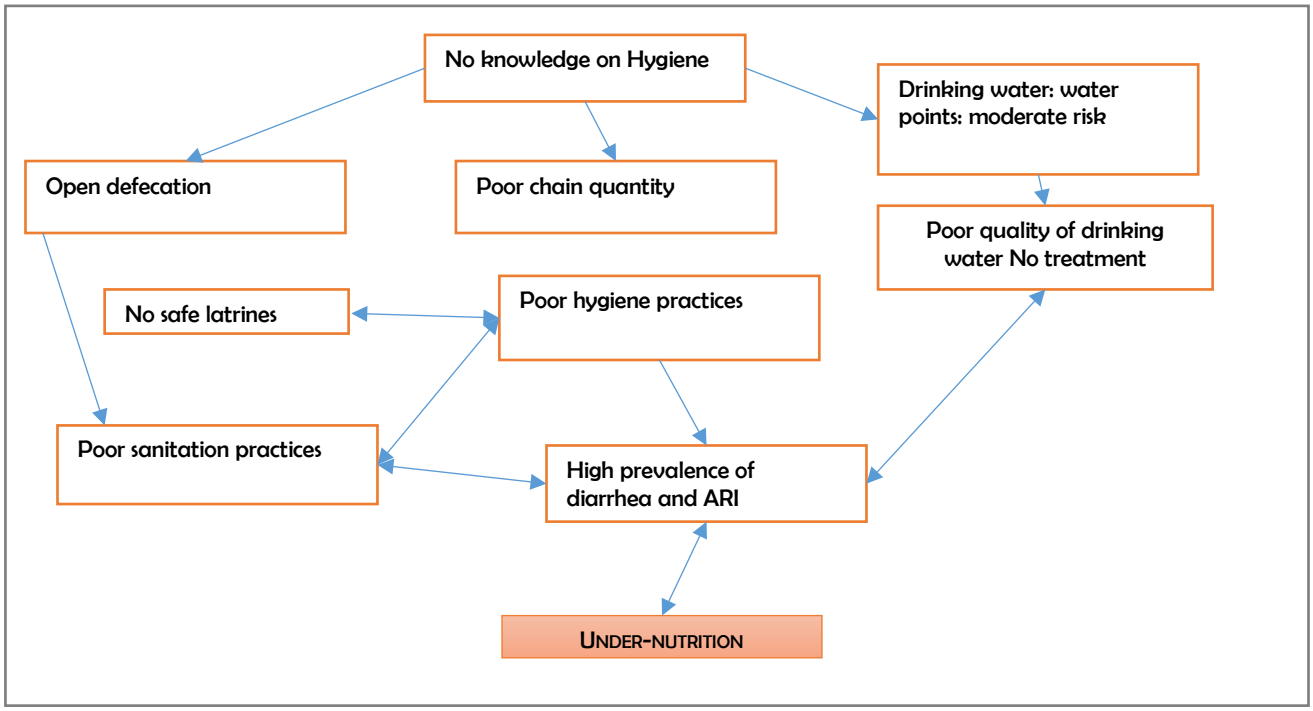
In terms of the use of latrines, the record remains poor since only 22% of households with latrines have them in good condition. The FSNA survey supplies the following explanation: "*The problem of ownership and use of latrines in Karamoja is associated with cultural beliefs*" (Dec. 2012). So we explored this direction in the focus group, but did not obtain conclusive results on relevant cultural beliefs. Clearly, open defecation appears as a usual life in rural areas. By contrast, we learned that the use of latrines in the villages visited, largely depended on the size of the village. Two factors are connected to this, i.e. the growth of the population, and the constant presence of men in the villages, forcing villagers to be more receptive to the use of latrines. This is what emerged in a village in the qualitative survey. Also, for participants in focus groups, open defecation is so harmful because of food contamination by flies.

The prevalence of unsafe feces disposal (children 0–23 months) is very high, since 80% of mothers do not attach any importance to this preventive practice. The prevalence indicator of the animal waste (77%) confirms this sanitary gap in the villages. It is important to note here that the prevalence of diarrhea for children aged between 0 and 23 months in March 2016 was 50%. Again, in focus groups, mothers reported that they did not know the dangers of contamination by fecal material.

Chart 23. H25: Poor sanitation and hygiene practices, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Latrines: 18% (22% thereof safe latrines) H29: Open defecation outside houses: 80.3% Safe disposal feces: 20% Observed animal waste: 77% Secondary Data: FSNA, Dec. 2015 Open defecation: 86.3% ACF, Dec. 2009 Open defecation: 97% Literature review: NCA Pathway	Limited knowledge on the effects of sanitation FGW: no hygiene practices, mothers do not understand why children may have diarrhea due to the lack of hygiene, they perceive food (see H15) as a likely cause of diarrhea.	Seasonality: Historical trends: a slight decrease of the prevalence rate for open defecation between 2009 and 2016, but still very high Changes:
Data Triangulation: plausible with source of data and the qualitative survey and literature review H25 and H29 hypothesis confirmed		Consistency: by historical trends: H25 and 29 hypothesis validated

Figure 26: H25- Causal Pathway: Major- Poor sanitation and hygiene practices.



b) H24: Poor hygiene practices in the household

The hygiene practices related to the cleanliness of kitchen utensils are good (70% of mothers use good practices in March 2016). However, in terms of kitchen waste, in 2012, it was found that, very few households are concerned about the kitchen scraps (FSNA, 7.8% of households practiced maintenance of kitchen waste).

In 2011, 22% of people used soap. In 2016 the prevalence gets good marks since it amounts to 31.4%. Also in 2011 "*It was noted that the majority of people in Karamoja washed hands with water only*" (ACF, 73.8%). In 2016 in the focus group, only half of mothers reported having this type of practice, which the RFS survey validates by the soap indicator (good behavior: 44%). There seems to be an improvement in personal hygiene practices.

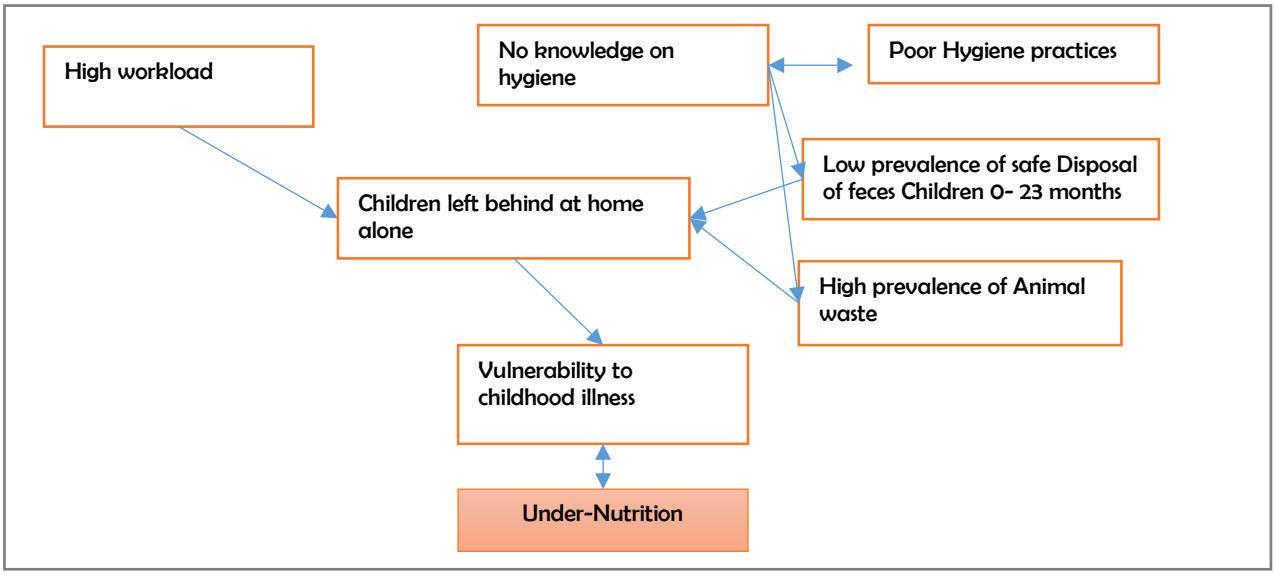
Two explanations have been suggested among participating women in the integration of these new hygiene practices by mothers. The first relates to their preference for giving birth at the health center. The reason for this choice is based on the difference they perceive on the hygiene conditions that would be, according to them, more appropriate in the health centers than at their home. Also, the teaching they receive at the time of childbirth, makes them aware of the basics of children's personal hygiene. This outreach work is also present in the villages through the TBA and VHT. In all focus groups in 4 villages, mothers have selected the poor hygiene as a cause of malnutrition.

Chart24. H24. Poor Hygiene practices in the household, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Household hygiene good practices: 77% H23: Use of soap: 31.47%	Cause of under nutrition in 4 villages (corporal hygiene)	

Good behavior using soap: 44.7% Secondary Data: Use of soap: ACF: Sept. 2011 Use of soap or ashes: 22% Household Hygiene: FSNA, Dec. 2012 7.8% Garbage Pit 11.1 % Sun rack 8.7%: Rack in kitchen Literature review: Poor household sanitation and caretaker hygiene are leading causes of diarrhea. The fecal oral route is connected to hygiene and can happen when caretakers reuse rags that have been used to clean a child after defecating, don't wash their hands after defecating (or handling defecation) or if a child defecates on the floor. (Sheth 2006). NCA Pathway.	FGW: more sensitive to body hygiene due to their more frequent visits in health centers for childbirth TBA and VHT are highly active to raise awareness of mothers to better body care for children.	Seasonality: Historical trends: Changes: *body hygiene is on the increase * a mother's awareness of the impact of body hygiene as a cause of child malnutrition.
Data Triangulation: plausible with source of data and the qualitative survey and literature review H24 and H23 hypotheses confirmed		Consistency: by historical trends: H24 and H23 hypotheses validated

Figure 27: H24- Causal Pathway: Major- Poor hygiene practices in the household



c) H20: Poor quality of drinking water (treatment)

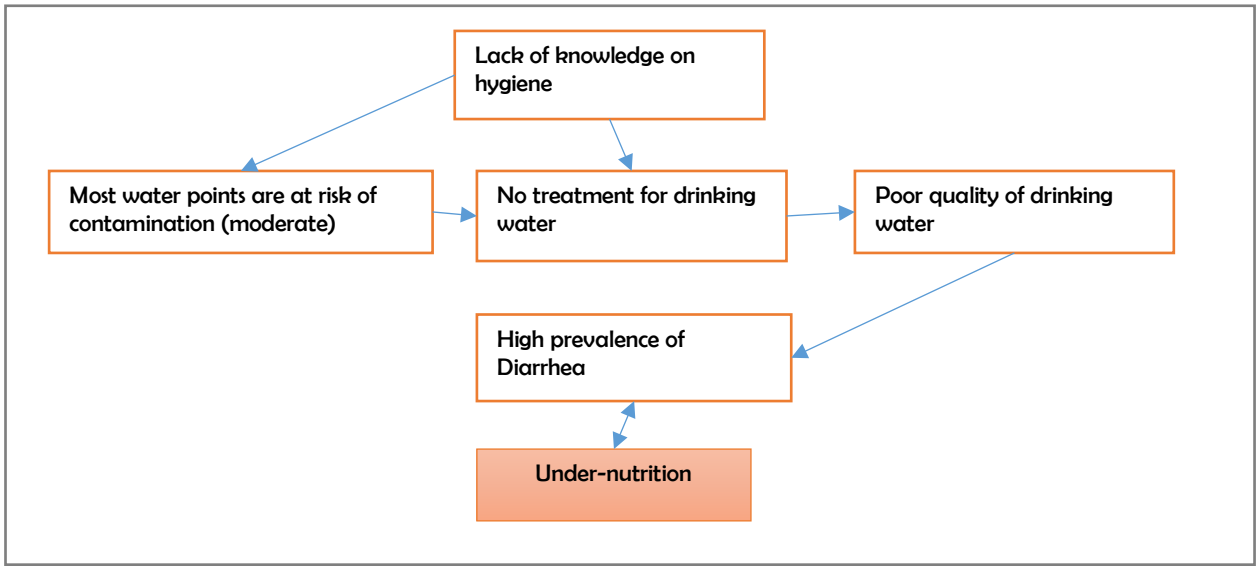
In March 2016, 90% of the district's households had access to improved water points, a prevalence that is relatively similar to 2009. As a result, the RFS survey adds to this an assessment of the risks of contamination around these water sources. It seems that since 2012, there had been deterioration in the maintenance of the wells. Indeed, in December 2012, the FSNA survey rejected the hypothesis on possible contamination of drinking water: "*few households, 2.2% had their drinking water contaminated with faecal matter (E.coli) in Karamoja, 1.6% in Moroto district*", while in 2016, the assessment of all water sources (RFS) shows that 77% of households collect water from water points that could be heavily contaminated (observation).

However, we must consider the improvement in the prevalence of households that treat water. It turns out that in 2012 7.4% of households treated water and in December 2015, 13.5%,. In 2016, they were 18 % to do so. In the qualitative survey, it is the urban participants who are sensitive to this practice, whereas in rural areas, mothers admitted not doing so because they thought that the water from the water point was clean and they had no apprehension about the quality of the water pumped from boreholes.

Chart25. H20: Poor quality of drinking water (treatment), triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Improved Water: 90% Moderate risk: 77% Treatment: 18% Secondary Data: Dec. 2015 Improved water FSNA: 87.2% Treatment: Dec.2012 : 7.4% Dec. 2015: 13.5% Literature review: NCA Pathway	A monitoring process for water in the urban space FGW: little incentive to water treatment, mothers believe that water from the boreholes is of good quality	Seasonality: Historical trends: Changes: deterioration in the maintenance of the wells
Data Triangulation: plausible with source of data and the qualitative survey and literature review H20 hypothesis confirmed		Consistency: by changes H 20 hypothesis validated

Figure 28: H20 – Causal Pathway: Important-Poor quality of drinking water (treatment)



d) H21: Poor chain water and quantity

Since 2009, research (ACF, FSNA) shows that despite a more than adequate access to water sources (boreholes) in the district, households have not yet gotten used to collecting an adequate daily amount of water for basic needs. In December 2015, the FSNA survey argues that this gap "*was significantly associated with all indicators of malnutrition; children in households where the per capita water use was 15 liters or less were likely to be malnourished.*"

Concerning the collected amount of water, the RFS survey (2016) validates this result. The amount of water used daily would average 10 liters per person per day. In addition, the RFS investigation shows via the "water management score" indicator that households attach little significance to the cleanliness of their container. We observed that most containers are a severe risk of contamination in 34% of households.

The qualitative survey helps identify the reasons why families have not yet become accustomed to daily water collection sufficient for all needs. First, for the villages where the borehole is near housing, proximity plays a negative role on water collection, even more so rural areas. Each member of the family (father, mother and children) will get water according to their personal needs. Each person has a container (5 liters for adults) and often around a liter for children. We must not forget that mothers go to the bush during the dry season, they consider appropriate for their needs.

Regarding personal hygiene practices, the men usually go bathing near water points, children often accompany them, which necessarily reduces the amount to be collected. Then, since there is a daily meal, the one liter for cooking therefore does not require a large amount of water daily. Finally, with

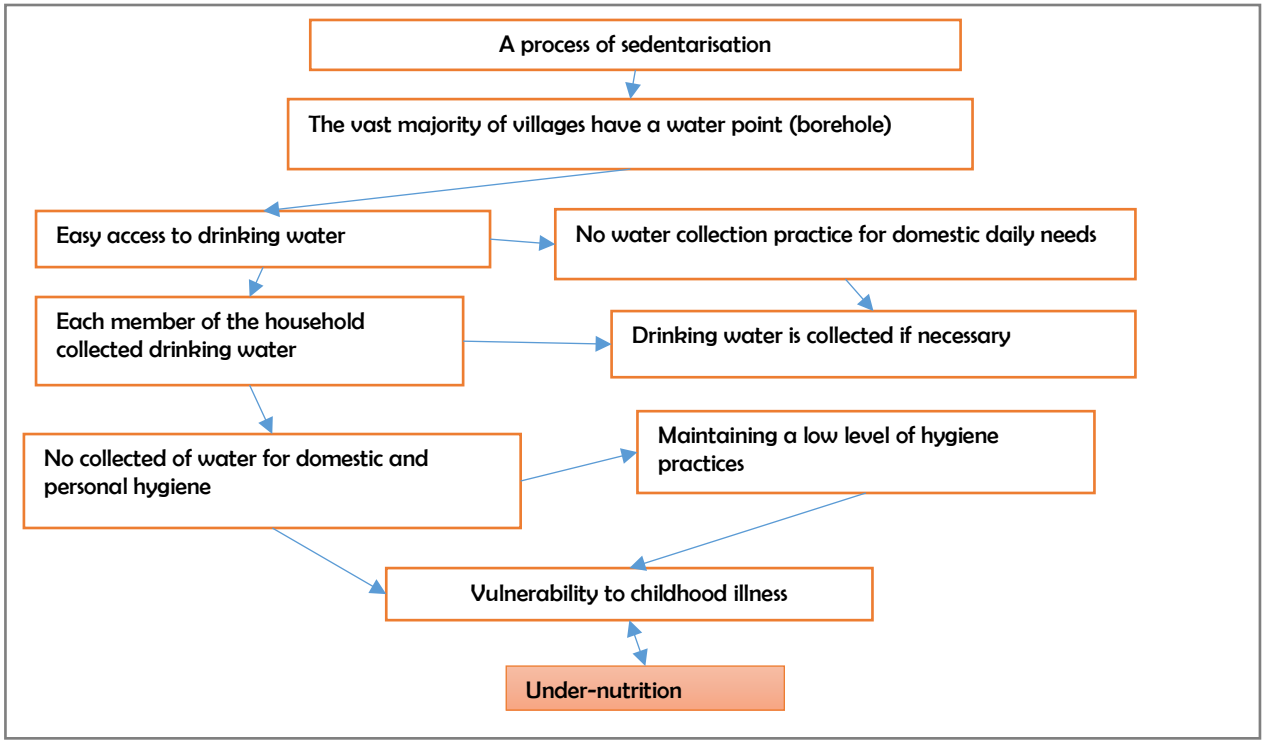
regard to domestic hygiene, as we have seen, cleanliness does not appear listed among the daily activities of households.

A large collection of daily water remains and can be used according to the patterns described above. In 2012, the ACF survey also observed that practice and noted that "*water is used primarily for consumption rather than hygiene*" (May 2012, p. 21).

Chart26. H21. Poor chain water and quantity, triangulation and consistency

Source of data	Qualitative survey	Consistency
Primary data: RFS, March, 2016 Water management score: 64% (moderate and severe risk) Quantity: 9.15LLD Secondary Data: FSNA, Dec. 2014 Mean: 12.7 liters per capita per day FSNA: Dec.2015 Mean: 11.6 Liters per capita water use Literature review: NCA Pathway	Collecting water is carried out with individual small containers in rural areas. FGW: mothers fetch water according to their daily needs. They collect very little water for personal hygiene	Seasonality: Historical trends: preference for collecting water for immediate consumption of water, and small amount of water for hygiene requirements. Changes:
Data Triangulation: plausible with source of data and the qualitative survey and literature review H21 hypothesis confirmed		Consistency: by historical trends: H 21 hypothesis validated

Figure 29: H21- Causal Pathway: Important- Poor water chain and quantity



e) H22: Distance to water source and time to need to collect water are long

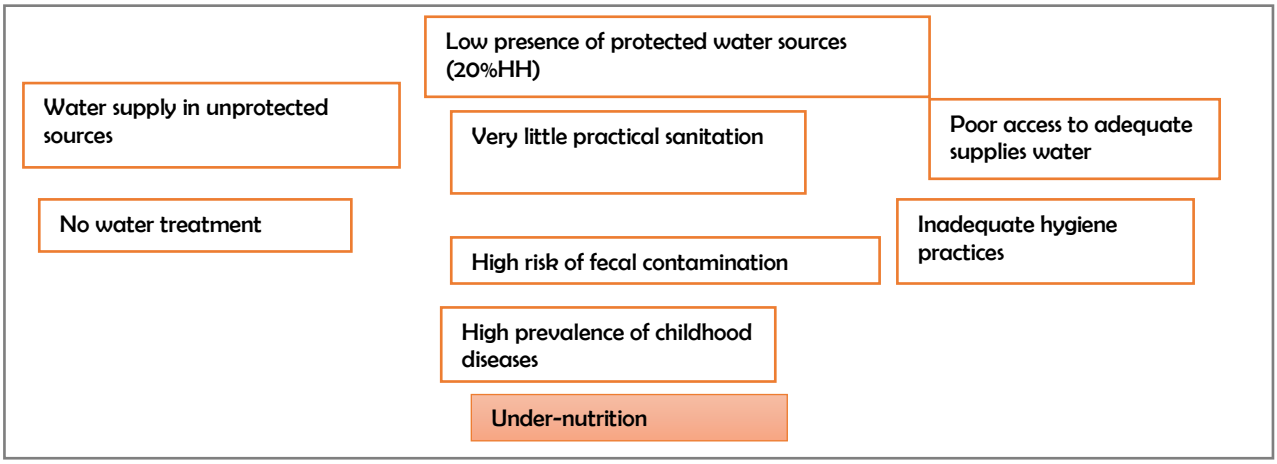
The RFS survey shows that 80% of households are at a distance of less than 30 minutes. This could mean that this risk factor is negligible in Moroto District, that is to say having little impact on child malnutrition. We have however maintained following the evaluation of the investigators on all water points in 30 villages sampled from the household survey. It turns out that in the most remote and isolated villages accessing water points is a real problem for at least 20% of households in Moroto District. Moreover, in 2011, in a large survey (IWRW), the proportion was similar (20%).

So even if the water coverage is very good for a large part of the population, we cannot overlook that in some villages, this risk factor is real and could therefore negatively impact on child malnutrition.

Chart27.H22. Distance to water source and time to need to collect water are long

Source of data	Observation of water points	Consistency
Primary data: RFS, March, 2016 More than 30 minutes: 22% of household. Secondary Data: 2011 IWRW 20% of households More than 60 minutes Literature review: The distance to water, or time to collect water, is often the main constraint of access to water, and associated with the quantity of water used. NCA Guidelines.	RFS Observation of the investigators on all water points Qualitative survey Convenient access to water points in 4 villages	Seasonality: Historical trends: since 2011, the proportion of households has limited access to water has not changed. Changes:
Data Triangulation: plausible with source of data and the observation of water points and literature review H22 hypothesis confirmed		Consistency: by historical trends: H 22 hypothesis validated

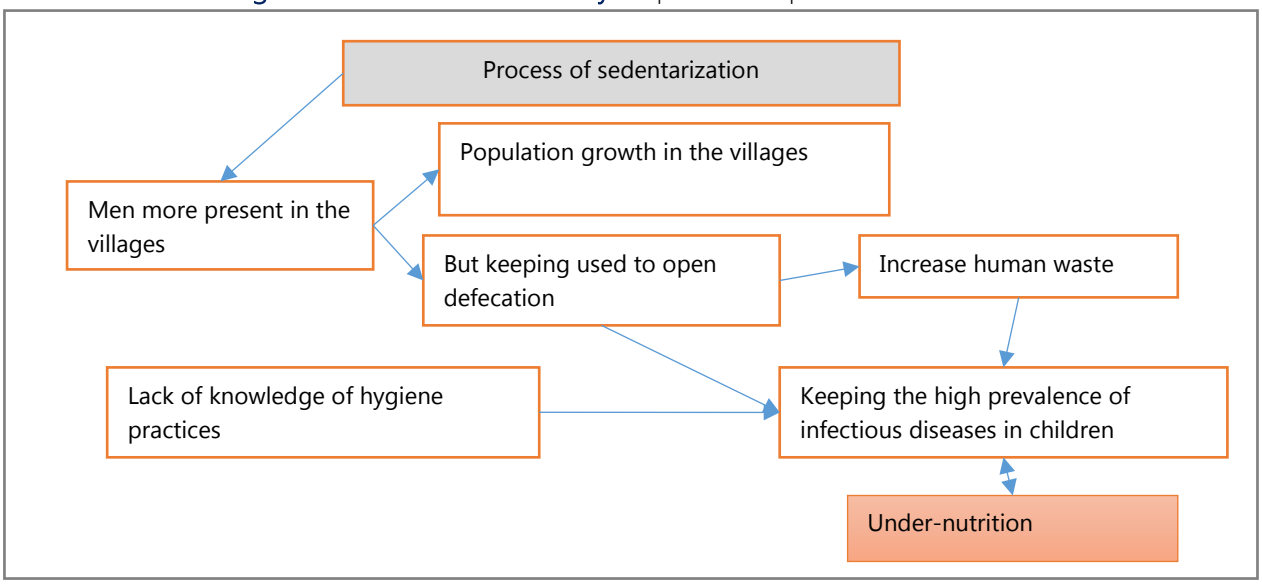
Figure 30: H19- Causal Pathway: Minor- Distance to water resource and time needed to collect water are long



f) H. 29 Open defecation (see H25)

Data Triangulation: plausible with source of data and the qualitative survey and literature review H29 hypothesis confirmed	Consistency: H29 hypothesis validated

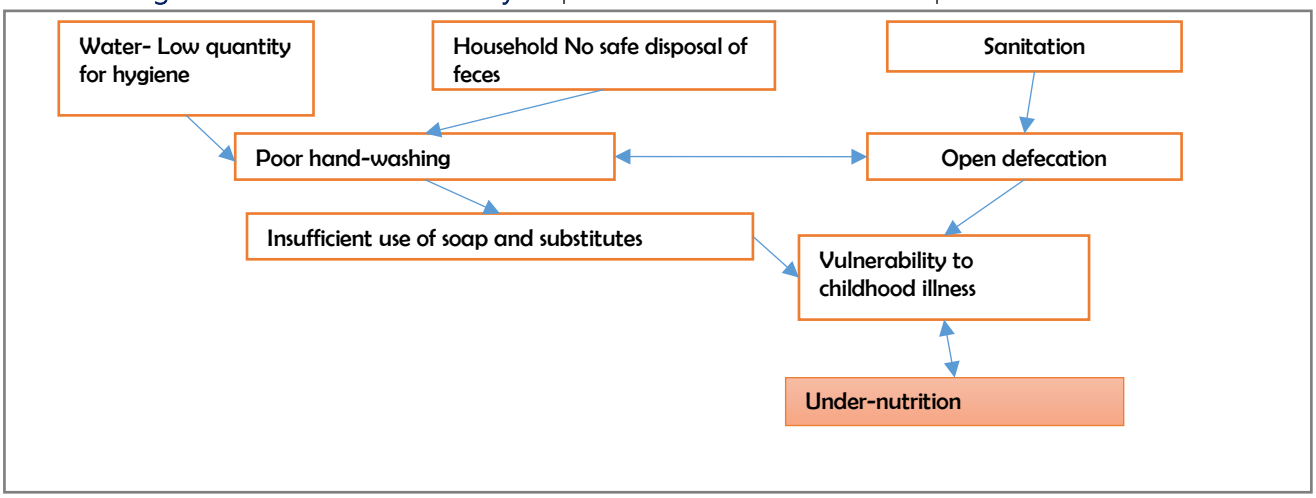
Figure 31: H26 Causal Pathway: Important- Open defecation. H26.



g) H23: Insufficient use of soap and local substitutes (H24)

Data Triangulation: plausible with source of data and the qualitative survey and literature review H23 hypothesis confirmed	Consistency: H23 hypothesis validated

Figure 32: H23-Causal Pathway: Important- Insufficient use of soap and substitutes



7. SEASONALITY, CHANGES, HISTORICAL TRENDS AND SHOCKS

The analysis of seasonality relies on the MAHP indicator (Months of Adequate Food Provisioning). We show via this indicator that households during the period of April 2016 to March 2016, experienced strong instability regarding access to food. This instability has important implications for the care of children and their food diet.

The analysis of changes is presented in Table 20. It differentiates between changes positively or negatively contributing to the prevention of child malnutrition. Changes are associated with each sector and the hypotheses related thereto. The analysis of historical trends aims to show which are the risk factors that have contributed to maintaining the high prevalence of child malnutrition since 2009.

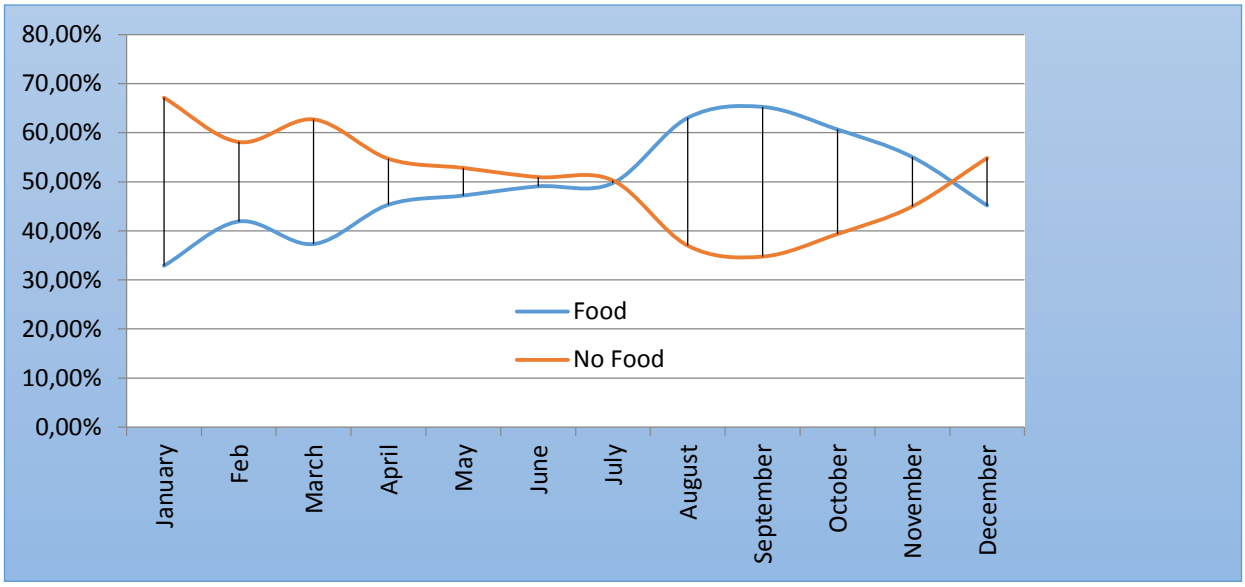
The shocks analysis is based on various reports that have dealt extensively with shocks that destabilize households in their daily life and impact on nutrition security of children aged under five years old. To this, we add an analysis of structural changes that have increased poverty among pastoralist communities in the district for ten years.

7.1 Seasonality in Moroto district

In Moroto District, the most critical seasonal effect concerns the length of the dry season (usually November to March) compared to the rainy season (usually from April to October) in relation to the amount of food available. In the rainy season, households are engaged in agricultural activities. From these activities they draw crops that allow them to have food reserves to feed their community in the dry season. If the rainy season is short because there is not enough rain for cultivation, food security becomes a big issue during the dry season.

As can be seen in Figure 7, when comparing the proportion of household food security and the proportion of food-insecure households, it is clear that during the dry season households are suffering from food insecurity and in the rainy season the proportion of food insecure households decreases. Thus, in a year when the expected harvests cannot meet the needs of the community, households will be obliged to resort to the market, therefore obliged to have income generating activities. This alternative seems to have an impact on reducing food insecurity during the dry season. For the previous year (2015), there is a slight reduction in the proportion of the number of food insecure households between January and March. However, at the end of the dry season almost half of the population is food insecure. Moreover, food stress seems to have a direct impact on the health status of children since it is during the months of April, May and June, the number of cases of severe malnutrition identified in the Moroto hospital is higher compared to other months of the year.

Figure32: Proportion of households with food and no food during a year, April 2015-March 2016, Moroto district.



Sources: RFS-NCA, March 2016, MAHP

8.2 Changes by sector and by risk factor, District of Moroto, Karamoja

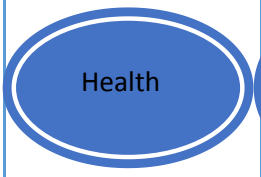
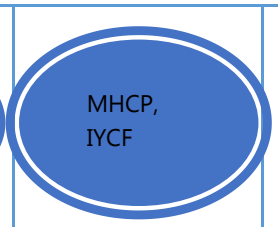
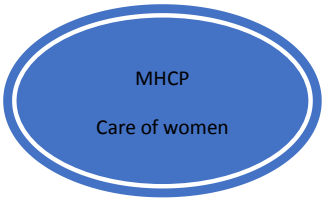
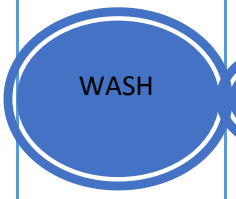
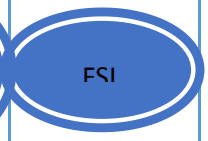
Table 20 shows the results that support the analysis of consistency for each of the hypotheses. It sets the change above as a new fact which influences the living habits of households and can have impact on child malnutrition according to the risk factors studied.

In the Moroto District a number of important improvements and positive changes in other sectors studied produce improvements in the health sector. Firstly, urbanization changes behavior and also provides services that are used by the population and can improve the comfort of mothers and children. For example, there is an increase in the attendance of expectant mothers who come to the health center to give birth.

The more frequent use of health centers allows mothers to keep the breastfeeding protocol in the hour after the birth of the child. The increasing prevalence of early breastfeeding, albeit still low, marks a transition towards focusing on the health of the children immediately after birth. This motivation to give birth in health centers will play positively on the health of the mother also. Regarding children's health, there are also indirect positive effects. The mothers of the town of Moroto who have shown an interest in visiting more frequently a health facility are given support by the hospital when children suffer from acute respiratory infections and diarrhea.

However, mothers of rural areas remain ambivalent and practice a back and forth approach between the traditional healer and the health center when children suffer from these diseases. However, they are in demand for advice and possibly drugs for the treatment of fever in VHT villages.

Table 20: Changes by sector and risk factor in Moroto District, Karamoja, Uganda, 2016

				
H15: Poor health status of children (ARI and diarrhea): ***New support for urban mothers: Moroto Hospital***	H6. Inadequate infant and child feeding practices *Nutritional transition with residue during the dry season* H5. Poor practices of	H26. Role of education: *Continual improvement of the level of education for urban women* H9. Limited male involvement in child care practice Social changes, (urban life and rural life) H8. Mothers not supported especially when women are heads	H20: Poor quality of drinking water (treatment): *Deterioration in the maintenance of wells*	H1. Inadequate access to milk and animal products by mothers and children: *Food diet modification*

H16. High prevalence of fever (malaria): *VHT's role in villages* H18. Low utilization ANC, maternity and postnatal services: *Increase in the number of deliveries at the health center. Use of post-natal services links with the nearest health center (urban/rural)* H19. Insufficient income to cover transport cost to the nearest Health center: *the money barrier decreases since 2011. The distance is still a barrier for a third of households*	initiation of breast feeding and exclusive breastfeeding *Early breast feeding: Utilization of maternity unit for women*	of households *Female Head of household and food insecurity* H12. Poor maternal well being (violence and alcohol) *Inclusion of local beer in daily life habits of men and women* H27. Mental Health *Resilience deterioration* H14. Poor status of reproductive health (birth spacing and family planning): *social changes, wedding* H10. High workload for mothers: *Prolonged instability of food insecurity.* H13. Early child bearing (teenagers pregnancies): *Social changes* H11. Lack of caregiver empowerment: *Sedentary lifestyle, and traditional culture undermined by the market economy*		*for adults and children* H2. High food access instability: *Depletion of food stock during dry season* H4. Low purchasing power: *Using more market food during dry season*
Positive changes: H15, H16, H18, H5, H26, H19 <u>Health</u>: Health status of children: in urban area: : ***New support for urban mothers Moroto Hospital (Diarrhea and Ari)***, in rural areas: ***VHT's role: children (Fever)***		Negative changes: H18, H19, H9, H8, H12, H27, H14, H13, H11, H20, H1, H2, H4 <u>Health:</u> Access to health: *post-natal services links with nearest health center (urban/rural)* *Distance is still a barrier for a third of households* MHCP:		

Access to health: *increase of number of deliveries in health center,* *Money barrier decreases since 2011* MHCP: Early breastfeeding: *utilization of maternity unit for women* Care of women: *continual improvement in the education level of urban women*	IYCP: *Nutritional transition with residue during the dry season* Care of women: *Social changes, and urban life and rural life. Social changes, wedding. Female Head of household and food insecurity. Inclusion of local beer in daily life habits of men and women. Prolonged instability of food insecurity Resilience deterioration. Sedentary lifestyle, and traditional culture undermined by the market economy* Unhealthy environment: *Deterioration in the maintenance of water points (safe water points)* FSL: food access: *food diet modification for adults and children, depletion of food during the dry season. Using more food market*

Also, we note that education proves to be a positive determinant for urban mothers.

There are also negative changes and they are mainly in the MHCP sector. IYCP practices are directly related to new eating habits that could be reduced to the greater consumption of local beer for adults, and therefore residue for children. Regarding maternal well-being, the changes are significant. Firstly, there is significant deterioration of the traditional rules related to marriage (birth spacing, teenagers' pregnancies) and the sexual division of labor (high workload). Secondly, these changes seem to be imposed by the impoverishment of households, which further undermines the subsistence of single women.

7.2 Historical trends by sector and by risk factors in Moroto District, Karamoja

The analysis also shows that certain risk factors are established for several years now in the local context of Moroto district.

First, in the food security sector, it is observed that since 2011, crops are not sufficient, which means that income generating activities have to be undertaken during the dry season. However, we observed that these activities were not sufficient to properly feed the mothers (HDDS) and their children (IDDS).

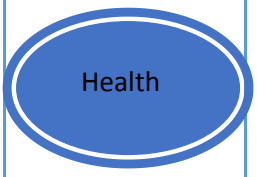
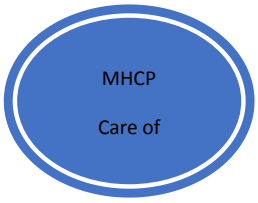
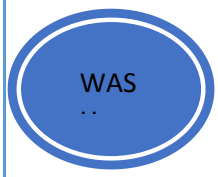
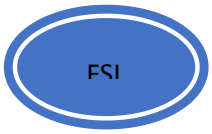
Then it seems that households have not yet integrated into their lifestyle hygiene practices and adequate sanitation. Such lack necessarily has an impact on the prevalence of childhood diseases. Here, it should be added that the high prevalence of diarrhea and acute respiratory diseases are also explained, as we have seen, by the low attendance of mothers at the postnatal services of health centers, the considerable appeal of the traditional healer and a trend towards reducing exclusive breastfeeding.

At the center of this dynamics, a highlight since 2011, are the working conditions of mothers during the dry season which undermine children's health (0-23 months). Indeed, because of the distance that the

mother has to cover to go to work, children will be exposed to a very unhealthy environment, especially as the caretaking of children is provided by another child under 12 years.

We also found that the number of pregnant women increases from year to year and that this increase will be linked to changes in the conditions of the dowry for the marriage, which would also increase the number of teen pregnancies. On this subject, it is essential to note that there is a structural change regarding reduced livestock which induces a process of sedentarization and leads men to be more present around women, thus negatively impacts on the reproductive health of mothers (low birth spacing) during 2011-2016. Finally, another significant consequence of the steady decline of livestock is that children no longer have access to milk in their food diet.

Table21. Historical trends by sector and by risk factors, Moroto District, Karamoja

				
H15: Poor health status of children (ARI and diarrhea) *ARI and Diarrhea:* ***High level of prevalence rate since 2009*** H16. High prevalence of fever (malaria) *No variation between 2009 and 2016*	H6. Inadequate infant and child feeding practices: *no variation with IDDS between 2012 and 2016* H5. Poor practices of initiation of breast feeding and exclusive breastfeeding: *decrease of the prevalence rate of exclusive breast feeding*	H10. High workload for mothers: *poor harvest since 2011* H14. Poor status of reproductive health (birth spacing and family planning): *prevalence of low birth spacing is relatively important between 2011 and 2016* H7. Low maternal nutritional status during pregnancy: *consistent increase in the number of pregnant woman*	H22. Distance to water source and time needed to collect water are long: *Since 2011, the proportion of households with limited access to water has not changed.* H21. Poor water chain and quantity *preference for collecting water for immediate consumption of water, and small amount of water for hygiene* H25: Poor sanitation and	H4. Low purchasing power: *Poor income during the dry season* H2. High food access instability: *Since 2011, poor harvests* H1. Inadequate access to milk and animal products by mothers and children: *Milk as a dietary supplement for children has been in serious decline*

			hygiene practices: *a slight decrease of the prevalence rate for open defecation between 2009 and 2016, but still very high*	

7.3 Shocks and structural changes

According to the recent report on resilience, it turns out that the population of the Karamoja region has experienced multiple shocks in the recent past. Among the most important, the report notes the following shocks: "*Most prominent among those are drought, floods, livestock and crop diseases, insecurity, high food prices and relatively limited access to basic services*"[40].

The FSNA report also addresses this issue. According to the authors, five shocks affect households in Karamoja: high food prices, adverse weather conditions, sickness/health expenditure, debt to repay, crop loss due to pests, pathogens and rodents. Three of these shocks affect households in the Moroto district: *sickness/health expenditure, debt to repay, crop loss due to pests, pathogens and rodents*. Among them, the most important shock would be the "debt to repay," as it concerned 73% of the households (June 2014).

In the section on food security we had two risk factors that were identified as structural changes. This involves the hypothesis on the reduction in livestock numbers and the hypothesis on the relative depletion of crops. Our work leads us to consider these as structural changes. During meetings with the participants of the villages of the qualitative survey, we asked the fathers and mothers to define the concept of poverty. Clearly, participants selected two factors to describe the state of poverty of a household, i.e. livestock and the amount of harvest obtained. It is accordingly clear that since 2011, Moroto District households feel they have been increasingly impoverished. This deterioration of their living conditions is particularly important since the communities of the Moroto District have had for at least two centuries a lifestyle and a social identity based on pastoralism.

8. FINAL RATING EXERCISE

We introduce this section with a brief presentation of the causes of malnutrition found by the reports of FSNA (2015) and the Resilience Unit (2015) in the Karamoja region. Following that, we establish the

40- Resilience Unit: "*trend analysis and feedback from the range of stakeholders consulted in the study area showed that cumulative shocks and stresses had had a bearing on household food insecurity and malnutrition in the past*".

ranking of these causes according to Link NCA study analysis grid for each of the analyzed hypotheses. Also, all the pathways are presented for each of the hypotheses. Finally, on the basis of the suggestions of the final workshop we present the evaluation of our partners and the consequent classification of the findings of the NCA analysis.

8.1 Secondary data source: the causes of malnutrition identified in recent surveys (FSNA, Resilience Unit)

As it can be seen in box 1 below, three causes of malnutrition are common to both reports. These are; poor infant and young child feeding practices, poor sanitation and limited access to food. In the (RU) report health is related with sanitation, and for the FSNA reports, they take into account the availability of food (limited and unstable) in the food security sector.

Box1: Main causes of under nutrition in Karamoja, Resilience Unit and FSNA

Resilience Unit	FSNA
Poor care and feeding (1) Poor care and feeding practices: 99 per cent of children aged 6–23 months were not receiving a minimum acceptable diet in June 2014 and 58 per cent received minimum meal frequency.	Poor infant and young child feeding practices with untimely initiation of breast feeding and poor diets for children; (1)
Poor Health and sanitation (2) Poor level of hygiene, limited access to an improved water source and limited treatment of water: respondents frequently prioritized closer access to water and few of them treated water. Limited access to safe sanitation: only 10 per cent of wasted children had access to a private latrine. High morbidity rates: diarrhea (31 per cent) and malaria (58 per cent), acute respiratory infection (40 per cent). Limited access to health care: including not sleeping under an insecticide-treated net, not receiving a vitamin A supplement and not being dewormed.	Poor sanitation with low safe water usage (despite availability) and high rate of open defecation; (2)
Limited access to food (3)	Low economic access to food with the majority of households having no income earner; some households have resorted to borrowing mainly to buy food for consumption; (3)

	Limited availability of food with low production at household level and limited ability to store the little that is produced; (4) Unstable availability: access and utilization conditions of above factors with exhaustion of coping strategies and/or adoption of hazardous ones like consumption of alcohol. (5)

These three causes of malnutrition were considered in the analysis of the NCA findings as risk factors and tend to show high prevalence rates since 2011. They were also selected as hypotheses validated in the analysis of the NCA surveys findings in Moroto district. We provide here a simple reminder of how assumptions have been classified. The NCA classification guide is presented in footnotes in Annex 4.

8.2 The major hypotheses of the NCA survey

Resulting from the analysis grid, there are 12 major hypotheses. This is a large number, especially since none of the 30 hypotheses have been rejected. They can be found in Table 28. The estimated three "major" hypotheses in the initial workshop are validated as major by the analysis of CAS results. The top 4 assumptions were considered "major" hypotheses. Then, follow two hypotheses whose rankings are slightly lower. Finally, the two causes that were ranked last at the initial workshop were considered "significant" hypotheses.

Major hypotheses, NCA Survey, Causes of under nutrition, Moroto District, March 2016

Major Hypothesis
H6: Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding).
H10: High workload for mothers
H5: Poor practices of initiation breastfeeding, and exclusive breastfeeding.
H25: Poor sanitation and hygiene practices.
H15: Poor health status of children under 5 (Ari prevalence, Diarrhoea prevalence).
H2: High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap.
H24: Poor hygiene practices in the household (food preparation and storage, solid waste management).
H4: Low purchasing power.
H7: Low maternal nutritional status during pregnancy.
H13: Early child bearing, high prevalence of teenage pregnancies.
H16: High prevalence of Fever/malaria children 0-59 months.
H14: Poor status of reproductive health (birth spacing and family planning).

Among the 12 assumptions used by the analysis as major hypotheses seven hypotheses are direct links to structural changes (destocking of livestock and poor harvests). The major hypotheses relating to the unhealthy environment follow a common causal pathway; it is the finding of a lack of knowledge of hygiene and sanitary practices that leads to greater vulnerability of childhood diseases. As for the issue of the status of children's health, factors refer to additional risk factors such as low use of post-natal services, heavy workloads of women that lead to their absence from home, thus reducing the time for taking care of children.

8.3 The important hypotheses, NCA survey

We find here 13 important hypotheses relating to child malnutrition. Some of them are connected to the major hypotheses such as open defecation, insufficient use of soap and substitutes. The water-related assumptions such as poor quality of drinking water, and poor water chain and quantity were identified as important because they are associated with hygiene.

Several important hypotheses are in close relationship with the current changes taking place in communities. Risk factors included the role of education, low utilization of ANC, maternity and postnatal services, poor maternal well-being (violence and alcohol), Mothers not supported, especially when women headed households, lack of caregiver's empowerment are directly linked with the process of sedentarization which settles in the district.

Important hypotheses, NCA Survey, Causes of under nutrition, Moroto District, March 2016

Important hypothesis
H20. Poor quality of drinking water (treatment).
H29. Role of Education.
H18. Low utilization of ANC+ maternity and postnatal services.
H26. Open defecation.
H1. Inadequate access to milk and animal products by the children and mothers.
H12. Poor maternal wellbeing (violence and alcohol).
H8. Mothers not supported, especially when women headed households.
H17. Poor utilization and maintenance of bed net.
H11. Lack of caregiver's empowerment.
H21.Poor chain water and quantity.
H30. Mental Health.
H23. Insufficient use of soap and substitutes.
H22. Insufficient income to cover transport costs to the nearest Health Centre.

8.4 The minor hypotheses

To complete the analysis of the causes of child malnutrition, two risk factors appear to play a minor role compared to other major and important risk factors noted. However, they are taken into account as follows: for the first risk factor, "limited male involvement in child care practices" which indicates persistence among men in wanting to keep the traditional model.

Minor hypotheses, NCA Survey, Causes of under nutrition, Moroto District, March 2016

Minor Hypothesis
H11.Limited male-involvement in child care practices.
H19. Distance to water resource and time needed to collect water are long.

Indeed, men who have experienced the pastoral way of life feel that their roles in the care of children should not go beyond the terms of the traditional organization that puts child care in the hands of mothers. However, men who have adopted a "modern" lifestyle perceive the importance of fatherhood. Here pastoral men are perceived rather as idle assets by modern men. We will see that the participants of the final workshop changed the rank of this hypothesis as major hypothesis (see Table 29).

Regarding the second hypothesis "Distance to water resource and time needed to collect water are long," which aims to take into account the impact of the remote villages where nearly 20% of households are far from the water points. As we have seen, it appears that in Moroto District, the vast majority of households have access to drinking water, however, for households that do not have this opportunity, lack of access to water is a significant risk factor for the children of these communities. The analysis of this risk factor is based on the evaluation of all water points of the RFS investigation.

The causal pathway of the minor hypotheses relate to two different sectors. The first shows the impact of the non-involvement of men to help mothers in the care of children (MHCP, care of women). The second causal pathway selected, takes into account households in Moroto District who do not have easy access to drinking water in an environment where health and hygiene practices are very low.

Table22: Link NCA study Expert rating

Risk factors Initial workshop	Rate of initial workshop	Prevalence from secondary data/RFS NCA	Strength of association with under nutrition from literature review	Seasonality of risk factor	Findings from the qualitative survey	Community rating exercise	Interpretation
Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding). 1.	4.56	+++	+++	+	++	++	Major
High workload for mothers 2.	4.33	++	++	+++	+++	++	Major
Poor practices of initiation breastfeeding, and exclusive breastfeeding. 3.	4.06	+++	+++	+	+++	++	Major
Poor sanitation and hygiene practices. 4.	3.94	+++	+++	+	++	++	Major
Poor health status of children under 5 (Ari prevalence, Diarrhea prevalence). 5.	3.94	+++	+++	++	+++	++	Major
High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap. 6.	3.89	+++	+++	+++	+++	++	Major
Poor hygiene practices in the household (food preparation and storage, solid waste management). 7.	3.83	+++	+++		+++	++	Major
Poor quality of drinking water (treatment). 8.	3.83	+++	+++		+		Important
Role of Education. 9.	3.72	++	+++		++	+	Important

Low purchasing power. 10.	3.72	+++	++	+++	+++	+++	Major
Limited male-involvement in child care practices. 11.	3.67				+	+	Minor
Low maternal nutritional status during pregnancy. 12.	3.61	+++	+++	++	+++	+++	Major
Early child bearing, high prevalence of teenage pregnancies. 13.	3.61	++	+++		++	+	Major
Low utilization of ANC+ maternity and postnatal services. 14.	3.61	+	+++	+	+	+	Important
Open defecation. 15.	3.61	+++	+++			+	Important
Dependency. 16.	3.61				-	-	Untested
Inadequate access to milk and animal products by the children and mothers. 17.	3.56	+++	+++	+	++	+++	Important
Poor maternal well being (violence and alcohol). 18.	3.56	++	+	+	+++	+	Important
Mothers not supported, especially when women headed households. 19.	3.50	++	+		++	+	Important
Poor agriculture products. 20.	3.50		++	+++	++	+++	Structural changes
High prevalence of Fever/malaria children 0-59 months. 21.	3.44	+++	+++	++	+	++	Major
Low Household livestock ownership. 22.	3.39		++		+++	++	Structural changes
Poor status of reproductive health (birth spacing and family planning). 23.	3.39	+++	+		+++	+++	Major
Poor utilization and maintenance of bed net.	3.22	+	++		+		Important

24.							
Lack of caregiver's empowerment. 25.	3.22	+					Important
Poor chain water and quantity. 26.	3.11	+			+		Important
Distance to water resource and time needed to collect water are long. 27.	3.11		+				Minor
Mental Health. 28.	3.00				+	+	Important
Insufficient use of soap and substitutes. 29.	2.78	+	++		++		Important
Insufficient income to cover transport costs to the nearest Health Centre. 30.	2.39	++	++	+	++	++	Important

8.5 Workshop rating[41]

Regarding the first activity on an assessment of the NCA analysis, four groups were therefore assigned a confidence score for each of the 30 risk factors. The average for the 30 risk factors is 2.46, which is a good score.

As regards the 13 major hypotheses, the score ranges between 3 [high] and 2 [medium]. The average is 2.7. For important risk factors, the score is slightly lower at 2.35. Finally, for two minor risk factors, the score is 1.75.

Of the 13 "major" risk factors, participants consensually kept 12 risk factors. One risk factor did not meet with consensus, that is, "Early child-bearing, high prevalence of teenage pregnancies.' Of the 12 'important' risk factors, participants maintained consensually 11 risk factors. They modified the ranking of two risk factors. The first, 'mental health', was assessed as a minor factor. The second 'Insufficient income to cover transport costs to the nearest Health Center' was also assessed as a minor factor. The table further below points to explanations given for this consensual modification. Of the two risk minor factors, one was elevated to a major factor. This is the hypothesis relating to the role of fathers, 'Limited male-involvement in child care practices.'

Referring to the comments of the participants, we observe that three risk factors were discussed: Limited male-involvement in child care practices—Mental health—Dependency. It is worth noting that these three factors have been studied during the NCA survey as part of the qualitative survey. In fact, in the focus groups with mothers, the issue of mental health has arisen once.

Regarding their role of fathers in the focus groups, men did not have a negative perception of their roles. Yet the number of activities they reported doing was minimal.

In as much as 'dependency' is concerned, in the focus groups for men and women, the issue was raised in terms of assistance; this risk factor was not touched upon as a complaint or as a lack. It was then classified as 'untested' because it would have included several other aspects explaining dependency such as assistance through food distribution.

Finally, the risk factor "Early child-bearing, high prevalence of teenage pregnancies" remains difficult to deal with, since it refers to two dimensions of fertility problems. Moreover, participants have emphasized this factor in their discussions. According to the RFS survey, nearly 30% of mothers had their first child before the age of 18. However, the question of teenage pregnancy is not of the same nature, it would refer more to social change. This problem was addressed in the qualitative survey. So we had sufficient evidence to show that in focus groups with teenage mothers, some of them were confronted with a problem of malnutrition in children under 5 years old. It should be noted that this hypothesis was assessed at the first workshop as a 'significant' risk factor.

41- This section is from the final workshop report published May 31, 2016.

Table23: Average confidence, rating proposed by experts, and comments for working group, Final Workshop, 17-18 May 2016

Risk factors	Rating proposed by Link NCA study Expert	Average of Confidence Note	Rating proposed by experts	Comments for Working Group
Inadequate infant and young child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding)	Major	3,00	Major	Lack of knowledge. Poverty and unavailability of food
High workload for mothers	Major	3,00	Major	Tradition and attitude of men
Poor practices of (initiation breastfeeding, exclusive breastfeeding)	Major	2,50	Major	Home delivery, poor maternal nutrition, lack of knowledge. Initiating a child to breastfeed and exclusively breastfeeding for 6 months is important for child survival and growth
Poor sanitation and hygiene practices	Major	2,75	Major	Data show high risk from open defecation and animal waste. Lack of water storage facilities. Attitude/beliefs. Mobility of pastoralists.
Poor health status of children under 5 (Ari prevalence, Diarrhea prevalence)	Major	2,75	Major	Link with poor hygiene practices.
High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap)	Major	3,00	Major	WFP Food, assistance in place, but not for all. Link with season and low purchasing power
Poor hygiene practices in the household (food preparation and storage, solid waste management)	Major	3,00	Major	Tolerance of child open defecation
Poor quality of drinking water (treatment)	Important	1,75	Important	Borehole water is considered safe
Role of education	Important	2,50	Important	
Low purchasing power	Major	3,00	Major	No savings. Poverty
Limited male-involvement in child care practices	Minor	1,50	Major	Gaps in data. Man is needed to share roles to

				reduce the burden of woman. Men sleep under trees but the pattern is changing.
Low maternal nutritional status during pregnancy	Major	2,25	Major	Pre pregnancy not considered. Most of children born are not underweight. ANC the mothers are monitored and given food supplements. Male involvement in maternity (ANC)
Early child bearing, high prevalence of teenage pregnancies	Major	2,00	No consensus	Pathway not clear, why risk of infection? Not all malnourished children are produced by teenager mothers; it has nothing to do with age. Girl's child education (poor). The survey% doesn't show a high risk. It is dependent for other factors.
Low utilization of ANC+ maternity and postnatal services	Important	2,75	Important	Most mothers only stop at ANC and vaccination days
Dependency	Untested	1,75	Untested	Only apply for some men. No definition given. Be clear on the type of dependency not tested.
Inadequate access to milk and animal products by the children and mothers	Important	2,50	Important	Link with seasonality, major risk factor because communities settling are dealing with (pastoralists). Need to introduce to vegetable and fruits
Poor maternal well being (violence and alcohol)	Important	2,75	Important	High workload, heavy drinker husbands turn violent; drinking mothers get pregnant often
Mothers not supported, especially when women head households	Important	2,50	Important	Every saucepan has a leader called a husband. It is a related contributing factor to already ranked risk factors e.g. low purchasing power.
Poor agriculture products	Basic cause	3,00	Basic cause	Poor rain pattern and harvest. With a good

				harvest no need for livestock.
High prevalence of Fever/malaria children 0-59 months	Major	2,75	Major	Few of the 70% were probably malnourished. Not all malnourished children have malaria.
Low Household livestock ownership	Basic cause	2,75	Basic cause	
Poor status of reproductive health (birth spacing and family planning)	Major	2,25	Major	Birth spacing questioned (24 months). Family planning should be in terms of number of children
Poor utilization and maintenance of bed net	Important	1,75	Important	Possession ≠utilization and maintenance. It is seasonal.
Lack of caregiver's empowerment	Important	2,50	Important	Only RFS result taken into account. Poverty, workload and knowledge.
Poor chain water and quantity	Important	3,00	Important	Because water from boreholes is contaminated, it is not boiled hence not safe to drink
Distance to water resource and time needed to collect water are long	Minor	2,00	Minor	Homesteads have close water sources
Mental Health	Important	1,50	Minor	Lots of gaps. Not a common factor. Link to poverty. Not common in Karamoja. It's a result not a cause. Link may be specific at high level
Insufficient use of soap and substitutes	Important	2,50	Important	Prevention (diarrhea disease).
Insufficient income to cover transport costs to the nearest Health Center	Important	2,25	Minor	The health centers are close to the villages, i.e. easily accessible. It is a long distance for malnourished children to cover to get to HC. For overall malnutrition it is minor since stunting can be managed at community level.

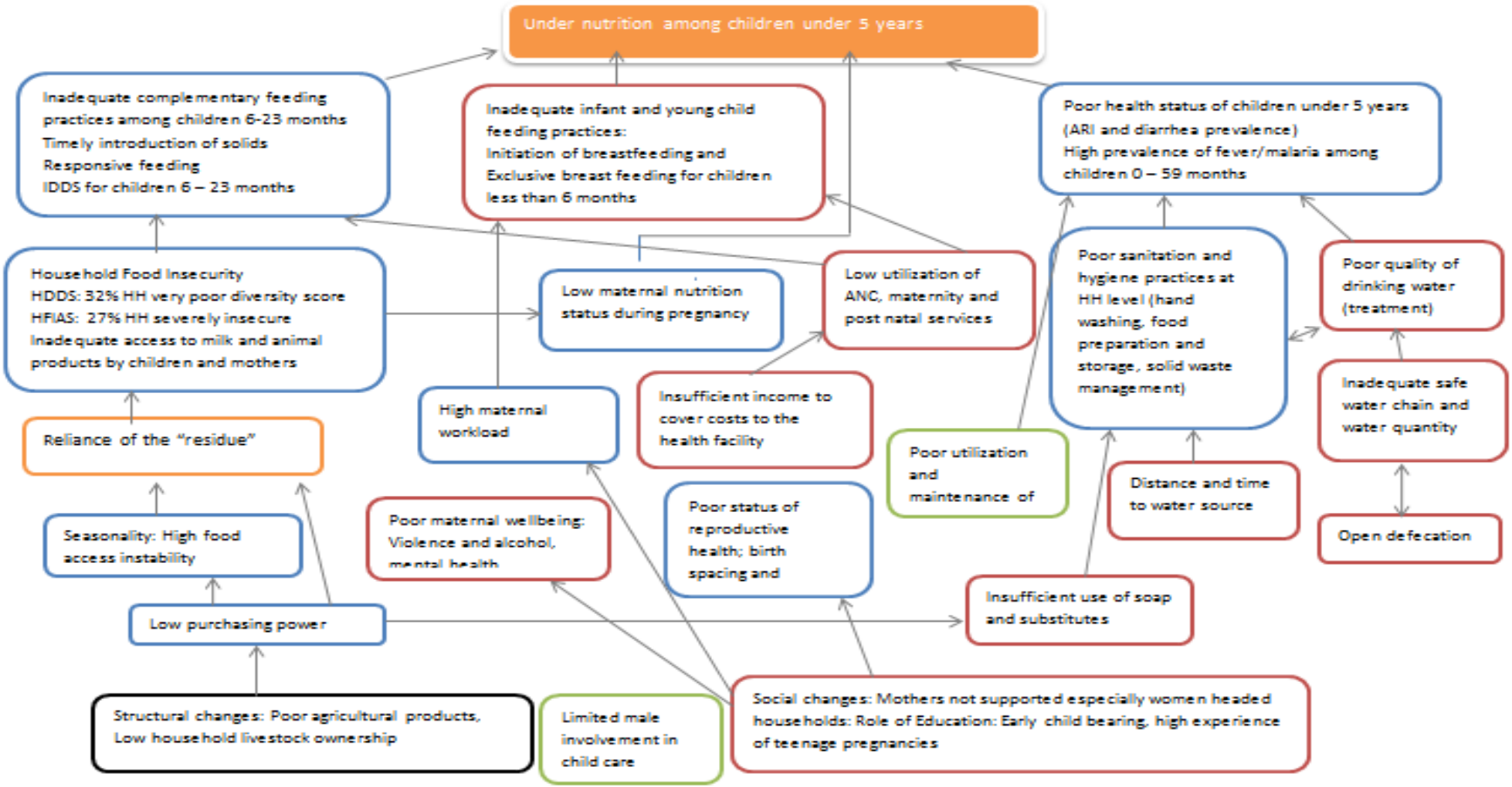
9. LOCAL CAUSAL MODEL

The formalization of the local causal model based on two pillars that characterize the Moroto local context. These structural changes occur in the district: loss of livestock, and recurrence of bad harvest during the rainy season. They result in social changes, more precisely social relations that alter the lifestyle of pastoralist communities.

Note that such representation builds on two main characteristics that households use to define poverty. For them, there is a process of impoverishment in progress for several years. In the rainy season, the crops are not sufficient, and in the dry season, the income-generating activities are not sufficient to ensure household food security. This depletion leads to uncertain perceptions of the future. The traditional world of pastoral communities is disturbed by an unintended settling process. Indeed, households have no cattle to transhumance; they must look to the future by relying on other strategies that will lead them to search for a job.

Despite this transition, institutions devoted to health and education appear in the economic and social landscape of the villages. These institutions are by definition bearing of positive changes aimed at improving children's living conditions. There was an increase in the use of these services by households. But a gap remains in the implementation of services in the institutional safety net; the communities have not yet understood the requirements of the spirit of the institutional protection which is that of empowering parents to get a good grip on the care of their children e.g. good hygiene practices.

Figure 35: NCA Local causal model: District of Moroto



Part III- Recommendations

1. FINAL WORKSHOP RECOMMENDATIONS

The recommendations can be found in the table below. For two groups, there are also proposals for the action plan.

It is interesting to note firstly that the recommendations and action plans of all groups were based on a bottom-up approach, where the community plays a leading role. Secondly, on the risk factor of high workload for mothers, that the amendments have brought a significant change in the role of men in improving the quality of life of mothers and children. A program involves a widening of the action plan to the family as an entity.

Finally, local experts are clearly of the opinion that the implementation of programs involving either the promotion of hygiene or the improvement of women's purchasing power should be parts of a regional plan for economic and social development in the Moroto District.

Recommendations	FSL	IYFP Care of women	IYCFP Care of children	WASH
Risk Factor	Low purchasing power High food instability	High Workload of mothers	Inadequate infant and young child feeding practices	Poor sanitation and hygiene practices
Objective	Labor market and pastoralist economic activities	Equal roles between men and women, and new economic activities	Community based monitoring and evaluation of CF practices	Promote, encourage and educate communities to improve WASH
Action Plan or Recommendations	Recommendations Strengthening access to credit Alternative income local labor market: more skills development Developing value chain for livestock and agricultural products Integration of farmers	Action Plan *Activity* To substitute charcoal burning and firewood: build income generating activities: *tree planting raiding of seed* Rudimentary way of farming	Recommendations Operational Research: use of human centered design approaches Community mobilization: sensitization, feedback meeting, community dialogue Engagement of LC1	Action Plan *Who's responsible* Food and safe water hygiene: clean preparation and clean and safe water: *Community* Using of soap:

	in the economic market Volunteer movement of pastoralist from density and concentration Restocking (use a zonal approach)	intermediate shifting: *use of Ox plough* To substitute livestock farming: diversification of agriculture: *introduction of poultry farming* Sensitization of men on their roles and responsibilities: advocate against bad cultural practices and norms: *cultural leaders, elders, opinion leaders*	and volunteer service providers to promote complementary feeding Advocacy to complementary feeding empowering champions, multi-sectorial approach Creating Centers of excellence CF practices : cooking food Consumption of bio-fortified food Promote small animals (complementary food)	wash hands demonstrate: *Community* Construction/use/maintenance of latrines using local available material: *VHT, Community* Strengthen Capacity building school health program for VHTs, women, and youth groups: *DHO'S* Enact policies at all levels District, Sub county-Parish, Village levels: *District Council* Monitoring and evaluation of the program*:* *District*

2. NEXT STEPS

The NCA analysis maintains 12 major hypotheses, and 13 important hypotheses Thus, it appears that for several years (2009), the high malnutrition prevalence has been particularly complex. However, the detailed of the risk factors analysis shows that we can formulate more appropriate action plans in light of causal demonstrations that have emerged from the NCA analysis.

According to the four sectors studied in the analysis of results, we can confidently recommend the following actions.

- In the sector of food security and livelihoods

Seasonality punctuates vulnerability to food insecurity. Everything is at stake on the quantity harvested during the rainy season. If this amount is small, it has a strong impact on women's ability to hold income-generating activities. Women are able to partially meet the food needs of the family. However, they must sacrifice the quality of the food diet of children for most of them are primarily fed through the preparation of a fermented cereal recipe which is called the residue. It would be useful in this context to deepen one hand the nutritional impacts of this recipe, and also to know what the effects of this recipe on the health of children in the long term.

A survey on the impacts and effects of residue would as a result of implementing a "cash transfer" system allowing mothers to have access to the food market during the dry season. All conditions for establishing a food security safety net should be examined as to the magnitude of the food crisis during the rainy season.

- In the sector of Care practices and Mental health

Regarding care for children (IYCP), it seems that for years there has been no real progress on risk factors related to practices in this area, the most important being the practice of exclusive breastfeeding. It is of crucial matter to address the enhancement of the practice. This practice proves to be a pre-requisite for a good introduction of complementary foods and the establishment of a diversified diet thereafter.

Regarding care of women, we now know that a major cause of malnutrition in Moroto district refers to the heavy job of mothers, particularly during the dry season. We know that this risk factor has a strong impact on malnutrition for two important reasons. First the mothers must leave home to go to the bush, they leave their children unattended. Then, they must go to the market to sell and buy food, which means they are not able to prepare two or three meals a day, taking care of their health or that of their children. Community organization of child care when mothers are at work could be a social innovation that enables secure children.

A risk factor emerged as being fundamental to the mothers of the villages in the rural area, it is the respect of the birth interval. As we observed, the men here are very reluctant to change the traditional male role, which does not mean they are resistant to reducing the prevalence of malnutrition. It would be appropriate to have an awareness campaign for men to have all the information about the negative impact of low birth spacing.

- In sector of health

As we have seen, there is a demand from women wanting to give birth in health centers. From this transition, it appears appropriate to continue to sensitize mothers to attend health centers for prenatal visits and especially to encourage them to establish a health check for their infants. Here one can think of TBA and VHT capacity building programs so that women can incorporate into their care practices, which can be simply termed as preventive practices against malnutrition.

- In the sector of unhealthy environment (water, sanitation, and hygiene)

This is probably in this area that we can respond quickly and effectively to as much as several years, the prevalence of all risk factors in this sector has not changed. It clearly appears that households have not integrated hygiene practices. This is an important vector in the prevalence of infectious diseases. A WASH action plan for improving hygiene practices thus appears entirely appropriate in Moroto District.

3. CONCLUSION

Holding an NCA inquiry aimed to identify risk factors that put children under five years old with a high prevalence of malnutrition (wasted, stunting).
Three components emerge from this analysis. First, food vulnerability is visible in Moroto District. Households must adopt strategies that are challenging the health of women, causing them to be in the search for income-generating activities that can not sufficiently meet the basic food needs of the family. To this is also added the recurrence of inappropriate practices in hygiene. Finally, if child malnutrition appears as an event for families, the representation of malnourished children among mothers is trivialized. In other words, they are all protection fronts facing the possible disappearance of their traditional way of life of pastoral communities.

Also, this analysis was to better understand why the malnutrition prevalence rate remains high despite efforts to support the population in Moroto District since 2009. We can now answer this question. The sedentarization is formalized by an abandonment of a pastoral society to that of an agricultural society remains undefined and abstract issue for the population. By staying in the dark, men forget the difficult conditions in which women find themselves. Trying to protect the pastoralist life of this test, women cannot protect children as they would like.
Finally, we can say that such investigation and thorough analysis that follows provides partners, local, national and international stakeholders an analytical framework that can be deployed in all fields of expertise in child malnutrition. The NCA analysis can then serve as a lever in order to formalize much more accurate projects indicators and programs so as to achieve in the coming years targets for reducing child malnutrition in Moroto District.

Annex: List of boxes, charts, figures, maps and tables

TABLE Page

Annex 1. NCA Indicators, Risk factor Survey, Moroto District, 2016

Table Baseline Indicators NCA
Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016

Indicator		95% CL		Population
	Value : Mean or Proportion	Lower	Upper	Sample, NCA
Household Level Indicator				
Household Size	5.47 (Std: 1,9467)			597
Household head age	34.17 (Std: 9,8058)			583
Father	35,28829			444
Status of head of household				607
Father	75,78%	72,13%	79,10%	460
Mother	21,91%	18,73%	25,46%	133
Grand parents	2,14%	1,19%	3,73%	13
Other	0,16%	0,01%	1,06%	1
Father Occupation				451
Farmer or/and pastoralist only	15,96 %	12,77 %	19,75 %	72
Farmer and Worker	10,64 %	8,02 %	13,95 %	48
Pastoralist and worker	4,43 %	2,80 %	6,88 %	20
Worker only	37,03 %	32,59 %	41,69 %	167
Unemployed	31,93 %	27,69 %	36,48 %	144
Number of wives	1,7212 (Std : 1,1094)			312
Main caregiver occupation				594
Housewife	69,36%	65,45%	73,01%	412
Farmer only	7,24%	5,35%	9,70%	43
Farmer part-time job	3,70%	2,39%	5,64%	22
Other	19,70%	16,62%	23,17%	117
Main caregiver marital status				589
Married	88,96%	86,08%	91,32%	524
In an union	5,43%	3,80%	7,67%	32
Separate	1,02%	0,41%	2,32%	6
Single	0,34%	0,06%	1,36%	2
Widow	4,24%	2,82%	6,29%	25
Main caregiver age	29.4 (Std : 8,1802)			589
Number of children U5	1.49 (Std: 0,6322)			577
1	55,11%	50,32%	59,21%	318
2	39,51%	35,52%	43,65%	228
3	3,64%	2,32%	5,60%	21
4	1,04%	0,42%	2,37%	6

Table Baseline Indicators NCA-RFS
Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016

	Indicator	95% CL		Population
	Value	Lower	Upper	Sample, NCA
Food security and Livelihoods				
HDDS: Household Dietary Diversity Score	3.47 (Std Dev : 1.64)			590
HDDS<3	32,20%	28,48%	36,17%	190
HDDS 3-4	42,03%	38,03%	46,14%	248
HDDS 5-6	20,68%	17,53%	24,22%	122
HDDS > 6	5,08%	3,51%	7,26%	30
HDDS: Milk				600
No	87,50%	84,52%	89,99%	525
Yes	12,50%	10,01%	15,48%	75
HFIAS: Household Food Insecurity Access Scale	16.86, (Std Dev: 4,7228)			600
Secure	2 % (11, 2, Std Dev : 4,722811)			
Mildly	23% (17,16, Std Dev 4,1144)			
Moderately	46% (17,25, Std Dev : 3,9612)			
Severely	27% (17,62, Std Dev :3,5141)			
MAHFP: Months of Adequate Food Provisioning	6.075 (Std Dev: 3.13)			587

Table Baseline Indicators NCA
Indicators, 95% Confidence Intervals and Base Population, District of Moroto, Uganda, 2016

Unhealthy environment (WASH)	**Indicator**	**95% CL**		
	Value	Lower	Upper	Sample, NCA
Indicator	Mean or Proportion			
Households observation				600
Number of Households with improved water source	90% (1)			541
Safety of the water source	98,15%	96,51%	99,06%	533
1. Ground open well, well borehole with hand pump, well borehole with motorized pump system				
No Risk	0,75%	0,24%	2,05%	4
Mild Risk	25,14%	21,56%	29,09%	134
Moderate Risk	71,11%	67,02%	74,88%	379
Severe risk	3,00%	1,78%	4,93%	16
Water management				603
Good Practices	18,87%	15,88%	22,28%	114
Water Management observation score				603
Mild risk	15,75%	12,99%	18,97%	95
Moderate risk	30,18%	26,57%	34,05%	182
Severe risk	34,05%	43,72%	51,83%	288
Water needs	(per capita per day)			580
Total Basic needs	9.31 (Std: 8,2249)			
Drinking water	1,3362 (Std :1,1437)			
Food preparation	1,7089 (Std Dev : 1,75)			
Bathing	0,3553 (Std :0,1783)			
Cleaning the house	0,631 (1,7077)			
Latrines				600
Household with Latrines	18,00%	15,06%	21,36%	108
Use of safe latrines	22,22% (HH with Latrines)	14,79%	31,24%	24
Open defecation in compound	1,67%	0,85%	3,15%	10
Open defecation outside houses	80,33%	76,88%	83,39%	482
People using the household or latrine in village	5,2479 (Std : 6,3976)			117
Disposal of child feces				340 HH
Children 0-23				321 Children
Safe disposal child feces	20%			67
				535
Caregiver hand washing good behavior	44,86%	40,60%	49,19%	240
				591
Use of soap	31,47%	27,78%	35,41%	186
Observation (have a soap)	30%			176
Household Hygiene (food) observation				600
Good	71,67%	67,85%	75,21%	430
Bad	28,33%	24,79%	32,15%	170
Household hygiene (animal waste)				601
Observe Animal waste	77,37%	77,37%	80,61%	465
Water collection and distance to water point				602
30 minutes or less	78,41%	74,86%	81,58%	472
31-61 minutes	15,28%	12,55%	18,47%	92
61-180 minutes	4,49%	3,03%	6,54%	27
More than 3 hours	0,83%	0,31%	2,04%	5

95% CL Population	Indicator			
HEALTH				
	Value	Lower	Upper	Sample, NCA
Children health status				
Acute respiratory infections				813
24-59 months	54,80%	50,17%	59,35%	257 (469)
0-23 months	70,64%	65,47%	75,34%	243 (344)
Diarrhea in the past 14 days				821
24-59 months	26,91%	23,00%	31,19%	127 (472)
0-23 months	49,28%	43,93%	54,65%	172 (349)
Fever in the past 14 days				816
24-59 months	51,18%	46,55%	55,79%	239 (467)
0-23 months	57,88%	52,50%	63,09%	202 (349)
Utilization of Bed net (0-59 months)				781
Exposure to Mosquitos	61%	55,26%	65,57%	438
Access to health service for children				
DPT3 Immunization				184
12-23 months	90,05%	84,90%	93,90%	172
Access to health service Women				
ANC				
Have Antenatal care	96,19%	94,20%	97,54%	556 (578)
With Health worker	97,01%	95,15%	98,19%	551 (568)
ANC: Caregivers who saw a health professional 4 times	49,48%	45,35%	53,62%	288 (556)
Less than 4 times	23,02%	19,71%	26,70%	134
More than 4 times	21,99%	18,74%	25,63%	128
Last delivery at hospital or Health center	67,61%	63,56%	71,41%	384 (568)
Delivery at home	27,64%	24,04%	31,55%	157 (568)
Distance to Health center				578
60 minutes	59,69%			345
Main barriers to the Health center				561
Money costs	44,92%	40,76%	49,15%	252
Transportation	36,90%	32,92%	41,06%	207
Distance	15,51%	12,67%	18,83%	87
Service is not good enough	5,70%	3,99%	8,04%	32
Decision power	2,32%	1,29%	4,03%	13
Culture	1,60%	0,78%	3,14%	9

Annex 2: Questionnaire, RFS Survey

1. Identification						
		Day/Month/ Year				
ID. 10	Date of Survey	/ /	**ID. 60**	Starting Time of the Interview		H. / min
ID.20	Name of the village		**ID. 70**	Ending Time of the Interview		H. / min
		1 to 46	**ID.80**	Does the head of Household accept the interview?		Yes=1 No=0
ID.30	Number of Cluster		**IF Not**			
		1 to 8	**ID. 90**	What is the reason?		
ID.40	Team ID number		Could you please answer at the only question If not ID.80 ?		INH.09	Size of the household _____
		1 to 15	**IF Yes**			
ID. 50	Household Number		Now, I read the consent form			
ID.100	**ID QUESTONNAIRE**		**READ THE CONSENT FORM**			

/ name is (*enumerator name*) ……And I would like to invite you to participate in a study carried out by **Action against Hunger** (ACF), an organization ıich is involved in nutrition, food security, water and sanitation activities and committed to ending child undernutrition. I will first explain the study, and then ask if you would like to participate. If u want to ask any questions, please ask at any time. This study is funded by **UNICEF and WFP.** The purpose of this research project is to learn more about the causes of child malnutrition in mmunities of Moroto. We expect that this study will help to improve the understanding of undernutrition for you, your community, local authorities and other agencies in order to reduce under-trition in the future. As a community member, you are in a position to provide us with insight into the situation, and I would appreciate it if we could interview you. To participate in this study, you ıst be 18 years of age or older. If you decide to participate in the study, we will ask some questions about your household's health, water access, sanitation, and food-related practices. These estions will take no more than one hour. If you agree to participate in this research, we will take notes on your responses to our questions. We will record your father's name; however your swers will not be connected to you or your family. Your name or your father's name will not be reported in any publication; only information that does not identify you will be used for this study. e do not expect any foreseeable risk or harm to come to you from your participation in this study – in no way will your responses affect your eligibility for benefits from current or future programs. ıe decision whether to be in this study is entirely up to you. You are free to refuse to participate. If any question I ask makes you uncomfortable, you do not need to answer. You can stop rticipating in this study at any moment you want. Your decision to stop will not affect your relationship with any institution, either now or in the future. Your decision to participate or not to rticipate in this study does not affect your eligibility for any current or future program benefits from any agency.

REQUEST FOR MORE INFORMATION: If you have additional questions or concerns about this research at any point after you participate in this study, you can contact me or my fellow researcher.

CONSENT
Do you have any questions about this study including about what I've just described to you?
Are you willing to participate in this study?

Signature:

INH.09	**Size of the household**	**__ __**	
INH. 10	Does a child from 0 to 59 months is present in the household?	Yes = 1	No = 0
	If no, go to the next household, If yes, go to the next question		
INH. 12	Is the head of household present?	Yes = 1	No = 0
	If yes or no, go to the next question		
INH. 14	Does the mother or the caregiver of the 0-59-month child is present?	Yes=1	No=0
	If yes go to HOH.10 or make an Appointment		
INH. 116	I would like to ask few questions to the caregiver of the child, at what time could we come back?	__ __:__ __ AM/PM	

Part2. Household composition						
HOH.10	Who is the household head of your household?	Father=1	Mother=2	Grandparent =3	other=4	
HOH.11	How old is he/she? Age		_____ _____			
HOH.12	What is his or her occupation?	Farmer or/ and pastoralist only=1	Farmer and worker=2	Pastoralist and worker=3	Worker only=4	Unemployed=5
HOH.12.1	**If HOH 12 is : 2 or 3 or 4** In which sector do you work?		Mining=1 Gov/adm services=2 Sale of food (excluding alcohol and soft drinks) on the market=3 Sale of non-food products on the market (clothing, shoes, etc.)=4 Selling drinks and water only=5 Selling drinks and alcohol market=6 Canteen and restaurant market=7 Other=8 Specify_____			
HOH.13.	If the head household is a male: How many wives do you have?		_____ _____			
HOH.13.1	If it is more than one, where do your other wives live? **Go to H.15**	In the same Manyatta= 1	On another Manyatta=2	In the same Manyatta and another Manyatta=3		
HOH.14	If the household head is "mother": Where your husband lives?	In the same Manyatta= 1	On another Manyatta=2	Not relevant=3		
HOH.15	How many children under 5 years old lived in your home?	_____ _____				
HOH.16	Do all these children under 5 years living in this house have the same caregiver?	**Yes= 1**	**No=0**			
HOH.17	If no, how many caregivers are living in your household?	_____	**PREPARE THE NUMBER OF QUESTIONNAIRES YOU NEEDED TO FILL FOR EACH CAREGIVER.**			

If only one caregiver, fill HOH 18 to HOH 26. If more than one, continue with HoH 19 to HOH 27.							
HOH.18	Could you give the name of the first caregiver?	Name:		**HOH.19**	Could you give the name of the second caregiver?	Name:	
HOH.20	How many children have the first caregiver?	---- ----------		**HOH.27**	How many children have the second caregiver?		
HOH.21	How many children have under 5 years old?	----------		**HOH.28**	How many children have under 5 years old?		
Could you give the name and for each of them, the age: the youngest to the oldest				Could you give the name and for each of them, the age: the youngest to the oldest			
HOH.22	Name:	**HOH.22.1**	--- --- (in months)	**HOH.29**	Name:	**HOH.29.1**	--- --- (in months)
If child age is below than 23 months, You should fill **A Child Questionnaire**				If child age is below than 23 months, You should fill **A Child Questionnaire**			
HOH.23	Name:	**HOH.23.1**	**--- ---** (in months)	**HOH.30**	Name:	**HOH.30.1**	--- --- (in months)
If child age is below than 23 months, You should fill **A Child Questionnaire**				If child age is below than 23 months, You should fill **A Child Questionnaire**			
HOH.24	Name:	**HOH.24.1**	--- --- (in months)	**HOH.31**	Name:	**HOH.31.1**	--- --- (in months)
If child age is more than 23 months, you should fill questionnaire **B Child Questionnaire**				If child age is more than 23 months, you should fill **B Child Questionnaire**			
HOH.25	**Name:**	**HOH.25.1**	--- --- (in months)	**HOH.32**	Name:	**HOH.32.1**	--- --- (in months)
If child age is more than 23 months, You should fill questionnaire **B Child Questionnaire**				If child age is more than 23 months, You should fill questionnaire **B Child Questionnaire**			
HOH.26	Name:	**HOH.26.1**	**--- --- (in months)**	**HOH.33**	Name:	**HOH.33.1**	**--- --- (in months)**

PART3. Food security and Livelihood FSL				
1. HDDS: Household Dietary Diversity Score				
Now I would like to ask you about the types of food that you or anyone else in your household ate yesterday during the day and at night. Since till this morning, what is the food eaten in your household? **DO NOT READ THE ANSWER FIRST, THEN PROBE**				
HDDS	Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night	YES	No	
HDDS.10	Any bread, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?	1	0	
HDDS.20	Any potatoes, yams, manioc, cassava or any other foods made from roots or tubers?	1	0	
HDDS.30	Any vegetables?	1	0	
HDDS.40	Any fruits?	1	0	
HDDS.50	Any beef, pork, lamb, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	1	0	
HDDS.60	Any eggs?	1	0	
HDDS.70	Any fresh or dried fish or shellfish?	1	0	
HDDS.80	Any foods made from beans, peas, lentils or nuts?	1	0	
HDDS.90	Any cheese, yogurt, milk or other milk products?	1	0	
HDDS.100	Any foods made with oil, fat or butter?	1	0	
HDDS.110	Any sugar or honey?	1	0	
HDDS.120	Any other foods, such as condiments, coffee, tea?	1	0	
HDDS.130	TOTAL (Sum 0-12)			
	2. HFIAS: Household Food Insecurity Access Scale			
Now I would like to ask you what the food available to your household was for the past four weeks. To answer this question, please think about the last four weeks. **If the answer is NO passes to the next question (EX. HFIAS.10 is no, pass to HFIAS.20)**				
HFIAS.10	1. Did you worry that your household would not have enough food? If no, pass to HFIAS.20	1		
HFIAS.11	How often did this happen in the past four weeks?	1	2	3
HFIAS.20	2. Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	1		
HFIAS.21	How often did this happen in the past four weeks?	1	2	3
HFIAS.30	3. Did you or any household member have to eat a limited variety of foods due to a lack of resources?	1		
HFIAS.31	How often did this happen in the past four weeks?	1	2	3
HFIAS.40	4. Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	1		
HFIAS.41	How often did this happen in the past four weeks?	1	2	3
HFIAS.50	5. Did you or any household member have to eat a smaller meal than you felt you needed because there was not	1		

Caregiver Questionnaire

ID.200	Name of the village		**Now I would like to ask you questions about yourself.**						
ID.300	Number of Cluster (1 to 30)		**HOH.40**	What is your occupation?	Housewife= 1	Farmer only =2	Farmer and Part-time job=3	Other=4 Specify	
ID.400	Team ID number (1-8)		**HOH.50**	What is your marital status?	married=1	In an union=2	separated=3	single=4	widow=5
ID.500	Household Number 1 - 20)		**HOH.60**	How old are you?	___ ___ years				
ID.240	Caregiver ID		**CG.1010**	Source for Birth	Caregiver statement= 1		Birth certificate=2		
CG.1020	What is the relation with the child (name)?	Mother=1		Father=2		Grandparent=3		Other=4	
The next section will be fulfilled only to responders announced that are the mother (see CG.1020).									
CG.2020	Did you eat more/less/same amount as usual when you were pregnant or breastfeeding?				More=1		Less=2		Same=3
CG.2030	What is the caretaker's physiological status?				Pregnant=1		Lactating=2		None of above=3
CG.2040	Did you go to school? If no, go to question CG.2050				Yes= 1		No= 0		
CG.2041	If yes: How many years have you completed?				Number _____				
CG.2050	Do you feel supported? **Include all kinds of support such as financial, social, etc. Do not probe. The question is left to understanding of the mother.**				extremely= 1	somewhat=2	not very=3	not at all=4	
CG.2060	**Do you feel you have too much work to take care of your child**				Yes =1		No=1		

Please indicate for each of the five statements, which is closest to how you have been feeling over the last two weeks. **Example: If the respondent has felt cheerful and in good spirits more than of the time during the most two weeks, put a tick in the box number3.**							
Over the last two weeks?		All of them	Most of time	More than half of the time	Less than half of the time	Some of the time	At no time
WHO.10	I have felt cheerful and in good spirits	5	4	3	2	1	0
WHO.20	I have felt calm and relaxed	5	4	3	2	1	0
WHO.30	I have felt active and vigorous	5	4	3	2	1	0
WHO.40	I woke up feeling fresh and rested	5	4	3	2	1	0
WHO.50	My daily life has been filled with things that interest me	5	4	3	2	1	0
WHO.60	Total: calculate immediately by summing up all answers						

If after adding up the columns the score is below 13 or if the caregiver has answered 0 to 1 at any of the 5 items, then there is a risk of depression. In this case, also administer the 10 questions from this MDI (Major Depression Inventory).

How much of the time in the last two weeks:	**All the time**	**Most of the time**	**Slightly More than half the time**	**Slightly less than half the time**	**Some of the time**	**At no time**
Have you felt low in spirits or sad?	5	4	3	2	1	0
Have you lost interest in your daily activities?	5	4	3	2	1	0
Have you felt lacking in energy and strength?	5	4	3	2	1	0
Have you felt less self-confident?	5	4	3	2	1	0
Have you had a bad conscience or feelings of guilt?	5	4	3	2	1	0
Have you felt that life wasn't worth living?	5	4	3	2	1	0
Have you felt difficulty in concentrating, e.g. when reading the newspaper?	5	4	3	2	1	0
Have you felt very restless?	5	4	3	2	1	0
Have you felt subdued or slowed down?	5	4	3	2	1	0
Have you had trouble sleeping at night?	5	4	3	2	1	0
Have you suffered from increased appetite?	5	4	3	2	1	
MD.10	**TOTAL 0-50**					

H.50	Did you see anyone for antenatal care for your last pregnancy? If NO, go to H.61					Yes=1	No=0
H.60	If yes whom did you see?	1= Health worker (Doctor, nurse, midwife, auxiliary midwife)	2= Traditional birth attendant	3= VHT (Village Health Team)	4= relative friends	5= Others	
Probe: anyone else? Till the respondent any answer "no one else" Probe for the type of person seen and tick all answers given.							
H.70	How many times did you see someone for antenatal care?					____ ____ times	
H.61	Where did you go for your last delivery?		Health center=1	Stay at home=2	Other=3		
H.65	How old are you when you gave birth for the first time?		___ ___ years				

What are your main barriers from going to the health center when someone is sick?

H.80	1= Money cost	2=Time	3= Transportation means	4= Geographical distance	5=Decision power	6= service is not good enough	7=Culture Specify_____

Child Questionnaire

ID.210	Name of the village		Do you have another child aged more than 24 months and less than 59 months? IF YES			**C.20**	Yes=1 No=2
ID.310	Number of Clusters 1-30		How many?	**C.30**	----------number of children 24-59 months		
ID.410	Team ID numbers 1 to 8		IF the answer is **1** child, go to **ID.111**, If the answer is **2**, Fill another **Child questionnaire PART B** for the second children 24-59 months				
ID.510	Household Number, 1 to 20		**ID.111**	Selected Child (Name)			
ID. 110	Selected child (Name)		**ID.811**	**_____ months**			
Do you know the birth date (Name)? If not calculate immediately in months, if the birth date is known. Otherwise use the event calendar to define age.			**ID.921**	**Source of obtaining age**	**Birth certificate=1**	**Event calendar=2**	
ID.710	Yes=1	No=2	**ID.926**	**Sex of selected a child**	**Male=1**	**Female=2**	
ID.810	**_____ months**		**ID.112**	**Child ID (0-23 months)**			
ID.920	**Source of obtaining age**	**Birth certificate=1** / **Event calendar=2**	**ID.113**	**Child ID (24-59 months)**			
ID. 925	**Sex of selected a child**	**Male=1** / **Female=2**					

If ID. 110 (Name) is less than 23 months, **Ask:** Do you have another child aged less than 23 months?	**C.10**	Yes=1 No=2	**If No Fill Questionnaire Part A below** If **YES** Fill for another **CHILD questionnaire PART A**

A Child Questionnaire 0-23 months		**B Child Questionnaire 24-59 months**	
Sibling of the child: RH Child questionnaire **Care practices and Health, Sanitation: A Child Questionnaire (0-23): A1-A7-A8-A9-A10-A11-A13-A14** **Section: A2* A3* A4* A5* A6* A12* (*for specific age groups)**		**Sibling of the child: RH child questionnaire** **Care practices and Health, Sanitation B Child Questionnaire: AB7- AB8- AB9- AB10- AB11- AB 14**	
A1	**Early Breast feeding (0-23 months)**		
A2	**Exclusive Breast feeding (0-6 months)**		
A3	**Introduction of solids and soft food (6-8 months)**		
A4	**Continued breast feeding at one year (12-15 months)**		
A5	**IDDS (6-23 months)**		
A6	**Meal frequencies (6-23 months)**		
A7	**Child Feeding Behavior Children (0-23 months)**	**AB7**	**Child Feeding Behavior Children (24-59 months)**
A8	**Child Caregiver Interaction (0-23 months)**	**AB8**	**Child Caregiver Interaction (24-59 months)**
A9	**Acute respiratory infection (0-23 months)**	**AB9**	**Acute respiratory infection (24-59 months**
A10	**Diarrhea (0-23 months)**	**AB10**	**Diarrhea (24-59 months)**
A11	**Fewer (0-23 months)**	**AB11**	**Fewer (24-59 months)**
A12	**DPT3 Immunization (12-23 months)**		
A 13	**Safe disposal of child feces (0-23 months)**		
A14	**Observation Child Caregiver interaction**	**AB14**	**Observation Child Caregiver interaction (24-59 months)**

Now I would like to ask some questions about your child. Part A: Child-0-23 months

RH Sibling of the Child			
RH.60	Does (name) have a younger sibling	Yes=1	No=0
RH.61	If yes, what is the age difference between (**name**) and his/her direct younger sibling?	_____ Months	
RH.62	If don't know, what is the age of his/her direct younger sibling? **Use the Event calendar and Calculate immediately his/her age, then fill RH.61**	---------- Months	

A1 : Early Breast feeding (0-23 months)					**A2: Exclusive Breast feeding (0-6 months)**				
CP.10	Has (Name) ever been breastfed If yes fill the next question CP.11	**Yes =** **1**	**No =** **0**	**Don't know =** **8**	**CP.20**	Was (Name) breastfed yesterday during the day or at night?	**Yes =** **1**	**No =** **0**	**Don't know =** **8**
For CP.11	**If respondent reports she put the infant to the breast immediately after birth, circle "000" for immediately. If less than one hour, circle "1" for one hour, and records "00" hours. If less than 24 hours, circle "1" and record number of completed hours, from 1 to 23. Otherwise circle "2" and record number of completed days;**				Sometimes babies are fed breast milk in different ways, for example by spoon, cup or bottle. This can happen when the mother cannot always be with her baby. Sometimes babies are breastfed by another woman, or given breast milk from another woman by spoon, cup or bottle, or some other way. This can happen if a mother cannot breastfeed her own baby.				
	How long after birth did you first put to the breast? **Probe**								
CP.11	Immediately 000	Less than one hour 1	Less than 24 hours (from 1 to 23) 1 --- ---	More than 24 hours 2	Number of completed days ----- -----	**CP.21**	Did (name) consume breast milk in any of these ways yesterday during the day or at night?	**Yes =** **1**	**No =** **0**	**Don't know =** **8**

Continued A2: Exclusive Breast feeding (0-6 months)

Next, I would like to ask you about some liquids that (Name) may have had yesterday during the day or at night.Did (Name) have any:

CP.50	Plain water	Yes=1	No=2	Don't know=8
CP.51	Infant formula such as Simulac and Promil	1	2	8
CP.52	Milk such as tinned, powdered, or fresh animal milk?	1	2	8
CP.53	Juice or juice drinks?	1	2	8
CP.54	Clear broth?	1	2	8
CP.55	Yogurt/Curd?	1	2	8
CP.56	Thin porridge?	1	2	8
CP.57	Any other liquids as water syrup?	1	2	8
CP.58	Any other liquids?	1	2	8

Continued A2: Exclusive Breast feeding (0-6 months)

How many times yesterday during the day or at night did (name) consume any (item from list)?

CP.60	Infant formula such as Simulac and Promil?	Time B	__ __	
CP.61	Milk such as tinned, powdered, or fresh animal milk?	Time C	__ __	
CP.62	Thin porridge?	Time F	__ __	
CP.70	Did (name) eat any solid, semi-solid, or soft foods yesterday during the day? If YES, go to CP.71	Yes=1	No=0	Don't know=8
CP.71	How many times did (name) eat solid, semi-solid, or soft foods other than liquids yesterday during the day or at night?	Number of times	_____	

A3 Introduction of solids and soft food (6-8 months)				
CP.72	Did (name) eat any sold, semi-solid, or soft foods yesterday or during the day? If yes go CP.73	Yes= 1	No= 0	Don't know= 8
CP.73	How many times dis (name) eat solid, semi sold, or soft foods other than liquids yesterday?	Number of times		

A4 Continued breast feeding at one year (12-15 months)				
CP.74	Was (***name***) breastfed yesterday during the day or at night?	Yes=1	No=2	Don't know=8
Sometimes babies are fed breast milk in different ways, for example by spoon, cup, or bottle. This can happen when the mother cannot always be with her baby. Sometimes babies are breastfed by another woman, or given breast milk from another woman by spoon, cup or bottle or some other way. This can happen if a mother cannot breastfeed her own baby.				
CP.75	Did (*name*) consume breast milk in any of these ways yesterday during the day or at night?	Yes=1	No=2	Don't know=8

A5 IDDS (6-23 months)

Next I would like to ask about some liquids that (Name) may have had yesterday during the day or night.
Did (name) have any

IDDS.110	Plain water	Yes=1	No=0	Don't know=8
IDDS.111	Infant formula such as simulac and promil	Yes=1	No=0	Don't know=8
IDDS.112	Milk such as tinned, powdered, or fresh animal milk?	Yes=1	No=0	Don't know=8
IDDS.113	Juice or juice drinks?	Yes=1	No=0	Don't know=8
IDDS.114	Clear broth?	Yes=1	No=0	Don't know=8
IDDS.115	Yogurt/Curd?	Yes=1	No=0	Don't know=8
IDDS.116	Thin porridge?	Yes=1	No=0	Don't know=8

Please describe everything that (name) ate yesterday during the day or at night, whether at home or outside the home. Please, think about when (name) he/she woke up yesterday morning, till the time he/she woke up that morning, at home or outside. Think about the time he/she woke yesterday. If YES: Tell me everything (name) ate at that time. What did (name) after that? Did she/he eat something at that time? If YES What did (name) after that? ANYTHING ELSE - Continue till the person answer, "nothing else." Repeat the question till this morning weak up. If the participants answer a mix dishes, ask:"What was the ingredient of this dish? Till all the food category related to the mix dishes. Each time one is telling what the child ate, tick yes in the food category. ONCE THE RESPONDENT FINISHES RECALLING FOODS EATEN, READ EACH FOOD GROUP WHERE '1' WAS NOT CIRCLED, ASK THE FOLLOWING QUESTION AND CIRCLE '1' IF RESPONDENT SAYS YES, '2' IF NO AND '8' IF DON'T KNOW

IDDS.120	Porridge, bread, rice, noodles, or other foods made from grains	Yes =1	No=2	Don't know= 8
IDDS.121	Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside	Yes =1	No=2	Don't know= 8
IDDS.122	White potatoes, white yams, manioc, cassava, or any other foods made from roots	Yes =1	No=2	Don't know= 8
IDDS.123	Any dark green leafy vegetables	Yes =1	No=2	Don't know= 8
IDDS.124	Ripe mangoes, ripe papayas, or (insert other local vitamin A-rich fruits)	Yes =1	No=2	Don't know= 8
IDDS.125	Any other fruits or vegetables	Yes =1	No=2	Don't know= 8
IDDS.126	Liver, kidney, heart, or other organ meats	Yes =1	No=2	Don't know= 8
IDDS.127	Any meat, such as beef, pork, lamb, goat, chicken, or duck	Yes =1	No=2	Don't know= 8
IDDS.128	Eggs	Yes =1	No=2	Don't know= 8
IDDS.129	Fresh or dried fish, shellfish or seafood	Yes =1	No=2	Don't know= 8

IDDS.130	Any foods made from beans, peas, lentils, nuts, or seeds	Yes =1	No=2	Don't know= 8
IDDS.131	Cheese? Yogurt, or other milk products	Yes =1	No=2	Don't know= 8
IDDS.132	Any oil, fats, or butter, or foods made with any of these	Yes =1	No=2	Don't know= 8
IDDS.133	Any sugary foods such as chocolates, sweets, candies, pastries, cakes or biscuits	Yes =1	No=2	Don't know= 8
IDDS.134	Condiments for flavor, such as chilies, spices, herbs, or fish powder	Yes =1	No=2	Don't know= 8
IDDS.135	Grubs? Snails or insects	Yes =1	No=2	Don't know= 8
IDDS.136	Foods made with red palm oil, red palm nut, or red palm nut pulp sauce	Yes =1	No=2	Don't know= 8

A6 : Meal frequencies (6-23 months)				
MF.10	Was (***name***) breastfed yesterday during the day or at night?	Yes=1	No=2	Don't know=8
MF.11	Did (***name***) consume breast milk in any of these ways yesterday during the day or at night?			
	How many times yesterday during the day or at night did (***name***) consume any (**item from list**)?			
MF.12	B. Infant formula such as (insert local examples)?	Times B: |_||_|		
MF.13	C. Milk such as tinned, powdered, or fresh animal milk?	Times C: |_||_|		
MF.14	F. Thin porridge?	Times C: |_||_|		
MF.15	How many times did (***name***) eat solid, semi-solid, or soft foods other than liquids yesterday during the day or at night? Number of times:			Don't know=98

A7 Child Feeding Behavior Children (0-23 months)				
CP.100	Does anyone help (name) to eat	Yes=1	No=0	Don't know=8
CP.110	What do you do when (name) refuses to eat? Categorize answers into the positive, negative, or no reaction	Nothing=1	Other (coax, play with, change food)=2	Force=3

A8 Child Caregiver Interaction (0-23 months)				
CM.10	In the past 3 days, did you or any household member over 15 years of age engage in story-telling, singing or playing with (**name**)?	Yes= 1	No=0	Don't know=8
CM.20	Do you leave (**name**) alone or in the care of other children younger than 12 years of age? If YES go to the next one	Yes= 1	No=0	Don't know=8
CM.21	How often?	every day=1	several times a week=2	Less than once a week=3

A9 Acute respiratory infection (0-23 months)				
H.20	Has (name) had an illness with a cough (trouble breathing or breathe faster than usual with short, quick breaths) in the past two weeks?	yes=1	No=0	Don't know=8

A10 Diarrhea (0-23 months)				
H.30	Has (name) had diarrhea (more than 3 loose or watery stools in 24-hour period) in the past two weeks?	yes=1	No=0	Don't know=8

A 11 Fewer (0-23 months)				
H.40	Has (name) had fever in the past 14 days?	Yes=1	No=0	Don't know=8
H.50	May I see the place where (name) sleeps? If yes	Yes=1	No=0	
	Then check for the presence of a mosquito net. If the mosquito net is not placed above the bed of the child, we consider that the child is not sleeping under an ITN.			
H.60	The mosquito net is placed above the bed?	Yes=1	No=0	

A 12 DPT3 Immunization (12-23 months)				
H.70	Has (name) (if 12-23 months) received DPT3 immunization before his/her first birthday? If yes	yes= 1	no= 0	Don't know=8
H.71	Specify the source?	On statement=1	Immunization card=2	

A 13 Safe disposal of child feces-0-23 months										
The last time (name) passed stool, where did the child defecate? *(If answer is 7-8, skip SANQ14.)*								**SANQ.13**		
Used potty=1	Used washable diaper=2	Used disposable diapers=3	Went in his/her clothes=4	Went housing/yard=5	Went outside the premise=6	Used own sanitation facility=7	Used public latrine=8	Other (specify)=9	Don't know=10	
The last time (Name) passed stool, where were his/her feces disposed?								**SANQ.14**		
Dropped into toilet facilities=1	Buried=2	Solid waste/trash=3	In yard=4	Outside premises=5	Public latrine=6	Into sink or tub=7	Thrown into waterways=8	At the well=9	Thrown elsewhere (specify)= 10	Washed or rinsed away(specify)= 11

 A 13 Observation Child-Caregiver interactions		
Caregiver tends to keep the child within visual range and looks at the child quite often	Yes=0	No=1
Caregiver talks to the child during the course of the visit	Yes=0	No=1
Caregiver interacts with child to promote development and learning	Yes=0	No=1
Caregiver smiles at the child, laughs with the child, caresses, kisses or hugs the child.	Yes=0	No=1
Caregiver spanked or hit the child during the visit, or shouted or yelled at him/her.	Yes=1	No=0
Calculate the Sum	**CM.30**	

B. Child Questionnaire 24-59 months

RH Sibling of the Child			
RH.60	Does (name) have a younger sibling	Yes=1	No=0
RH.61	If yes, what is the age difference between (**name**) and his/her direct younger sibling?	_____ Months	
RH.62	If don't know, what is the age of his/her direct younger sibling? **Use the Event calendar and Calculate immediately his/her age, then fill RH.61**	---------- Months	

AB7 Child Feeding Behavior Children (24-59 months)				
CP.100	Does anyone help (name) to eat	Yes=1	No=0	Don't know=8
CP.110	What do you do when (name) refuses to eat? Categorize answers into the positive, negative, or no reaction	Nothing=1	Other (coax, play with, change food)=2	Force=3

AB 8 Child Caregiver Interaction (24-59 months)				
CM.10	In the past 3 days, did you or any household member over 15 years of age engage in story-telling, singing or playing with (**name**)?	Yes= 1	No=0	Don't know=8
CM.20	Do you leave (**name**) alone or in the care of other children younger than 12 years of age? If yes go to the next one	Yes=1	No=0	Don't know=8
CM.21	How often?	every day =1	several times a week=2	Less than once a week=3

AB9 Acute respiratory infection 24-59 months				**AB10 Diarrhea 24-59 months**			
Has (name) had an illness with a cough (trouble breathing or breathe faster than usual with short, quick breaths) in the past two weeks?				Has (name) had diarrhoea (more than 3 loose or watery stools in 24-hour period in the past two weeks?			
H.20	YES=1	No=0	Don't know=8	**H.30**	YES=1	No=0	Don' know=8

AB 11 Fewer 24-59 months									
H.40	Has (name) had fever in the past 14 days?	Yes=1	No=0	Don't know=8	**H.50**	May I see the place where (name) sleeps? If Yes, Check the presence of mosquito net	Yes=1	No=0
If the mosquito net is not placed above the bed of the child, we consider that the child is not under an ITN sleeping			**H.45**	Above the bed=1	Not above=0			
A 13 Observation Child-Caregiver interactions								

 A 13 Observation Child-Caregiver interactions			
Caregiver tends to keep the child within visual range and looks at the child quite often		Yes=0	No=1
Caregiver talks to the child during the course of the visit		Yes=0	No=1
Caregiver interacts with child to promote development and learning		Yes=0	No=1
Caregiver smiles at the child, laughs with the child, caresses, kisses or hugs the child.		Yes=0	No=1
Caregiver spanked or hit the child during the visit, or shouted or yelled at him/her.		Yes=1	No=0
Calculate the Sum	**CM.30**		

Part4. WASH

All these questions are for domestic use of water and do not include water for animals

Do not read the answers only one response possible. What is your main source of drinking water for members of your household? Present a map with the different water points that have been assessed: Coding key: (to be determined according to the setting and map) **Water points=** 1 to 5 See the WPO questionnaire **Fill the part Water points at the end of the questionnaire**		1= Groundwater open well, well borehole with a hand pump, well borehole with motorized pump system 2= Protected spring 3= Roof rainwater 4= piped supply 5=Water trucking
UE.10	1 to 5, Circle and write (1 to 5) and the letter code	
UE.20	What do you do usually to make the water safe to drink? **Probe: Anything else? (record all items mentioned)** Code 9 if they are using sealed bottled water	1= Boil 2= chlorine 3= Strain it through a cloth 4= Use water filter (ceramic, sand, composite etc.) 5= Solar disinfection 6= Let it stand and settle 7= Other 8= Nothing 9= Drink sealed bottled water
UE.25	**Do you have a water container?** Yes=1 no=2 If UE 25 is YES: How much water did your household use YESTERDAY (excluding for animals) Ask the question in the number of 20 liters "Jerrican" and convert to liters A. Volume of Container [_____] B. Number of containers used [_____]	
UE.30	Total water used= A*B= [_____]	
What do you use that water for?		
WAT.16	Drinking water	Number of liters
WAT.17	Food preparation	Number of liters
WAT.18	Bathing	Number of liters
WAT.19	Cleaning the house	Number of liters
WAT.20	Total basics use	Number of liters
UE.40	How much time does it take on average to go to the drinking water source, get water, and come back? If the participant gets water at home, the coding 5	30 minutes or less=1 31 to 61 minutes=2 61 to 180 minutes=3 More than 3 hours=4 Not applicable=5

Water management observation			
Be careful with the notation (0 and 1) you calculate score of risk		**Yes**	**No**
WAT.10	Is the container used to carry water left uncovered during the transportation?	1	0
WAT.11	If the container used to carry water is dirty?	1	0
WAT.12	Is the water storage left open/uncovered?	1	0
WAT.13	Is there a water-cleaning system visible (filter, boiling container, chlorine tablets)	0	1
WAT.14	While serving water to drink is there a risk of water contamination (do the fingers touch the water? Or is the scooping container used dirty).	1	0
WAT.15	Total risk of Risk: Number of Yes points		

Now I would like to ask some questions about sanitation.

UE.50	Where do members of this household usually relieve themselves?	1= Latrine in the household 2= Latrine in Manyatta 3= Open defecation in Manyatta 4= Open defecation outside Manyatta	
UE.51	Family uses the toilet/latrine, fill number of:	Female:	
UE.52	Family uses the toilet/latrine, fill number of:	Male:	
UE.53	Family uses the toilet/latrine, fill number of:	Children:	
UE.54	Record the number of people ≥12 months using the household or latrine in Manyetta	Total:	
If the answer is Latrine in the household =1 or in (closed to the Household) Manyatta= 2, Ask to see it and refer to the observation questionnaire			
UE.61	May I see it please?	Yes=1 No=0	
	If UE.51 is yes. Use the observation questionnaire Observation that the facility is used: the facility must show signs of use (such as a worn path between the house and the facility, signs of wear on the seat, absence of spider webs, etc.).	Yes=1 1	No=0 0
SAN.10	Are the feces well isolated from the environment? (leak, Crack)	1	0
SAN.20	Is the safe outlet? (Leading to open sewers, rivers etc.)	1	0
SAN.30	Presence of any anal cleaning item/ material (paper, water)	1	0
SAN.40	Is there a hand washing station inside the latrine or within 10 paces of the latrine?	1	0
SAN.50	Is there a cleansing agent at this hand washing station inside/near the latrine? Yes includes soap, detergent, and ash, whereas no include mud, sand and other	1	0
SAN.60	Presence of flies or other insects entering or exiting the pit	1	0
SAN.70	Presence of feces on the ground or around the pit or seat?	1	0
SAN.80	Total score of Risk (number of yes points)		

Food Hygiene Observation			
FH.10	Are there cooking utensils or food leftovers left on the ground?	Yes=1	No=0

Animal waste observation			
Waste.10	Are there any animal excreta in or near the compound/playground/surroundings?	Yes=1	No=0

WATER POINT OBSERVATION (WPO)

	1. Ground water: open well, well/borehole with hand pump/borehole with motorized pump system	No	Yes
G.10	Is there a latrine or any source of pollution within 30 m of the well?	0	1
G.11	Does the fence around the well allow animals in? If there is no fence, answer is yes.	0	1
G.12	Is the drainage channel less than 2 m long, broken or dirty?	0	1
G.13	Is there stagnant water close to the well?	0	1
G.14	Is the apron less than 1 m wide all around the well?	0	1
G.15	Are there any cracks in the well apron and headwall?	0	1
G.16	Is the cover of the well unsanitary and closed?	0	1
G.17	Is the well poorly sealed for 3 m below ground level?	0	1
G.18	Is the water point dirty?	0	1
G.19	Is the lift system in a bad condition / are ropes and buckets dirty?	0	1
G.20	TOTAL SCORE OF RISK (number of "yes" points)		
2.Protected spring: The spring is typically protected from runoff, bird droppings and animals by a "spring box", which is constructed of brick, masonry, or concrete.		No	Yes
S.10	Is there a latrine or any source of pollution within 30 m of the well?	0	1
S.11	Does the fence around the well allow animals in?	0	1
S.12	Is the drainage channel less than 2 m long, broken or dirty?	0	1
S.13	Is there stagnant water close to the well?	0	1
S.14	Is the apron less than 1 m wide all around the well?	0	1
S.15	Are there any cracks in the well apron and headwall?	0	1
S.16	Is the well poorly sealed for 3 m below ground level?	0	1
S.17	Is the water point dirty?	0	1
S.18	TOTAL SCORE OF RISK (number of "yes" points)		
3. Roof rainwater harvesting sanitary inspection form: refers to rain that is collected or harvested from surfaces		No	Yes
RW.10	Is the roof area dirty ?	0	1
RW.11	Are the gutters that collect water dirty?	0	1
RW.12	Is ther absence of filter box at the tank inlet or is it not working well?	0	1
RW.13	Is there any other point of entry to the tank that is not properly covered?	0	1
RW.14	Are ther cracks in the wall of the tank?	0	1
RW.15	Is the inside of the tank dirity or not periodically cleaned and disinfected?	0	1
RW.17	Is the drainage in bad condition and the water inadequately drained?	0	1
RW.19	TOTAL SCORE OF RISK (number of "yes" points)		

4. Water trucking		No	Yes
WT.10	Is the water point where the truck collects the water unsanitary?	0	1
WT.11	Is there no, or inadequate, chlorination of the water during the trucking process?	0	1
WT.12	Is the pipe used to fill and empty the water in the truck unsanitary or dirty?	0	1
WT.13	Is the tanker ever used for transporting other liquids besides drinking water?	0	1
WT.14	In the filler hole of the truck unsanitary or is the lid missing?	0	1
WT.15	Are any parts of the system (water tank of the truck, storage tank in the community, distribution point) not periodically cleaned and disinfected?	0	1
WT.16	Is the storage tank / distribution point unsanitary and dirty?	0	1
WT.17	Is there no chlorination of the water at the storage tank / distribution point?	0	1
WT.18	Is the storage tank at the distribution point badly covered?	0	1
WT.19	Is there stagnant water around the water tank / distribution point?	0	1
WT.20	TOTAL SCORE OF RISK (number of “yes” points)		
5. Piped supply sanitary inspection form		No	Yes
PS.10	Is the source well protected?	0	1
PS.11	Is there any point of leakage between the source and the reservoir?	0	1
PS.12	Are there any break-pressure tanks, are their covers unsanitary?	0	1
1PS.13	Is the storage tank cracked or leaking and the inspection cover or the air vent unsanitary?	0	1
P0S1.14	Is the storage tank dirty or not regularly cleaned?	0	1
PS.15	Are there any leaks in the distribution system?	0	1
PS.16	Are the areas around the taps unfenced or allowing access to animals?	0	1
PS.17	Is there inadequate drainage and standing water around the taps?	0	1
PS.18	Are the surroundings of the taps dirty and with possible contamination source (excreta, refuse, etc.)?	0	1
PS.19	Is the water not chlorinated?	0	1
PS.20	TOTAL SCORE OF RISK (number of “yes” points)		

Annex3. Timeline for RFS Survey, Moroto, March 2016

DATE	VILLAGE	CLUSTER NUMBER	TEAM NUMBER	
11/3/2016	ALAMAE	03	A &B	
11/3/2016	NATABAKALEJO	04	C&D	
12/3/2016	LONYILIK	05	A& C	
12/3/2016	KATIKEKILE	01	B& D	
14/3/2016	NAKODET	06	A,B,C &D	
15/3/2016	NAKONYEN	02	A & C	
16/3/2016	ARENGEKEJU	09	B & D	
17/3/2016	KAMBIZI	11	A & C	
17/3/2016	LORIKOKWA	10	B & D	
18/3/2016	NAMATWAE	14	B & D	
18/3/2016	LOPUR	13	A &C	
19/3/2016	LOKERIAUT	15	A & C	
19/3/2016	NADIKET	12	B & D	
21/3/2016	AWOIMUJU	17	B & D	
21/3/2016	LOPUTIPUT	16	A & C	
22/3/2016	NANGORIT	19	B & D	
22/3/2016	NABOKAT	18	A & C	
23/3/2016	LOKITELAKAPIS	20	B & D	
23/3/2016	KIDEPO PUPU	21	A & C	
30/3/2016	LONGOROKO	24	A & C	
30/3/2016	NATAPOYO	22	B &D	
31/3/2016	NATURUMRUM	26	B & D	
31/3/2016	ACHOLI INN	25	A & C	
1/4/2016	KAKOLIYE	27	A & C	
1/4/2016	LABOUR LINE	28	B & D	
2/4/2016	HOSPITAL	30	A & C	
2/4/2016	NEW NAKAPELIMEN	29	B & D	
4/4/2016	AKWAPUWA	23	B & D	
4/4/2016	NAROO	08	A & C	

Annex4. Rating, Initial Workshop and Final workshop

Initial Workshop		Rating Initial Workshop	Risk factors	Final rating For Final workshop
Major	1	4,56	Inadequate infant and child feeding practices (introduction of solids, complementary feeding practices, and responsive feeding)	Major
	2	4,33	High workload for mothers	Major
	3	4,06	Poor practices of (initiation breastfeeding, exclusive breastfeeding)	Major
Significant	4	3,94	Poor sanitation and hygiene practices	Major
	5	3,94	Poor health status of children under 5 (Ari prevalence, Diarrhea prevalence)	Major
	6	3,89	High food access instability (5 months reported difficulties in accessing food, duration of the hunger gap)	Major
	7	3,83	Poor hygiene practices in the household (food preparation and storage, solid waste management)	Major
	8	3,83	Poor quality of drinking water (treatment)	Important
	9	3,72	Role of education	Important
	10	3,67	Low purchasing power	Major
	11	3,61	Limited male-involvement in child care practices	Minor
	12	3,61	Low maternal nutritional status during pregnancy	Major
	13	3,61	Early child-bearing, high prevalence of teenage pregnancies	Major
	14	3,61	Low utilization of ANC+ maternity and postnatal services	Important
	15	3,61	Open defecation	Link RF 4
	16	3,61	Dependency	Untested
	17	3,56	Inadequate access to milk and animal products by children and mothers	Important
	18	3,56	Poor maternal well being (violence and alcohol)	Important
	19	3,50	Mothers not supported, especially when women headed households	Important
	20	3,50	Poor agriculture products	Basic cause
	21	3,44	High prevalence of Fever/ malaria in children 0-59 months	Major
	22	3,39	Low Household livestock ownership	Basic cause
	23	3,39	Poor status of reproductive health (birth spacing and family planning)	Major
	24	3,22	Poor utilization and maintenance of bed net	Important
	25	3,22	Lack of caregiver's empowerment	Important
	26	3,11	Poor chain water and quantity	Important
	27	3,11	Distance to water resource and time needed to collect water are long	Minor
	28	3,00	Mental Health	Important
Minor	29	2,78	Insufficient use of soap and substitutes	Important
	30	2,39	Insufficient income to cover transport costs to the nearest Health Center	Important

Annex 5 : Link NCA study Expert rating grid

Source of information	**Notes**
Strength and consistency across contexts of association between the risk factor and under-nutrition (from the Pathways to Under-nutrition Scientific Literature)	**[-]** NA: only risk factors having a demonstrated association with under-nutrition are considered in the Pathways to under-nutrition Module **[-]** Weak association has been demonstrated in many or few contexts **[+]** Medium strength association has been demonstrated in few contexts **[++]** Medium strength association demonstrated in many contexts OR strong association demonstrated in few contexts **[+++]** Strong associations demonstrated in most contexts or an association demonstrated in the particular context of the Link NCA study
Seasonality and medium-term trends of risk factor related to seasonality and medium-term trends of under-nutrition	**[-]** The seasonal variation and medium-term trend of the prevalence of the risk factor does not correspond to the seasonal variation and medium-term trends of the under-nutrition outcome considered. **[+]** No seasonal variation of the risk factor OR No contradiction observed. **[++]** The seasonal variations of risk factor and under-nutrition are as expected. **[+++]** The seasonal peak(s) of prevalence of the risk factor matches with the seasonal peak(s) of the under-nutrition outcome considered.
Participatory rating exercise with community	**[-]** The risk factor is rarely or never mentioned in the rating exercise **[+]** The risk factor is irregularly mentioned as one of the top 5 risk factors **[++]** The risk factor is regularly mentioned as one of the top 5 risk factors **[+++]** The risk factor is consistently mentioned as one of the top 3 risk factors
Category	**Criteria**
Major risk factor	No contradictory information **AND** Strength of association from literature review is classified as [++] or [+++] **AND** Majority of [++] or [+++] for all other sources of information
Important risk factor	A minor amount of contradictory information exists AND Strength of association from literature review is classified as [++] or [+++] AND Majority of [++] or [+++] for all other sources of information
Minor risk factor	A moderate level of contradictory information is permitted AND Strength of association from literature review is classified as [+] or [++] AND Majority of [+] for all other sources of information
Rejected risk factor	No contradictory information AND Majority of [-] or [+] for all sources of information
Untested risk factor	Contradictory information AND / OR Information gathered not complete or not available

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USAL ANALYSIS

ACTION AGAINST HUNGER

The Link NCA methodology was developed by Action Against Hunger – France with technical support from our scientific committee including multi-sectorial experts and eminent scientists from Tufts University | Friedman School of Nutrition Science and Policy, the French Institute for Development Research (IRD), and World Food Program (WFP).

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