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NUTRITION CAUSAL ANALYSIS

ACF INTERNATIONAL NETWORK

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KENYA

ISIOLO COUNTY

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FINAL REPORT

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NCA Final Report

October 2013

Nutritional Causal Analysis in Isiolo county - Kenya

Nutrition Causal Analysis
Qualitative Inquiry
Kenya - February 2014

Nutrition Causal Analysis– Qualitative Methodology

Isiolo County, Kenya

Kristy Manners

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The contents are the responsibility of Action Against Hunger.

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ABBREVIATIONS

ACF	Action Against Hunger
ANC	Antenatal Care
ARI	Acute Respiratory Tract Infection
ASAL	Arid and Semi-Arid Lands
CHW	Community Health Worker
DRR	Disaster Risk Reduction
EBF	Exclusive breastfeeding
ENA	Emergency Nutrition Assessment
FSL	Food Security & Livelihoods
FGD	Focus Group Discussions
HC	Health Centre
HH	Household
IMAM	Integrated Management of Acute Malnutrition
IMC	International Medical Corp
IYCN	Infant & Young Child Nutrition
KAP	Knowledge, Attitude and Practice
LBW	Low birthweight
WaSH	Water, Sanitation and Hygiene
MCH	Maternal and Child Health
MCHC	Maternal and Child Health Centre
MICS	Multiple Indicator Cluster Survey
MND	Micronutrient Deficiency
MUAC	Mid Upper Arm Circumference
NCA	Nutrition Causal Analysis
NCHS	National Centre for Health Statistics
NDMA	National Drought Management Authority
OTP	Outpatient Therapeutic Programme
OVC	Orphaned and Vulnerable Children
PLW	Pregnant and Lactating Women
PPS	Probability proportional to size
PVCA	Participatory Vulnerability and Capacity Analysis
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SSS	Small Scale Survey
STI	Sexually transmitted infection
SQUEAK	Semi Quantitative Evaluation of Access and Coverage
U5	Under Five Years Old
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation & Hygiene
WFH	Weight for Height
WFP	World Food Programme
WHO	World Health Organisation

EXECUTIVE SUMMARY

A. Overview

Isiolo County lies in the semi-arid and arid lands (ASAL) of Kenya. Action Against Hunger |ACF International (ACF) has been operating in parts of Isiolo County for a number of years. Programmatic adjustments following on from the findings of regular quantitative surveys and surveillance data have contributed to decreased acute malnutrition below the pre Horn of Africa crisis level. However prevalence of acute and chronic malnutrition has since plateaued at around 10% and 20% respectively[1]. There is therefore a high interest by stakeholders to further understand the causal pathways of malnutrition so as to be able to develop more effective programs to curb malnutrition.

The core objective of a Nutrition Causal Analysis (NCA) study is to understand the risk factors of undernutrition and their interplay with nutrition outcomes for a given study population. NCA provides a holistic view on the dynamics of wasting compared with KAP and SMART surveys. It looks at the severity of undernutrition based on various factors such as time and seasonality and provides a rating of the causes of undernutrition.

ACF developed a standardized method for NCA in collaboration with the Tufts Friedman School of Nutrition in the USA and other scientific and operational partners in 2013[2]. In order to better understand the causal pathways to undernutrition in Isiolo County, ACF conducted an NCA study in late 2013 using this newly developed methodology.

The NCA study had the objectives of: i) identifying the main causes of wasting in Isiolo County; ii) understanding the local seasonal and historical pathways to wasting; iii) developing local causal models for acute malnutrition; and iv) using these results to support advocacy on causes of wasting.

The qualitative inquiry approach to primary data collection was used to complement already existing sources of information and to develop an 'emic' *(local)* definition and understanding of undernutrition. It was also used to characterize food security, health and care practice in the community and explore local perceptions of the causes of poor food security, heath and care as well as identify seasonal and historical trends and understand how the community prioritizes risk factors related to undernutrition. An initial technical expert workshop allowed for participatory formulation of hypothesised causal factors which were later tested against community understanding and experience in selected study sites.

The results of this inquiry, in link with the secondary data analysis, were used to determine and rate key causal pathways to undernutrition in a final stakeholder workshop where individual pathways were rated, assigned a confidence note and prioritized for action.

The ACF NCA survey methodology was adapted to the Isiolo County context and involved a participatory process with community, county and national stakeholders. Key steps included:

1. **Identifying risk factors and establishing causal 'pathways of malnourishment'** for acute malnutrition through a literature review and formulation and rating of factors during an initial technical expert workshop.

[1] ACF Integrated Surveillance report for Garbatulla and Merti sub-counties, October 2013
[2] Guidelines forthcoming in 2014

2. **Gathering evidence of causality** through a qualitative inquiry conducted during four weeks of intensive fieldwork, where communities ranked priority risk factors of acute malnutrition.
3. **Rating causal factors** according to their relative contribution to undernutrition in a final stakeholder workshop, based on literature review, international scientific sources, quantitative survey results, analysis of seasonality; ranking by communities and technical experts.
4. **Validating results** through a participatory and consensus-driven process where initial hypothesised risk factors were revised and validated in accordance with qualitative inquiry results.

The sample was stratified into Pastoral, Agropastoral and Labour/charcoal livelihood groups so results could be disaggregated by population groups with potentially different sets of underlying causality for undernutrition. Four villages or study sites were selected in the three Sub-Counties of Isiolo County (Isiolo, Garbatulla and Merti). Methods included secondary data review, key informant interviews, focus group discussions and an iterative analytical process based on consultations with key stakeholders.

B. Findings

Findings showed that **high child morbidity** linked to inadequate access to **safe water** for household use coupled with poor access to appropriate **age-specific foods**, including milk in the dry season, are the three major causal factors underpinning acute malnutrition in Isiolo County. This was agreed by communities, technical experts and other critical stakeholders and is reflected in the high confidence of stakeholders in these three major risk factors identified through the NCA process.

Findings also confirmed that the impacts of recurrent drought are increasing **women's workload** in significant and detrimental ways, and in turn affecting maternal health and care of young children. This was reflected across the other major causal factors identified in the study process.

While the three livelihood groups under study have unique features affecting the health and nutrition of their community, many of the risk factors to acute malnutrition that have been prioritised are very similar across the groups.

Findings from the fieldwork indicated that acute malnutrition typically occurs during the dry season or during droughts, peaking at the commencement of rains, and is linked to seasonal reductions in access to and consumption of milk. However, with increasing recurrence of droughts, increasingly sporadic rainfall and unreliable climatic patterns, communities are having less time to recover during these "typical" peaks. As a result, other risk factors are becoming more important than just the availability of milk during the dry seasons. For example, as water shortages are occurring more frequently, disease and women's workload are increasing. Thus, though wasting is considered by technical experts to be more of a concern in Isiolo County than stunting, it is becoming clear that chronic malnutrition is emerging as an issue of major concern.

The agreed major factors underlying acute malnutrition reflect the impact that recurrent drought is having on the **economic capacity** of communities (loss of livestock, vulnerability to food price hikes, reduced access to food and markets); as well as on its **access to water** (loss of livestock, splitting of families for migration, increased workload of women, hygiene and sanitation, disease). These factors, underlain by **women's increasing workload,** are having a detrimental effect on the care of U5 children and maternal health.

Ongoing **social transformation** is resulting in families placing increased value on **education** compared to other generations. Impact on households is mixed: on the one hand literacy levels and knowledge of nutrition, health and hygiene are increasing, and girls are being kept longer in school to prevent early pregnancies. On the other hand, increased **tendency of communities to settle** in order to keep their children in school – due to low numbers of mobile schools – and to counteract the effects of livestock depletion from **recurrent droughts** through diversification of livelihoods into, for example, agriculture and labour/charcoal activities, is resulting in **splitting of families** while men migrate, in turn increasing the workload of mothers as they work in the *shamba* (homestead) or burn charcoal. Longer distances are being travelled for pastures and water for livestock, limiting access to milk and meat for children and women.

Ultimately, the **workload of women** is recognized by both men and women in communities to have increased dramatically: working in the *shamba* or burning charcoal, collecting water, conducting normal domestic duties, and caring for children. With inadequate time to care and feed children properly, and with reduced access to milk for children, poor nutritional status of children is compounded.

The table below summarizes the main results, presenting the **twelve major risk factors** identified in the NCA study. It illustrates preliminary ratings given to individual risk factors in the initial technical expert workshop; classification of risk factors into categories based on field investigation findings (major/important/minor/untested/rejected); and final confidence notes assigned by stakeholders in the last stage of the process.

Table 1: Summary of Major Risk Factors to Causes of Acute Malnutrition

MAJOR RISK FACTORS	Preliminary Rating from Initial Workshop*	Rating based on Field Investigation findings**	Rating change based on Deliberation in Final Workshop **	Confidence Note from Final Workshop ***
1. High childhood morbidity	3.6	MAJOR		3.0
2. Inadequate quantity and diversity of age-specific foods	3.8	MAJOR		3.0
3. Access to safe water for HH use	3.7	MAJOR		3.0
4. Inadequate access to food	3.6	MAJOR		2.9
5. Poor or fluctuating stability (climatic, market prices, conflict, economic, political)	3.4	MAJOR		2.9
6. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	3.9	MAJOR		2.9
7. Inadequate coverage of latrines	3.2	MAJOR		2.9
8. Distance and access to water is taking a large proportion of women's time and duties	3.3	MAJOR		2.9
9. Domestic duties are not reduced during pregnancy and lactation of women	3.1	MAJOR		2.9
10. Poor availability of foods	3.7	MAJOR		2.8
11. Caregivers spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	MAJOR		2.8
12. Access to water for livelihood use	3.5	IMPORTANT	MAJOR	2.6

* 1= minor contributor to undernutrition, 5= major contributor to undernutrition. ** major, important, minor, rejected, untested
*** 1=low , 3=high

C. Recommendations

The UNICEF Conceptual Framework illustrates that the causes of malnutrition are multi-factorial and that all three levels (basic, underlying and immediate causes) are vital to ensuring a healthy outcome for mother and child. Depending on the mandate of an organisation, programming often aims to address the immediate and underlying causes, often assuming that the impact of the program towards reducing undernutrition has directly been achieved by their single-pronged approach, and often neglecting the vital aspect of advocacy towards policy change, infrastructure and provision of basic services.

Through the field study of this NCA, it was evident that often what is believed, for example, to be increasing food security or educational knowledge, may in fact be affecting the care of a child in a detrimental way e.g. increased maternal workload, divided families to keep children in school, etc. Although food security may be improved in one aspect, the workload of a woman is increased in another. Programming often neglects the importance of the workload of women who bear much of the family responsibilities, and rarely if at all, makes the **reduction of women's workload** an explicit programming objective.

Communities proposed a number of insightful solutions to the risk factors affecting acute malnutrition. With limited budgets, it is even more vital to involve the community from the outset in any decision-making. For this reason, to follow through from the information sharing at community level and the wealth of solutions proposed by communities, a **Participatory Vulnerability and Capacity Analysis (PVCA)** would be appropriate whereby **communities design their own DRR and resilience strategy plans** to be **integrated with county level planning.** The NCA also provides the foundation to advocate to the government and agencies to collaborate further with these communities in supporting them in the process.

An Isiolo County NCA Dissemination Workshop held in January 2014 provided a forum for multi-sectorial groups at county level to enrich proposed community solutions with two key recommendations: 1. ***Reduce the workload of women*** and 2. ***Minimise the splitting of families***.

1. INTRODUCTION

A. OVERVIEW

Isiolo County lies in the semi-arid and arid lands (ASAL) of Kenya. Action Against Hunger |ACF International (ACF) has been operating in parts of Isiolo County for a number of years during which several SMART surveys were undertaken to determine the levels of malnutrition, together with SQUEAC assessments determining boosters and barriers to Integrated Management of Acute Malnutrition (IMAM) services coverage. Indeed, despite years of multisectoral integrated programming in the area, malnutrition rates have continued to be of major concern. Programmatic adjustments following on from the findings of regular quantitative surveys and surveillance data have contributed to decreased acute malnutrition rates to below the pre Horn of Africa crisis level. However prevalence of acute and chronic malnutrition has since plateaued at around 10% and 20% respectively[3]. There is therefore a high interest by stakeholders to further understand the causal pathways of malnutrition so as to be able to develop more effective programs to curb malnutrition.

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ACF developed a standardized method for NCA in collaboration with the Friedman School of Nutrition at Tufts University in the USA and other scientific and operational partners in 2013[4]. In order to better understand the causal pathways to undernutrition in Isiolo County, ACF conducted an NCA study in late 2013 using this newly developed methodology. NCA results are expected to be used in the development of nutrition sensitive and context specific interventions by the Kenyan government and other stakeholders in the area, as well as provide an opportunity for testing and adapting the newly developed NCA methodology to the Kenya context.

This report presents the results of a Nutrition Causal Analysis study undertaken in Isiolo County, Kenya from 6th September 2013 to 4th January, 2014.

B. CONTEXT

Isiolo County is grouped under the pastoral north east livelihood zone and is composed of three sub-counties: Garbatulla sub-county, Merti sub-county and Isiolo sub-county.

[3] ACF Integrated Surveillance report for Garbatulla and Merti sub-counties, October 2013
[4] Guidelines forthcoming in 2014

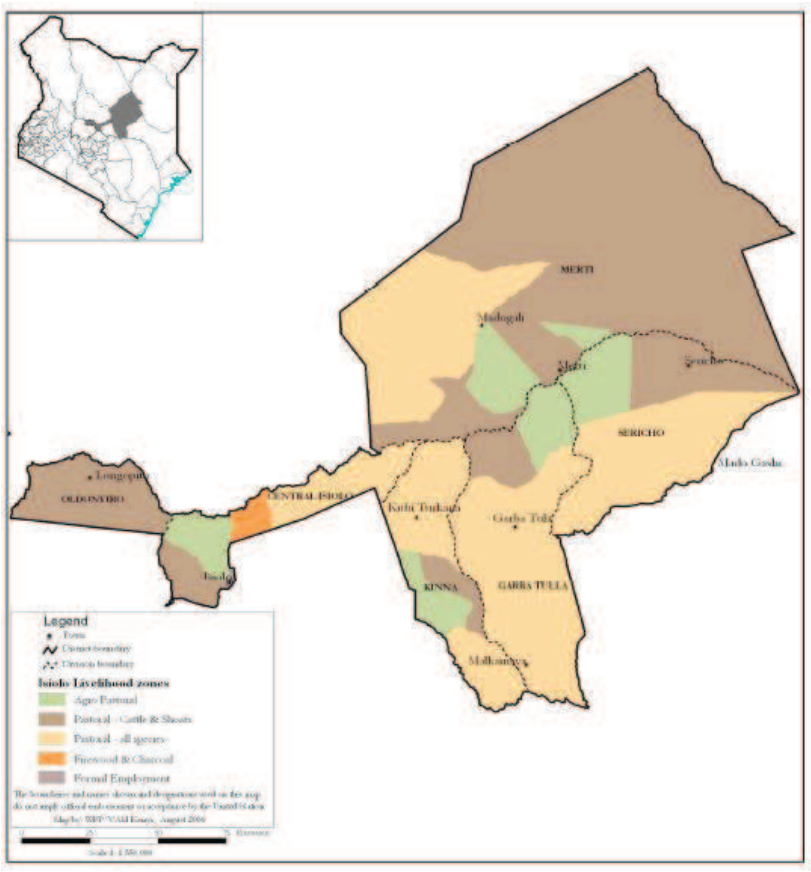


Figure 1: Map of Isiolo County

A number of NGOs collaborate with the government in Isiolo County on emergency and development projects, namely ACF and IMC in nutrition, APHIAPlus and Kenya Red Crescent Society (KRCS) in health, and World Vision International (WVI) and Food for the Hungry (FH) on Water, Sanitation and Hygiene (WASH) and Food Security and Livelihoods (FSL). Difficult to reach and remote areas contribute to poor coverage of programs in some areas, with much of the land mass being sparsely populated and pastoralism accounting for 70% of the livelihoods. Despite a low population density, Isiolo County is geographically, socio-culturally and ethnically diverse as illustrated in the Table below.

Table 2: Isiolo County Characteristics

Isiolo Sub-County	Merti Sub-County	Garbatulla Sub-County
- contains the county capital (Isiolo Town) - a number of ethnic groups (Samburu, Turkana, Meru, Borana) - pastoralism is the main livelihood, with other minor livelihoods in agropastoralism, formal employment/trade and charcoal/firewood burning - a mix of religious groups (Christian and Muslim)	- geographically, pastoralism is the main livelihood with agropastoralism along the Ewaso Nyiro river - populations close to the river are subject to floods, particularly every 2-3 years - majority Boranan clan - poor road and mobile infrastructure - majority Muslim with some Christian minorities	- geographically, pastoralism is the main livelihood with agropastoralism along the Ewaso Nyiro River and towards Meru - populations close to the river are subject to floods, particularly every 2-3 years - mix of Boranan, Somali and Meru clans - access to markets/trade generally via Meru

- main market/trade centre - more casual labour opportunities - centre for university and secondary school access	- strong culture and traditions - more polygamy - long distances for migration (approx. 200km)	- poor road and mobile infrastructure - majority Muslim - strong culture and traditions - more polygamy

Isiolo County sectorial data can be reviewed in Annex 2 and 3, with contextual summaries below on nutrition and health, WASH and food security.

B.1. Nutrition and Health

From the 2008 Isiolo district Multiple Indicator Cluster Survey (MICS)[5] and according to the 2010 Isiolo district strategic plan[6], health indicators were mostly below national targets, with infant and child mortality reported as moderately high at that time.

More recently, based on the periodic integrated food and nutrition surveillance data (SMART, Small Scale Early Warning Surveys, Long and short rain assessments) collected in Isiolo County by NDMA, ACF and other partners, it was reported that the most common diseases (prevalent overall among all age groups) were acute respiratory tract infections (ARI), malaria, diarrhoea, skin diseases and pneumonia[7].

From the May 2013 integrated nutrition surveys carried out by ACF in Garbatulla and Merti sub-counties and more recently in Isiolo county wide (February 2014), results for other health indicators show the following key results on child immunization and supplementation, child nutrition and maternal health and nutrition.

Child immunization and supplementation

- A gradual increase of vitamin A supplementation coverage was observed in Garbatulla, from 38.8% in September 2012 to 57.7% in May 2013[8]. This was attributed to implementation of combined outreach activities since September 2012 facilitated by ACF, Kenya Red Cross and the Ministry of Health. However, Vitamin A supplementation coverage varies across age group and was above the national target of 80% among the children less than one year, while supplementation among older children was only half the national target and this was likely due to an inconsistency toward attending routine maternal and child health services (usually taking place soon after the measles immunization).
- Generally, immunization coverage was found above the national target of 80% (except for vaccination against measles slightly below the 80% target) with a significant proportion verified through recall (probably linked to lack of Mother Child booklets as well as poor documentation by the health personnel).
- Based on the February 2014 nutrition and retrospective mortality survey, there were no reported cases of under-five mortality in the survey. The crude mortality rate was below the

[5] 2009 KBNS and Unicef MICS http://www.childinfo.org/files/Isiolo_Report.pdf
[6] http://www.ncapd-ke.org/images/stories/districts/Isiolo.pdf
[7] 2013 LRA report
https://kenya.humanitarianresponse.info/system/files/documents/files/Isiolo%20LRA%202013%20Report_Final.pdf
[8] ACF Garbatulla SMART survey May 2013

emergency thresholds. The crude mortality was as a result of typhoid, malaria, vomiting, TB/HIV, accidents and unconfirmed causes.

Child nutrition

With regards to the nutrition situation, up until 2008, most national stunting and underweight trends showed very little change since 1993, remaining above 30% nationally (cf. Annex 4). As seen in the nutrition data tables (cf. Annex 2 & 3), sub-county level nutrition data showed very gradual changes, stunting levels rising in some sub-counties or remaining unchanged.

Regular integrated food and nutrition surveillance data (SMART, Small Scale Early Warning Surveys) were collected in Isiolo County by ACF since 2010[9]. The results of the SMART survey carried out recently in February 2014 in Isiolo County showed that the prevalence of Global Acute Malnutrition (GAM) was 11.5%, a significant increase compared to the previous year when GAM was at 8.2% (May 2013).

Stunting rate was 23.2 % (slightly higher but not significantly different compated to the rate of 20.8% observed in May 2013). The survey also unveiled an underweight rate of 21.1 % (higher but not significantly different from 17.2% obtained in May 2013). Cf. these trends graphically illustrated in the Figures below.

Figure 2: Isiolo County Global and Severe Acute Malnutrition 2013-2014

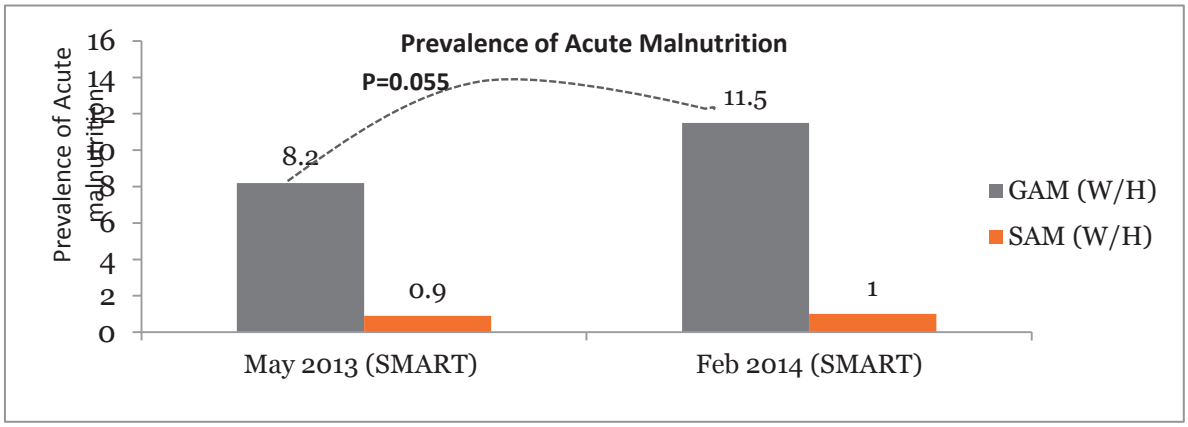
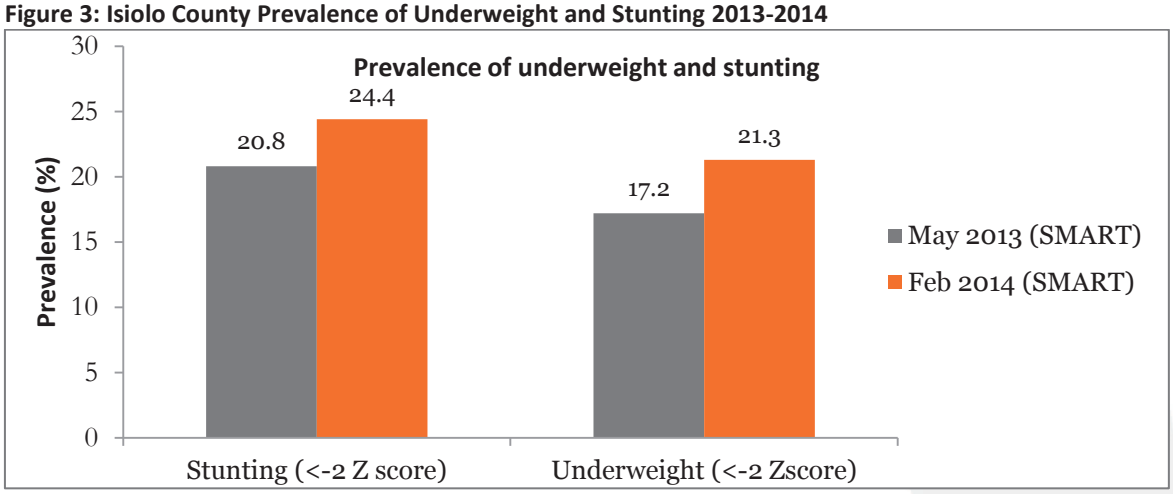
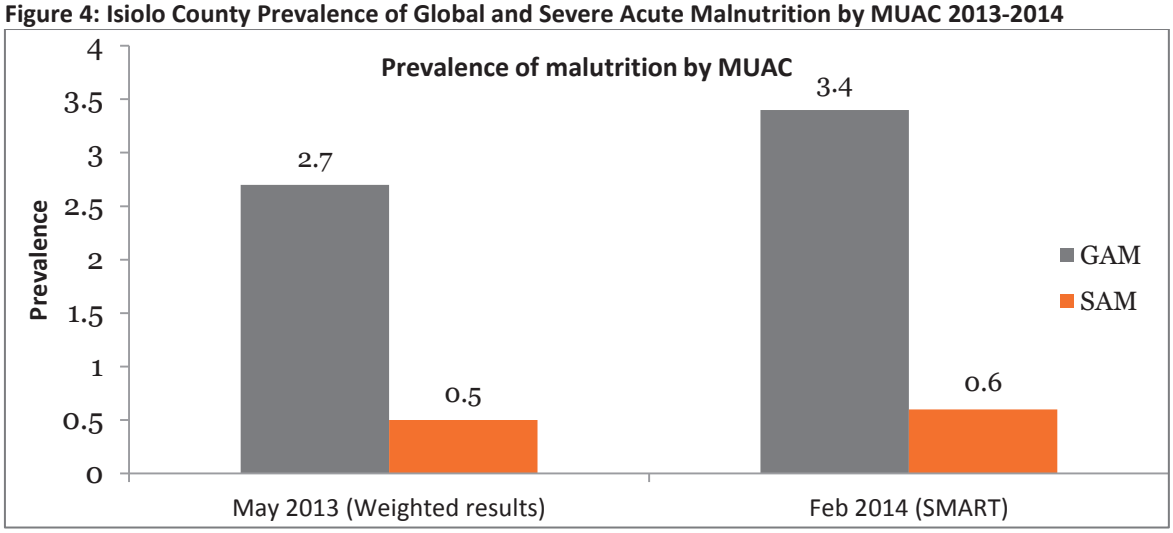


Figure 3: Isiolo County Prevalence of Underweight and Stunting 2013-2014



[9]Since 2010 nutrition surveys were carried at sub-county level and it is only in February 2014 that it was carried out for the whole Isiolo county. The February 2014 nutrition and mortality survey report is under production.

Figure 4: Isiolo County Prevalence of Global and Severe Acute Malnutrition by MUAC 2013-2014



Maternal health and nutrition

Results from the 2008 Isiolo district Multiple Indicator Cluster Survey (MICS)[10] showed that a number of improvements were needed notably in terms of prevention and treatment of malaria among pregnant women, management of anaemia during pregnancy and treatment of sexually transmitted infections (STIs). If the proportion of women receiving antenatal care (ANC) from a skilled personnel increases with increasing levels of education of the woman (as well as by increasing levels of the household wealth index), yet about 17% of the women did not receive any antenatal care. In terms of health facility deliveries, in 2008, only 31% of deliveries occurred at health facility level. About one in eight births (12%) were delivered by a doctor, 22% by a nurse or a midwife, and nearly 53% were facilitated by the assistance of a traditional birth attendant.

In lights of those results, the Isiolo MICS report stressed the importance for combined interventions toward improving women's nutritional status and to prevent infections (e.g., malaria and STIs) during pregnancy, and the potential of the antenatal period can have toward significantly improving foetal outcomes and maternal health overall.

From the ACF nutrition survey carried out in February 2014, only 24.3% of the pregnant mothers reported to have received iron-folate supplementation. It shows that the adherence to ANC services remains limited, with none of the mothers meeting the 90 days minimum requirement of iron-folate intake. This was attributed to insufficient health education and limited promotion of the importance of micronutrient supplementation among pregnant women.

Through integrated nutrition surveys, ACF monitors the nutritional status of Pregnant and Lactating Women (PLW) and of all women of reproductive age (15-49 years) based on MUAC criteria. Results showed that in the past years moderate acute malnutrition (MAM) rates among those women fluctuated throughout surveys and varied across sub-counties. In February 2014, in Isiolo County, MAM was at 6.4% and at 6.0% among PLW and 15-49 yrs old women respectively.

B.2. Water, Sanitation and Hygiene

Generally in Isiolo County, the distance to water sources ranges from 0-5 kilometres as most water

[10] 2009 KBNS and Unicef MICS http://www.childinfo.org/files/Isiolo_Report.pdf

sources are permanent[11], although in Merti Sub-County in February 2013, 44% of households walked more than an hour to a water source. Garbatulla Sub-County is showing positive trends in access to safe water, 85% of households in May 2013 having access to boreholes, while in Merti Sub-County it was only 56%. Very few households treat their water (16% in Garbatulla Sub-County, 33% in Merti Sub-County, 40% in Isiolo Sub-County in May 2013). Normal water consumption by pastoralist households is 7-8L/day and 10-15L/person/day in agropastoral livelihood zones, below the recommended threshold of 15L/person/day[12]. In May 2013, only 66% of households in Isiolo County had access to latrines.

B.3. Food Security and Livelihoods

In August 2013, the food security situation in Isiolo was classified as Stressed (Phase 2) following the long rains assessment.[13] Coping mechanisms were increasingly being used by households in the county in 2013, the Coping Strategy Index worsening from 7 in December 2012 to 18.6 in May 2013, severe coping strategies being practiced by less than a quarter of households[14].

Pastoralists in 2013 experienced favourable terms of trade for their livestock, an important feature considering livestock production contributes 80% to cash incomes for this livelihood, 45% for agropastoralists, 44% for firewood/charcoal burners and 15% for casual labourers. Livestock in general is important in various social, economic and health indices, contributing to food (milk, blood, meat), transport, marriage and social obligations, paying fines, capital investment and savings etc.[15].

Herd sizes increased these last two years due to no recorded drought, with 10% of herds remaining at the homestead. Middle and upper wealth groups typically own camels in addition to other livestock (cattle, shoats, chickens) and have disproportionately felt the positive effect of this increase compared to low income earners.

The 2013 Long Rains Assessment in September indicated that both animal milk availability and production declined compared to normal (2L vs 3L and 4L vs 5-6L respectively), with approximately half of the milk produced being sold for other commodities. Both Merti and Garbatulla towns saw a doubling of the milk prices (40KSH/L to 80KSH/L) during this season, with Isiolo Sub-County also seeing price rises, negatively impacting the food security of low income earners.

Cattle rustling and resource based conflicts have increased with the 2013 dry season, which may affect food related activities and markets, particularly in areas such as Merti who access most of the cereals from Isiolo town along poor road networks.

High demand of horticulture crops of mainly onions and tomatoes contribute greatly to household incomes, with the last season showing large increases in maize, beans and cowpea productions compared to long term averages for farmers due to better than expected rains. In Isiolo sub-county, production of crops was normal despite receiving high value seeds and subsidised fertilizer from the national cereals and produce board (LRA 3012).

[11] Kenya Long Rains Assessment, 2013
[12] Kenya Long Rains Assessment, 2013
[13] Ibid.
[14] WFP FSOM May 2013
[15] Kenya Long Rains Assessment, 2013

2. OBJECTIVES

A. STUDY OBJECTIVES

The NCA study had the objectives of: i) identifying the main causes of wasting in Isiolo County; ii) understanding the local seasonal and historical pathways to wasting; iii) developing local causal models for acute malnutrition; and iv) using these results to support advocacy on causes of wasting. The creation of local discussion forums to discuss solutions was one sub-objective that helped support the definition of contextually relevant and appropriate solutions to acute malnutrition.

B. RESEARCH QUESTIONS

Based on secondary and primary data analysis, the study proposed to answer the following research questions:

a. What is the prevalence and severity of wasting in Isiolo County?

b. Does the prevalence and severity of wasting in Isiolo County vary geographically or by characteristics such as livelihood, religion, clan or any other relevant characteristics identified during the initial technical expert workshop?

c. What is the prevalence of known risk factors for undernutrition amongst the population in Isiolo County?

d. What are the causal 'pathways of malnourishment' by which children in Isiolo County become wasted?

e. How has wasting amongst children less than five years of age and its causes changed a) over time due to historical trends, b) seasonally due to cyclical trends, c) due to recent shocks if any?

f. Which risk factors are most prevalent in this population? Which sets of risk factors and pathways are likely to be the most modifiable by stakeholders within the context? What type of action can be taken in response to these findings?

Additional research questions were subsequently incorporated into the research design:

g. How is acute malnutrition perceived and conceptualized within Isiolo County?

h. What are the key resources and practices present in the community around food security, health and care?

i. What are local perceptions of the causes of poor food security, health and care, disaggregated by vulnerable group?

j. Which groups are likely to be more vulnerable to or affected by acute malnutrition?

3. METHODOLOGY

The standard ACF NCA methodology comprises one preparatory step and four main steps: Designing the NCA, Identifying Risk Factors and Pathways, Gathering Evidence, Rating Causal Factors and Validating Results. These are summarized in the graphic below.

Figure 5: Overview of ACF NCA methodology

0. Designing the NCA	Hold technical meeting to identify relevance, **specific objectives and feasibility of the NCA.** Start gathering existing field studies and identifying key stakeholders and partners. Plan budget and human resources needs.		**2 days over 1 month**
1. Identifying risk factors and pathways	Scientific and grey literature review and key informant interviews. Prepare field study. Hold **initial technical expert workshop** at national or regional level generate hypothesised risk factors and pathways to be tested.		**1 month**
2. Gathering evidence of causality	Conduct **Qualitative Inquiry** in four randomly selected villages. For each village: - 1 day interview with village gate-keepers - 3 day FGD and role play with women on Food Security / Health - WaSH / Care Practice-related hypotheses - 1 day FGD with women for ranking exercise of main causes of undernutrition N.B. All FGD are disaggregated by nutrition vulnerable group under study	Conduct **Quantitative Survey** (similar to a SMART or KAP survey done simultaneously): - Random sampling - Anthropometric measurements (weight, height, age, MUAC) - 26 key NCA indicators Typically 700-800 children and approx. 500 households are sampled. N.B. The questionnaire is set for 45-60 min interview.	**1.5 months**
3. Rating causal factors	Propose a **rating of hypothesised risk factors** according to their relative contribution to undernutrition. The analysis is based on: literature review, international scientific sources, quantitative survey results, analysis of seasonality, ranking by communities and technical experts.		**1.5 months**
4. Validating results	Present and discuss results in the four villages of qualitative inquiry. Technical experts discuss and validate results during a **final stakeholder workshop.**		

A qualitative approach based on standard ACF guidelines for Nutrition Causal Analysis was used to

assess the probable causes of undernutrition and establish causal 'pathways of malnourishment' by which certain children in the study population become wasted. **Secondary data review, key informant interviews, focus group discussions and an iterative analytical process based on consultations with key stakeholders** formed the backbone of the NCA process.

A number of quantitative and qualitative surveys/assessments (SMART, SSS, SQUEAC and KAP) have been undertaken in the county due to ACF and IMC presence in Garbatulla, Merti and Isiolo sub-counties.[16] These coupled with other data from quantitative assessments/surveys by other stakeholders, such as the biannual interagency Kenya Long and Short Rain assessments, form a wealth of quantitative secondary information upon which further analysis was done and suitable hypotheses formulated in the early stages of design.

While a quantitative survey is well-suited to answering questions of ''how many', "which" and "what", qualitative methods are comparatively better suited to exploring the 'how' and 'why' of undernutrition causality. While quantitative methods can objectively assess undernutrition status and the prevalence of known risk factors, qualitative methods can uncover the community's own conceptualization of undernutrition, the degree to which it perceives it to be a problem, and what it perceives to be the relevant causes. This *emic* information may be as or more important to designing effective responses. Thus, the qualitative and quantitative components are intended to generate complementary data.

The qualitative inquiry approach to primary data collection was selected in the case of the present study in order to complement already existing sources of information and used to develop an 'emic' *(local)* definition and understanding of undernutrition. It was also used to characterize food security, health and care practice in the community and explore local perceptions of the causes of poor food security, heath and care as well as identify seasonal and historical trends and understand how the community prioritizes risk factors related to undernutrition. An initial technical expert workshop allowed for participatory formulation of hypothesised causal factors which were later tested against community understanding and experience in selected study sites.

The results of this inquiry, in link with the secondary data analysis, were used to determine and rate key causal pathways to undernutrition in a final stakeholder workshop where individual pathways were rated, assigned a confidence note and prioritized for action.

A glossary of key terms can be found in Annex 12.

A. LITERATURE REVIEW & RISK FACTOR IDENTIFICATION

The initial phase of the NCA involved secondary data collection to support the identification of hypothesised risk factors relevant to the Isiolo County context. These were then edited and classified according to their importance to the causes of undernutrition in an initial technical expert workshop involving sectoral specialists from national, county and field level operations. Identification of nutrition vulnerable groups and sampling methodologies were also finalised within this forum. This process assisted in the identification of hypothesised risk factors and pathways to be tested in field.

[16] ACF conducted a Small Scale Survey in Garbatulla and Merti sub-counties in October 2013, while IMC conducted a coverage survey in Isiolo Sub-County during November/December of the same year.

B. SAMPLING METHODS AND FRAME

B.1. Methods

In the initial technical expert workshop, various sampling methods were discussed. Previous NCA surveys had used Population Proportional to Size (PPS) methodology during the quantitative sampling and subsequently took a sub-sample from these clusters for the qualitative data collection. An issue raised in the workshop regarding PPS was that the clusters could highlight higher acute malnutrition in larger villages which could then have infrastructure and bias the information gathered.

On review of the NCA sampling methodology used in other piloted countries and in consensus with experts, **multi-stage simple random sampling** was selected. Villages in themselves also contain a lot of diversity, thus limiting the risk of not gathering enough diverse information. Ensuring that there are a wide variety of groups and individuals interviewed and sufficient number of case studies to ensure adequate triangulation also ensured an adequate level of information was provided for the NCA.

B.2. Frame

Livelihood Zone and Administrative Division Selection

Livelihood zones within the study area were chosen so results could be disaggregated by population groups exhibiting roughly homogenous agricultural, geo-physical, socio-economic and cultural attributes in an effort to minimise confounding factors.

During the initial technical expert workshop, the following three Livelihood Zones were highlighted as distinct socioeconomic and cultural areas within Isiolo County:

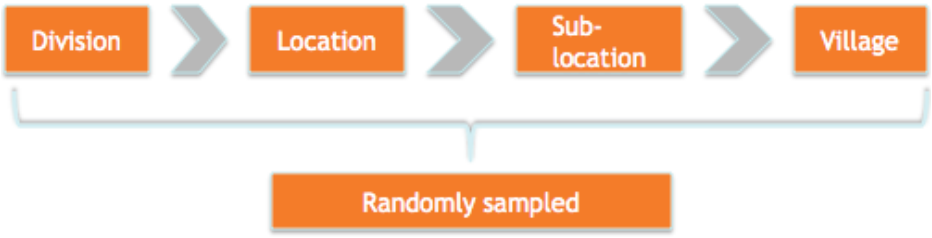
- Pastoral
- Agropastoral
- Labour/Charcoal

In addition, **conflict/high risk areas** and **marginalised areas** (e.g. Sericho) were also highlighted.

In consensus with the *NCA analyst* (the person responsible for leading the NCA study process) and national experts, the administrative divisions of Isiolo County were allocated to their respective livelihood area, which had been chosen to include pastoral, agropastoral, charcoal/firewood and formal employment. However, the database provided by the National Drought Management Authority (NDMA) segregated livelihoods into three groups – pastoral, agropastoral and formal/informal employment/casual labour – whereby the charcoal/firewood burning livelihood was grouped under formal/informal employment/casual labour. For simplicity, this third livelihood grouping will hereby be referred to as *labour/charcoal* throughout this report.

Given that Isiolo County is estimated to be approximately 70% pastoralist, two divisions were selected from the pastoral livelihood sampling frame. Multi-stage simple random sampling involved randomly selecting an administrative division of Isiolo County, using ENA's random number table (2011) for each livelihood. Once a division was selected, the administrative location was randomly selected in the same way, then sub-location and village as illustrated in the Figure below.

Figure 6: Sampling Method



Village Selection

Four villages or study sites were selected in the three Sub-Counties of Isiolo County (Isiolo, Garbatulla and Merti). See Table below.

Table 3: Sample Village Characteristics & Field Dates

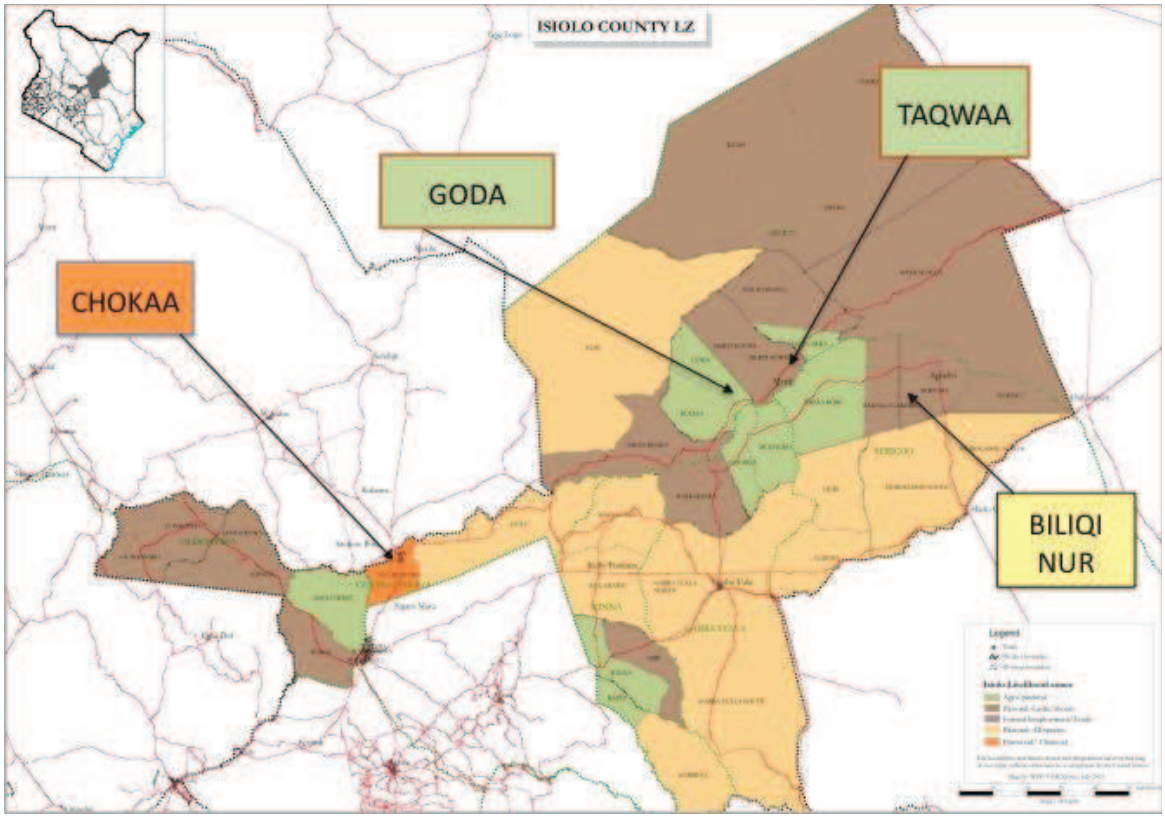
LIVELIHOOD	LIVELIHOOD POPULATION (est.)[17]	SAMPLED VILLAGE	VILLAGE POPULATION[18]	DATE
Agropastoral	21,476	**Goda "A" & "B" (Bulesa-Merti)**	748	14th-26th Oct (alternate days)
		Taqwa 1 & 2 (Merti North)	1850	14th-26th Oct (alternate days)
Pastoral	63,560	**Biliqi nuru (Sericho-Garbatulla)**	544	29th Oct-3rd Nov (consecutive days)
Labour/Charcoal	58,258	**Chokaa (Ngare Mara- Isiolo)**	606	6th - 11th Nov (consecutive days)

On arrival in the field, Taqwa 1&2 village was found to have an Agropastoral livelihood, despite NDMA data indicating it to be a pastoral community, and as a result, livelihood analysis was performed on two villages for Agropastoralism (Taqwa 1&2, Goda) instead of two pastoral villages.[19]

The figure below outlines the four villages selected within three livelihood zones: Agropastoral (green boxes), Pastoral (yellow box) and Labour/Charcoal (orange box).

[17] KNBS 2009 (from LRA 2013 livelihood zones)
[18] KNBS 2009
[19] The NDMA database represented the most-up-to-date information source available for disaggregating villages by livelihood zone. Further analysis is needed to obtain a more precise understanding of local livelihood profiles, as all selected study sites continue to view themselves as pastoralist despite diversification of livelihoods into agriculture or charcoal/firewood burning.

Figure 7: Sampled Livelihood Villages



Agropastoral Livelihood		Pastoral – all species	
Labour/Charcoal Livelihood		Pastoral – cattle/shoats	

Nutrition vulnerable group selection

Workshop participants identified and prioritised **nutrition vulnerable groups** for investigation at individual study sites during the qualitative inquiry.

Definition of nutrition vulnerable groups

- *Nutrition vulnerable groups* are groups of individuals believed to be at risk of poor nutrition outcomes.
- Socially excluded individuals, individuals belonging to certain livelihood groups, and individuals who are physiologically vulnerable (e.g. children <2) may be *vulnerable*, depending on the context.
- The population studied within a single NCA can be *heterogeneous* in terms of available resources, access to social services but also in terms of practices and how a population adapts to its environment.
- When the *risk factors* and *pathways leading to malnutrition* are likely to differ among different *nutrition vulnerable groups*, it can be helpful to stratify the sample so as to study each group separately.

The following groups were identified:

- Pregnant and lactating women (PLW) and children under five years of age (U5)
- Orphaned and vulnerable children (OVC)

- Decision makers/religious leaders/gate keepers
- Men
- Elderly/chronically ill
- Street children
- Marginal groups
  - Turkana community (charcoal/firewood collecting livelihood, cattle rustling, less livestock, higher insecurity)
  - Somali (no assets, no shelter, minimal livestock)
  - Slum dwellers (Bura-pesa-Isiolo Sub-county)
  - Rural populations within poor road infrastructure

The nutrition vulnerable groups identified from the workshop, particularly pastoralists, rural populations and marginalised populations, are also included within the three livelihood zones studied – pastoral, agropastoral and labour/charcoal.

During the primary data collection, while the focus was on mothers of U5 children, a number of key discussions were had with men, elderly men, elderly women, teachers, school children, adolescent girls and marginalized groups such as female single headed households.

C. TRAINING & TOOLS

Interview tools for Focus group Discussions (FGDs) and informed interviews were designed to test the causal hypotheses formulated in the initial technical expert workshop, and centred around the thematics of care practices, health, nutrition, hygiene & sanitation, water, food security and livelihoods. The interviews were designed to be semi-structured to allow for flow and flexibility within the discussions, without undermining the need for standardised questions to compare livelihood and gender groups. Cf. Annex 11 for the interview tool used.

A total of five survey enumerators were trained over 6 days in qualitative research methods, interview techniques, the NCA methodology, design of the database and data entry.

A pre-test occurred over three days in Tanna village, Garbatulla Sub-County. The interviews involved groups of one enumerator with the NCA analyst or two enumerators together, one as a translator, the other as note-taker. A local translator and/or community mobiliser was also used during the interviews as a translator. During the pre-test, observations were made relating to: Cleanliness of the environment; Hygiene practices; Food storage; Breastfeeding and complementary feeding practices; Domestic animal availability; Housing structure; Mother-child relationship. Observations were recorded and summarised at the end of each day.

Once the training and pre-test was complete, three translators were selected, one translator having experience and expertise in data entry.

D. FIELD DATA COLLECTION

Villages were notified ahead of time wherein Community Health Workers (CHWs), mobilisers and leaders were asked to organise for groups of approximately 10 caretakers of U5 children, who could be available for the whole week. Other groups (men, elderly, teachers etc.) would be notified during the course of the data collection week if they could be interviewed. It was requested that the groups contain a mix of socio-economic, ethnic or marginalised groups, to then be decided if further sub-

sampling would take place. There did not seem to be any favouring of individuals for selection into the FGDs. Some women sat on the periphery of the discussion to observe, but often moved on with time.

Further stratification was to take place within these villages if wealth groups, ethnic groups or other diversities existed within the village. This was the case in the sampled Labour/Charcoal community, where a large proportion of single mothers were found. The CHW, elder and married mothers helped to identify a core group of single mothers to participate in the FGDs during the week.

One to two FGDs took place each day with the mothers, while various others groups were interviewed during the week, organising a few days in advance for their availability. Most FGDs took 1.5-2 hours in length.

Informed interviews were conducted with two caretakers of malnourished children and two caretakers of healthy/non-malnourished children. These were selected by the CHW, mobiliser, elder or sometimes the mothers FGD group. The duration of this interview was approximately 45-60min.

Within each village, the **qualitative field data collection** was achieved through:

- 9 FGD thematics involving on average 10 participants per group. In total, 13 FGDs were conducted with men, mothers of U5 children, elderly women, adolescent girls, and school aged children (Class 8), involving around 130 people.
- 5 Informant interviews with school teachers and mothers of U5 children (malnourished and non-malnourished), involving around 5 people.

Refer to Annex 10 for the weekly FGD overview.

E. RATING AND RANKING CAUSES OF ACUTE MALNUTRITION

The final exercise with mothers of U5 children was for them to identify and rate their perceived top five causes of acute malnutrition that had been previously identified, rating the severity of how acute malnutrition affects the well-being of children and how modifiable it was with community resources. Ranking was then performed by the mothers to understand the most important causes of acute malnutrition.

The final stakeholder workshop used information from different sources, including the primary data collected, to classify causes of acute malnutrition in Isiolo County based on the relative importance in explaining acute malnutrition levels. This is detailed in Section D of the Results.

F. DATA ENTRY AND SUPERVISION

Data entry was performed each day on Excel. Voice recorders that were used during the interviews were listened to at the end of the day, while confirming the information with the notes taken. Each day a debriefing occurred of the FGDs and interviews, summarizing points, highlighting issues that needed to be explored more, and collaborating on points to highlight the local causal model.

G. DATA ANALYSIS

At the end of the data collection, one further week was spent on data cleaning and checking of data on Excel. Focus group discussion themes associated with the causal risk factors reached in consensus at the initial technical expert workshop were grouped together by village and livelihood. Further summary themes and extrapolation, through triangulation with observations and secondary data, assisted in the formulation of causal pathways and linkages.

4. RESULTS

Results are presented according to the major steps in the NCA methodology (cf. section 3): i) Identifying risk factors and pathways, ii) Gathering evidence of causality, iii) Rating causal pathways, and iv) Validating results.

Information collected from the community FGDs for each risk factor is presented below in summary form, highlighting the impact from seasonality. The complete review and interpretation of individual risk factors can be found in Annex 9. A causal pathway is suggested for each risk factor from the information gathered, that may have inter-linkages with other risk factors. Other annexes include livelihood historical timelines (Annex 5), seasonal livelihood activities (Annex 6), and perceived good practice (Annex 7).

A. IDENTIFYING RISK FACTORS AND PATHWAYS

The objective of this step is to conduct a scientific and grey literature review and key informant interviews, prepare the field study and finally hold a **technical expert workshop** at national or regional level to review and agree hypothesised risk factors and pathways to be tested.

Definition of hypothesised risk factors and pathways

- A *hypothesised risk factor* refers to a specific risk factor from the UNICEF framework of malnutrition causality that is believed to relate to undernutrition in the NCA context. Risk factors defined by the community that do not appear in the UNICEF framework may also be potential hypothesised risk factors.
- The pathway through which the hypothesised risk factor is believed to affect undernutrition is referred to as a *hypothesised pathway*. A hypothesised pathway typically connects several risk factors, and represents the mechanism by which risk factors together result in undernutrition.
- Once all hypothesised risk factors and pathways have been assessed and validated through the NCA process, the results are no longer referred to using the term "hypothesised".

A.1. Identification and rating of risk factors by workshop experts

During the initial technical expert workshop, invited technical experts considered 39 different risk factors pertaining to undernutrition and voted on and rated these on a scale of 1 to 5, five illustrating a major effect on acute malnutrition, one illustrating minimal/no effect on acute malnutrition (cf. Annex 1). Factors were subsequently grouped by thematic area. The top ten identified risk factors, indicated in red bold font in the table below for clarity, illustrate that **infant and young child nutrition** (IYCN), **child and maternal health**, **water**, and **maternal education** were perceived by experts to have major contributory effects on U5 and maternal malnutrition.

Table 4: Risk factors and preliminary ratings from initial technical expert workshop

RISK FACTORS	Mean Rating from Initial Workshop*	Median Rating from Initial Workshop*
1. LIMITED HH FOOD SECURITY		
A. Inadequate access to food	**3.6**	**4**
B. Poor availability of foods	**3.7**	**4**
C. Inadequate utilisation of food and water	3.5	4
D. Poor or fluctuating stability (climatic, market prices, conflict, economic, political)	3.4	3
E. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	**3.9**	**4**
F. Poor storage of food, seeds, grains, livestock in home	2.9	3
G. Poor land/livestock management and productivity	3.2	3
2. POOR MATERNAL AND CHILD HEALTH		
A. Early pregnancies and inadequate birth spacing	**3.6**	**3.5**
B. High childhood morbidity	**3.6**	**4**
C. Immunisation is not 100% covered in U5 and PLW	3.1	3
D. Poor access to health/nutrition programs due to insecurity and nomadic movement	3.5	4
E. Poor operational HC coverage	3.2	3
F. HC staff providing inadequate health and care practices	2.8	3
G. Stigma attached to malnutrition or admission to program	2.8	2.5
H. Poor perception/identification of disease and management	3.1	3
I. Health problems are often referred to a traditional healer first	2.9	3
J. Inappropriate care practices for U5 children	3.4	3
K. Poor health seeking behaviour for U5 and PLW	3.3	3
3. POOR MATERNAL AND INFANT & YOUNG CHILD NUTRITION		
A. EBF rates to 6mths are low / Inappropriate introduction & timeliness of complementary foods	**3.6-3.7**	**4**
B. Inadequate quantity and diversity of age-specific foods	**3.8**	**4**
C. Pregnant women restrict their diet to ensure an easier delivery	2.7	3
D. Pregnant and lactating women are malnourished	**3.6**	**4**
4. WATER, SANITATION & HYGIENE		
A. Access to water for livelihood use	3.5	4
B. Access to safe water for HH use	**3.7**	**4**
C. Inadequate coverage of latrines	3.2	3
5. VULNERABLE GROUPS & GENDER IMBALANCES IN THE HH, WORKPLACE & SOCIETY		
A. Women do not have power in the HH and the society	2.9	3
B. Low levels of maternal education	**3.9**	**4**
C. OVC not receiving the appropriate care and education they require	3.4	3
D. Mother spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	3
E. Siblings feeding the younger child while mother is working	2.7	3
F. Distance and access to water is taking a large proportion of women's time and duties	3.3	3
G. Domestic duties are not reduced during pregnancy and lactation of women	3.1	3
H. Animal responsibility vs gender	2.9	3
6. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION OF U5 AND PLW		
A. Some food are taboo for PLW and children	2.8	3
B. Socio-cultural barriers to hygiene and sanitation practices	2.7	3
C. Disease is seen as a result of a supernatural force	2.6	3

*1= minor contributor to undernutrition, 5= major contributor to undernutrition

A.2. Preliminary local causal model

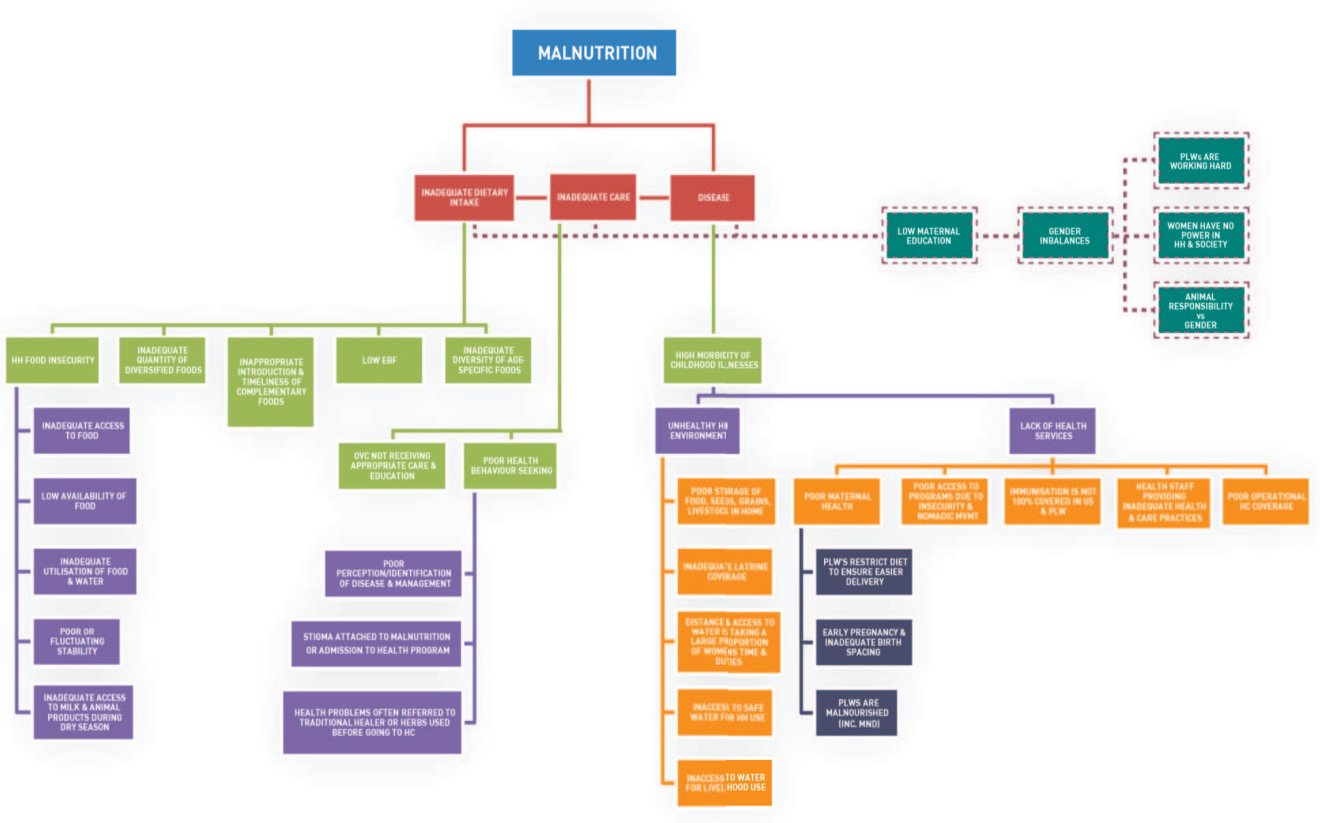
A **local causal model** is a set of interlinked risk factors and pathways posited (but at this stage of the study, not yet shown) to underlie a particular form of undernutrition. Linkages between individual hypothesised pathways together constitute a local causal model.

Definition of local causal model

- A *local causal model* is based on the UNICEF Framework for malnutrition.
- It is adapted to the context of each specific NCA study and only includes risk factors that are believed to be effectively important in the local context.
- At the early stages of the study, the *local causal model* is used as an exercise to hypothesize risk factors and pathways of undernutrition.
- As the NCA process unfolds, additional hypothesised risk factors and pathways may become apparent, particularly during the community level qualitative inquiry. Any new hypotheses will be included in the "visual depictions of pathways", a simplification of the *local causal model* and an output from the community level qualitative inquiry.

The figure below illustrates the local causal model for acute malnutrition in Isiolo proposed at the conclusion of the initial technical expert workshop.

Figure 8: Preliminary Local Causal Model



B. GATHERING EVIDENCE OF CAUSALITY

The objectives of this step are to i) Develop an 'emic' (local) definition and understanding of undernutrition; ii) Characterize food security, health and care practice in the community; iii) Identify seasonal and historical trends in undernutrition and risk factors; and iv) Understand how the community prioritize risk factors of undernutrition.

An emic definition is generated by developing an understanding of how good nutrition and malnutrition are perceived and understood within the study population, how nutrition is maintained and how undernutrition is typically addressed. Local practice is characterized by exploring respondent perceptions of the causes of poor food security, health and care. Local priorities are generated by prioritizing perceived causes according to a) which causes are believed to be most prevalent (affect the most people), and b) which causes are believed have the most severe effects.

Results are summarized and illustrated through three local livelihood-specific seasonal calendars and causal models.

Data from quantitative surveys was used as secondary data to contextualise the scene (cf. Annex 3). In the course of the qualitative inquiry primary data collection, livelihood characteristics were identified from FGDs and priority ratings of those risk factors important in the causality of malnutrition were highlighted by the mothers of U5 children. Local causal models per livelihood were formed, identifying risk factors within these models that had been prioritised by the mothers in the rating exercise.

Most villages displayed homogeneity in the form of ethnicity, religion and wealth. The sampled Labour/Charcoal community was the only study site that displayed a significant number of single mothers (approximately 150 single mothers out of an estimated 300-400 women) and for this reason married mothers and single mothers were grouped separately to ascertain if certain vulnerabilities could be contributing to acute malnutrition. In effect, they constituted an additional nutrition vulnerable group under study.

During the six days in each study site, discussions took place on relevant qualitative information pertaining to health and nutrition, water and sanitation, food security and livelihoods, gathered through the use of field interviews and focus group discussions (Cf. Annex 10 and 11 for tools used and the weekly FGD overview). Communities highlighted seasonal livelihood activities, identified and ranked risk factors to acute malnutrition, and identified good practices from the community perspective. Risk factors were also considered in terms of their prevalence in the community (number of children affected), degree to which they affect the well-being of the child (severity), and degree to which they were considered modifiable (given community knowledge and resources). This data was later used to develop the livelihood causal models as well as to inform the classification of risk factors by the NCA analyst (cf. section C).

The findings presented below are the result of four weeks of open dialogue with communities, focus groups discussions and observations from transect walks. It is a compilation of primary information gathered through field investigation of causal hypotheses drawn up in the initial technical expert workshop.

B.1. Livelihood Similarities & Differences

Historically, all four study sites were primary pastoral (Annex 5), and as such it is notable that the main factors cited by communities as affecting acute malnutrition are related to the availability of milk, which is seasonal and affected by recurrent droughts. The two main peaks of wasting typically occur towards the end of the dry season and the beginning of the short and long rains. However, as weather patterns are becoming more unpredictable and communities struggle to recover between these periods, seasonality of wasting is likely compounded with the effects of chronic malnutrition.

All communities viewed charcoal/firewood burning as a "last economic resort", as it involves high workload with little revenue. Higher levels of poverty were observed in the Labour/Charcoal community compared to other livelihood zones.

With mainly women burning and collecting firewood or working in the *shamba* or homestead, women had a lot of responsibilities and were working hard in the Labour/Charcoal zone and the Agropastoral zone in particular. The positive difference being that the Agropastoral community recognised that they were able to have access to diverse food during drought or difficult times, in addition to being able to sell some of the produce, compared to the Labour/Charcoal community who had little access to money and food.

Compared to other livelihood groups, pastoral communities had more difficulties accessing water, markets and services due to the remoteness or nomadic lifestyle that they lived. The table below and Annex 6 further compare the livelihood groups.

Table 5: Isiolo County Livelihood Characteristics

LABOUR/CHARCOAL LIVELIHOOD	AGROPASTORAL & PASTORAL LIVELIHOOD*
- Majority Christian - Majority monogamous marriages - Alcohol and mirra use/abuse - High pregnancies out of wedlock - High numbers of single female headed households - Shared responsibilities between genders - High use of herbs and traditional healers - Ugali based carbohydrate diet - Reliance and preference for animal products e.g. milk - Beading as a form of livelihood diversity from traditional practices - Infants carried everywhere with mother - Women carry water and other goods on back/head - Close to army posts and mining companies where casual labour and prostitution has arisen	- Majority Muslim - Majority polygamous marriages - Mirra use/abuse - Early marriages/pregnancies within wedlock - Women do the majority of the work; fewer shared responsibilities - Medium use of herbs and traditional healers - Rice based carbohydrate diet - Reliance and preference for animal products e.g. milk - Less livelihood diversity from traditional practices - Infants carried with mothers but also left with relatives/siblings - Donkeys used for transporting water etc.

*Due to the same religion and ethnicity, many socio-cultural aspects were similar in these 2 sampled livelihoods

B.2. Agropastoral Livelihood

Seasonality

In areas where agriculture is practiced, workload varies across the seasons depending on the crops grown. These communities are seeking more skills in agriculture as they are typically pastoralists.

The workload for women is typically highest during the dry season when water is less available, and men have migrated with their herds, coinciding with the hunger gap and higher levels of acute malnutrition (Annex 5 & 6). During FGD discussions and mapping of the seasonal calendar, Goda stated acute malnutrition was highest during the dry seasons, while Taqwa indicated higher levels during the long rains (March-June) and the dry season of January/February. Since ACF operations began in 2011/2012, high levels of diarrhoea have been noted in Taqwa, and the rains and proximity to the river is likely contributing to the community's perception of acute malnutrition being highest during this time, when diarrhoea is perceived to be highest.

See below the agropastoral seasonal calendar compiled during the field investigation.

Table 6: Agropastoral seasonal calendar

H = high L = low AV=available N-AV = not available F=favourable WD=wind/dry R= rainy S= school	J	F	M	A	M	J	J	A	S	O	N	D
Acute malnutrition												
Prevalence of acute malnutrition					H							
Peak of SAM admissions					H							
Water Resources												
Rainy Season/dry /wind - Goda	R			WD							R	
Rainy Season/dry /wind - Taqwa	W	WD		R	WD				R			
Underground water availability	AV										AV	
Surface water availability							L					
Food Availability												
Hunger gap (Agricultural & Economic)					H							
Harvest pest	H											
Cereals/Staples				H								
Vegetables	AV											AV
Availability of milk and eggs				N-AV								
Household Food Security												
Debts				H								
Market prices of foods				H								
Available food in the market				L								
Terms of trade	F Livestock											F Agric
Casual labour					H							
Gender												
Workload of women				H								
Movement/Conflict												
Livestock migration				H								
Water collection distance				H								

	Conflicts			H							
	Difficulties in movement		H							H	
Illnesses											
	Diarrhoea				H						
	Malaria		H							H	
	Acute Respiratory Infections		H							H	
Socio-cultural											
	Social Festivals		H							H	
	Peak of births		H							H	
	School time and fees	S		S			S				

Risk Factor Ratings of Mothers of U5 Children

The field portion of the qualitative inquiry had mothers of U5 children identify and rate their perceived top five causes of acute malnutrition, rating the severity of how acute malnutrition affects the well-being of children and how modifiable it was with community resources. Ranking was then performed by mothers to understand the most important causes of acute malnutrition.

Lack of care and food, disease and drought ranked in the top risk factors to malnutrition identified by agropastoral communities (cf. Table below).

The workload of women and subsequent lack of care and feeding of children was a recurring topic. However, when ranking risk factors associated with acute malnutrition, workload ranked low, while lack of care presented at both scales of lower and higher priorities between the two villages.

Contrasting information between the two sampled agropastoral communities illustrated disease being ranked highest and lowest. As mentioned above, high levels of diarrhoea resulting in acute malnutrition has been seen as an issue in Taqwa, thus it is little wonder that disease was ranked highest. In contrast, mothers in the second sampled village, Goda, mentioned that diarrhoea was not an issue in the community, nor did they feel that diarrhoea resulted in acute malnutrition, again possibly one of the reasons it was ranked low in their priorities.

Disease for both villages was not seen as being highly modifiable by the community (cf. Annex 8 for more details on communities' understanding of prevalence and ability to modify certain risk factors).

Table 7: Priority rankings of risk factors for Agropastoral Livelihoods

TAQWA Village **Priority ranking of risk factors for acute malnutrition**	**GODA Village** **Priority ranking of risk factors for acute malnutrition**
1. Disease	1. Lack of care
2. Drought	2. Lack of food
3. Poverty*	3. Lack of milk
4. Lack of food	4. Lack of money
5. Workload	5. Disease
6. Lack of care	6. Workload

* Defined locally as lack of cash and or lack of livestock assets; given that livestock represents wealth

Perceived Good Practices by Mothers of U5 Children

Generally, throughout the FGDs and discussions, knowledge of mothers in nutrition, health and hygiene was quite good, despite the lack of education and high illiteracy levels. However, whether this was put into practice needs further investigations through longer field observations, understanding the barriers to good practice and diet records. Of concern is the use of herbs, inducing of diarrhoea for cleansing and other traditional practices, and the effect this has on delaying appropriate medical treatment. More detailed comparisons between livelihoods and perceived good practices by mothers can be found in Annex 7.

Local causal model

Based on the collected information, a local causal model was formed (cf. Graphic below). Priority rankings of risk factors to acute malnutrition were highlighted from individual study sites (number 1 being the most important priority to acute malnutrition).

Boxed variables indicate core risk factors identified and ranked by the community, which in some but not all cases align with the risk factors rated by technical experts in the initial workshop (cf.

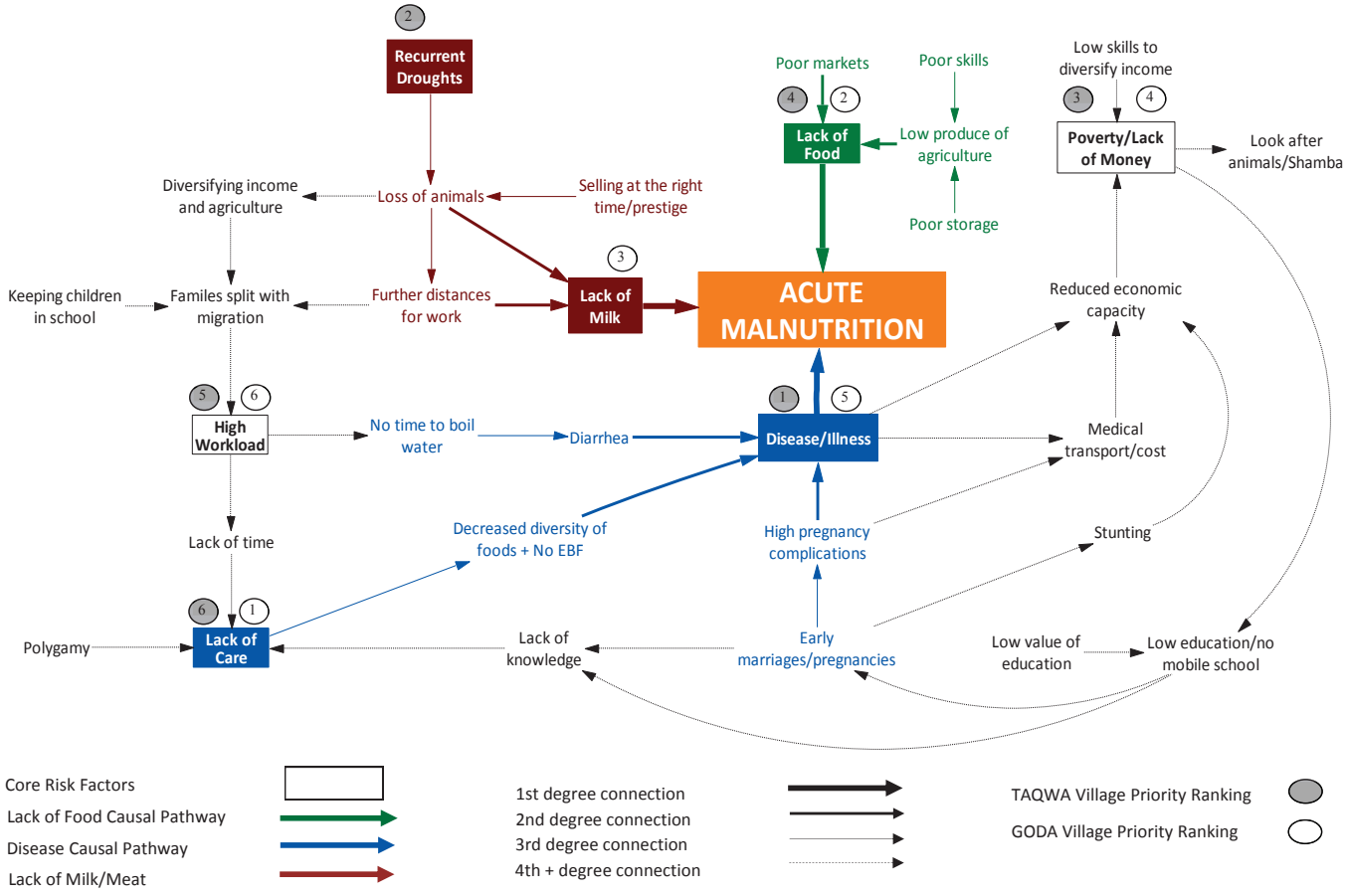
Table **4**, section 4.A.1.). There are slight differences in formulations as well as new risk factors not identified by experts.

Lack of food, lack of milk and disease were identified as the most proximate causes to acute malnutrition, linked to a number of interrelated secondary, tertiary, quaternary, etc. factors that include poverty, women's workload and drought.

Observations:

- A recurrent local theme was workload of women and poverty (defined locally as lack of cash and or lack of livestock assets; given that livestock represents wealth) cited as common indirect links to acute malnutrition, ultimately caused by recurrent droughts.
- Although agropastoral communities saw the benefit of diversifying their income and diet through agriculture, this resulted in a higher workload for the women, and in combination with keeping the children in school, resulted in families being split while men migrated with the herds, further impacting the workload of women.

Figure 9: Agropastoral Livelihood – Local causal model



B.3. Pastoral Livelihood

Seasonality

In pastoral communities, maternal workloads increase during the dry season as livestock migrate in search of water and pasture (cf. Annex 6 and Table below). Water is fetched for weaker animals during the dry season, adding to the workload of women. During this season, milk production is also less; however it is also a time when milk can be sold, as during the wet season milk is in surplus. Decisions then must be made between obtaining cash from milk sales or consuming milk as a main source of food during a season where little is available and acute malnutrition peaks. Food prices and diversity are lowest in the wet season when transport becomes difficult.

See below the pastoral seasonal calendar compiled during the field investigation.

Table 8: Pastoral seasonal calendar

H = high L = low AV=available N-AV = not available F=favourable WD=wind/dry R= rainy S= school F = fees	J	F	M	A	M	J	J	A	S	O	N	D
Acute malnutrition												
Prevalence of acute malnutrition		H			H							
Peak of SAM admissions			H					H				
Water Resources												
Rainy Season/dry /wind	R	D		R	DW				R			
Underground water availability		L			L							
Surface water availability		L			L							
Water collection distance		H			H							
Food Availability												
Hunger gap (Agricultural and Economic)		H			H							
Cereals/Staples		H			H							
Fruits	H				H							H
Vegetables	H				H							H
Availability of milk		L			L							
Household Food Security												
Debts		H			H							
Market prices of foods	H			H					H			
Available food diversity in the market	L			L					L			
Terms of trade (favourable vs unfavourable)	F			F					F			
Casual labour		H			H							
Movement/Conflict												
Livestock migration		H			H							
Conflicts		H			H							
Difficulties in movement	H			H						H		
Gender												
Separation of Family		S			S							
Workload of women		H			H							

Illnesses																							
	Diarrhoea		H										H										
	Malaria	H										H											
	Acute Respiratory Infections	H										H											
	Livestock Disease		H									H											
Socio-cultural																							
	Social Festivals	H										H											
	Peak of births											H											
	School holidays/School fees	F										F											

Risk Factor Ratings of Mothers of U5 Children

The field portion of the qualitative inquiry had mothers of U5 children identify and rate their perceived top five causes of acute malnutrition, rating the severity of how acute malnutrition affects the well-being of children and how modifiable it was with community resources. Ranking was then performed by mothers to understand the most important causes of acute malnutrition.

Lack of livestock, food and water featured in the top risk factors identified by pastoral communities (cf. Table below).

To pastoral communities, their livestock holds precedence and is viewed as a source of money, milk, food, prestige and health. Thus, without livestock, acute malnutrition is a certainty to these communities.

Despite other livelihood communities mentioning the distance to the health centre/dispensary as a major concern, only the pastoral community mentioned it as one of the risk factors for acute malnutrition. In this regard, it delayed treatment and cost them in the form of transport and medicines, which then resulted in lack of money, affecting their ability to buy food and needing to pull children out of school as they could not afford the school fees. This community also had a mistrust of Sericho hospital staff in their service delivery. Discussions at Modogashe Hospital with head of staff also confirmed that they received many patients from Sericho that had arrived at Modogashe at late stages of their illness or delivery, and for conditions that could be treated at Sericho.

The pastoral community was the only sampled community that did not have close access to a river or spring. During the dry season, the water pans dried up, and at the time of data collection only one was functional, being used for animals. Thus, the community relied on piped water from Sericho that often failed or lacked adequate pressure.

The community did not see that any of the priority rankings illustrated in the table below could be changed by them, except for dirty water which the community scored 5 out of a maximum of 10 (1 not modifiable: 10 being modifiable). Cf. Annex 8 or more details on the communities understanding of the prevalence and ability to modify certain risk factors.

Table 9: Priority rankings of risk factors for Pastoral Livelihoods

Priority ranking of risk factors for acute malnutrition
1. Lack of Livestock
2. Lack of Food
3. Lack of Water
4. Distance to Dispensary
5. Dirty Water
6. Workload

Perceived Good Practices by Mothers of U5 Children

As mentioned, the perceived good practices by mothers were not necessarily true good practice from a technical expert point of view. However, whether this was put into practice needs further investigation through longer field observations and understanding of the barriers to good practices and diet records.

Perceived good dietary diversity revolved around animal products, rice and githeri. Fruit and vegetables in most communities, particularly pastoral or those coming from a heritage of pastoralism, were not regarded as that important for health.

Again, the use of herbs was prominent, and was often used first before seeking treatment at the health centre/hospital. More detailed comparisons between livelihoods and perceived good practices by mothers can be found in Annex 7.

Local causal model

Based on the collected information, a local causal model was formed (cf. Graphic below). Priority rankings of risk factors to acute malnutrition were highlighted (number 1 being the most important priority to acute malnutrition).

Boxed variables indicate core risk factors identified and ranked by the community, which in some but not all cases align with the risk factors rated by technical experts in the initial workshop (cf.

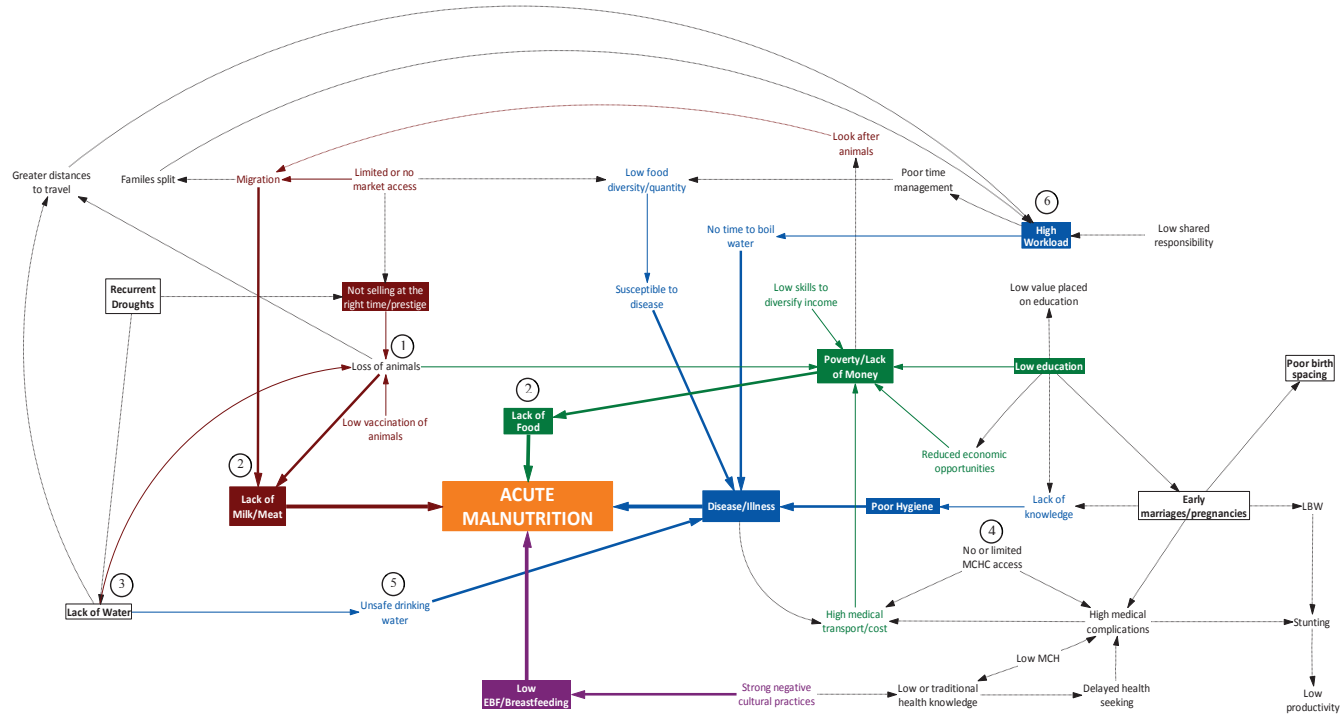
Table **4**, section 4.A.1.). There are slight differences in formulations as well as new risk factors not identified by experts.

Lack of food, lack of milk/meat, disease and low exclusive breastfeeding were identified as the most proximate causes to acute malnutrition, linked to a number of interrelated secondary, tertiary, quaternary, etc. factors that include poverty, women's workload and early marriage.

Observations:

- Workload of women and lack of money/poverty were cited as common indirect links to acute malnutrition, ultimately caused by recurrent droughts.
- Access to water, hygiene and sanitation were important themes highlighted by the community and through observation, particularly at this site where there were large numbers of donkeys– resulting in a lot of animal faeces on the ground.
- Distance and the resulting cost of transport to a health facility, delaying treatment and resulting in further complications and costs, was discussed as a major factor in poverty and children being pulled out of school.
- This community also spoke about a number of cultural practices and use of herbs that had negative effects on IYCN and health.

Figure 10: Pastoral Livelihood – Local causal model



Core Risk Factors

Lack of Food Causal Pathway

Disease Casual Pathway

Breastfeeding Causal Pathway

Lack of Milk/Meat

1st degree connection

2nd degree connection

3rd degree connection

4th + degree connection

Pastoral Community Priority Ranking

B.4. Labour/Charcoal Livelihood

Seasonality

In discussions with this community, charcoal/firewood burning activities remained fairly constant during the year, thus the workload of women remains high throughout the year, with peaks during the dry season to collect water (cf. Annex 6 and Table below). During the wet season however, communities travel further to find dry trees, but this is also the time of year when the price is higher for charcoal/firewood to receive higher revenues. In the sample village, both pastoral and charcoal/firewood burning activities occur, with men and women travelling long distances for most of the day thereby affecting the care of children. With livestock levels having reduced drastically in recent times and families unable to restock, charcoal/firewood burning has become a main source of livelihood.

See below the labour/charcoal seasonal calendar compiled during the field investigation.

Table 9: Labour/charcoal seasonal calendar

H = high L = low AV=available N-AV = not available F=favourable WD=wind/dry R= rainy S= school F=Fees	J	F	M	A	M	J	J	A	S	O	N	D
Acute malnutrition												
Prevalence of acute malnutrition		H				H						
Peak of SAM admissions		H				H						
Water Resources - Rainy Season/dry /wind	R	D		R		DW				R		
Underground water availability		L				L						
Surface water availability		L			L							
Food Availability												
Hunger gap (Agricultural and Economic)		H				H						
Cereals/Staples	H			H						H		
Fruits	H			H						H		
Vegetables	H			H						H		
Availability of milk		L		H		L						
Household Food Security												
Debts		H				H						
Market prices of foods		H				H						
Available food diversity in the market		L				L						
Terms of trade (favourable vs unfavourable)	F			F						F		
Casual labour		H				H						
Workload of women		H				H						
Movement/Conflicts												
Livestock migration		H				H						
Water collection distance		H				H						
Conflicts		H				H						
Difficulties in movement	H			H						H		
Separation of Family		S				S						
Illnesses												

Diarrhoea	H							H																
Malaria	H							H										H					
Acute Respiratory Infections	H							H										H					
Livestock Disease								H																
Socio-cultural																								
Social Festivals								H															H	
Young girls pregnancy (Army present from June-Sep mostly)								H															H	
Peak of births								H										H						
School time								H								H							H	
School Fees Due	F								F									F					

Risk Factor Ratings of Mothers of U5 Children

The field portion of the qualitative inquiry had mothers of U5 children identify and rate their perceived top five causes of acute malnutrition, rating the severity of how acute malnutrition affects the well-being of children and how modifiable it was with community resources. Ranking was then performed by mothers to understand the most important causes of acute malnutrition.

Lack of food and livestock, disease and dirty water featured in the top risk factors identified by labour/charcoal communities (cf. Table below).

Although we studied only one Labour/Charcoal community and there should be more investigations for contextual representation, we found there were a large proportion of mothers of U5 children who were single at the study site and as such had unique vulnerabilities compared to married mothers. As a result, the FGDs were divided into two groups.

Water, sanitation and hygiene issues featured strongly in the risk factor priorities of this community, despite a permanent spring being accessible (2km away) and a borehole/tap (200-400m away) being available. However, the spring was shared with both humans and animals, while the borehole often failed due to a lack of power and was insufficient to supply a community without long queues.

The absence of latrines in the community and the nursery was not seen as a higher priority for the risk of acute malnutrition, particularly as disease ranked number 2 for single women, many of which are preventable through good hygiene and nutrition practices. Single mothers ranked good hygiene and nutrition practices low as number 6 (cf. Annex 8 for more details on the communities understanding of prevalence and ability to modify particular risk factors). As the community stated, little government or agency support had been given to them in building latrines, and due to the rocky terrain where they lived, it was difficult to construct latrines without proper resources. Discussions with the men highlighted that it often takes over a day to dig a hole for burials.

Poverty (defined locally as lack of cash and or lack of livestock assets; given that livestock represents wealth) seemed to be strongest in this community compared to the pastoral and agropastoral communities; with single mothers being more vulnerable to a lack of resources and support. Many had few or no livestock and relied on charcoal/firewood burning working long hours away from home for little revenue. As a result, their access to food/money/livestock was limited and understandably ranked the highest risk factor by single and married mothers. Workload and lack of care to children resulted, also contributing as a major risk factor for acute malnutrition.

Table 10: Priority rankings of risk factors for Labour/Charcoal Livelihood

Single Mothers Priority rankings of risk factors for acute malnutrition	Married Mothers Priority rankings of risk factors for acute malnutrition
1. Lack of food	1. Dirty water
2. Disease	2. Lack of money/livestock
3. Workload	3. Workload
4. Water Shortage	4. Water shortage
5. Lack of Latrines	5. Lack of care/knowledge
6. Poor Hygiene Practices	6. Lack of food
	7. Lack of latrines

Perceived Good Practices by Mothers of U5 Children

Use of herbs before seeking appropriate medical advice featured in this community, particularly post-delivery with both the mother (healing for womb, stimulating milk production, expelling placenta) and newborn (expelling myconium).

Compared to the Agropastoral and Pastoral communities, who practiced 40 days of seclusion for post-natal mothers, the Labour/Charcoal community only had 4 days of seclusion. Given the higher workload, the number of single mothers and poverty in this community, this could be one of the reasons for shorter seclusion period. A positive aspect in this community was that responsibilities were more shared between the genders, and during this seclusion period, the men assisted in other duties and shopping etc.

Despite good food diversity being defined as consuming animal products and githeri, with the limited finances they had, there seemed to be some positive aspects of diversity and access to markets to allow for purchasing of avocadoes and potatoes.

Although the community stated they performed good practices in washing of hands, boiling water, cleaning containers etc., it was observed not to be occurring regularly or frequently. This also links with the water, hygiene and disease priorities mentioned above.

More detailed comparisons between livelihoods and perceived good practices by mothers can be found in Annex 7.

Local causal model

Based on the collected information, a local causal model was formed (cf. Graphic below). Priority rating numbers of acute malnutrition were highlighted for both married and single mothers (number 1 being the most important priority to acute malnutrition).

Boxed variables indicate core risk factors identified and ranked by the community, which in some but not all cases align with the risk factors rated by technical experts in the initial workshop (cf.

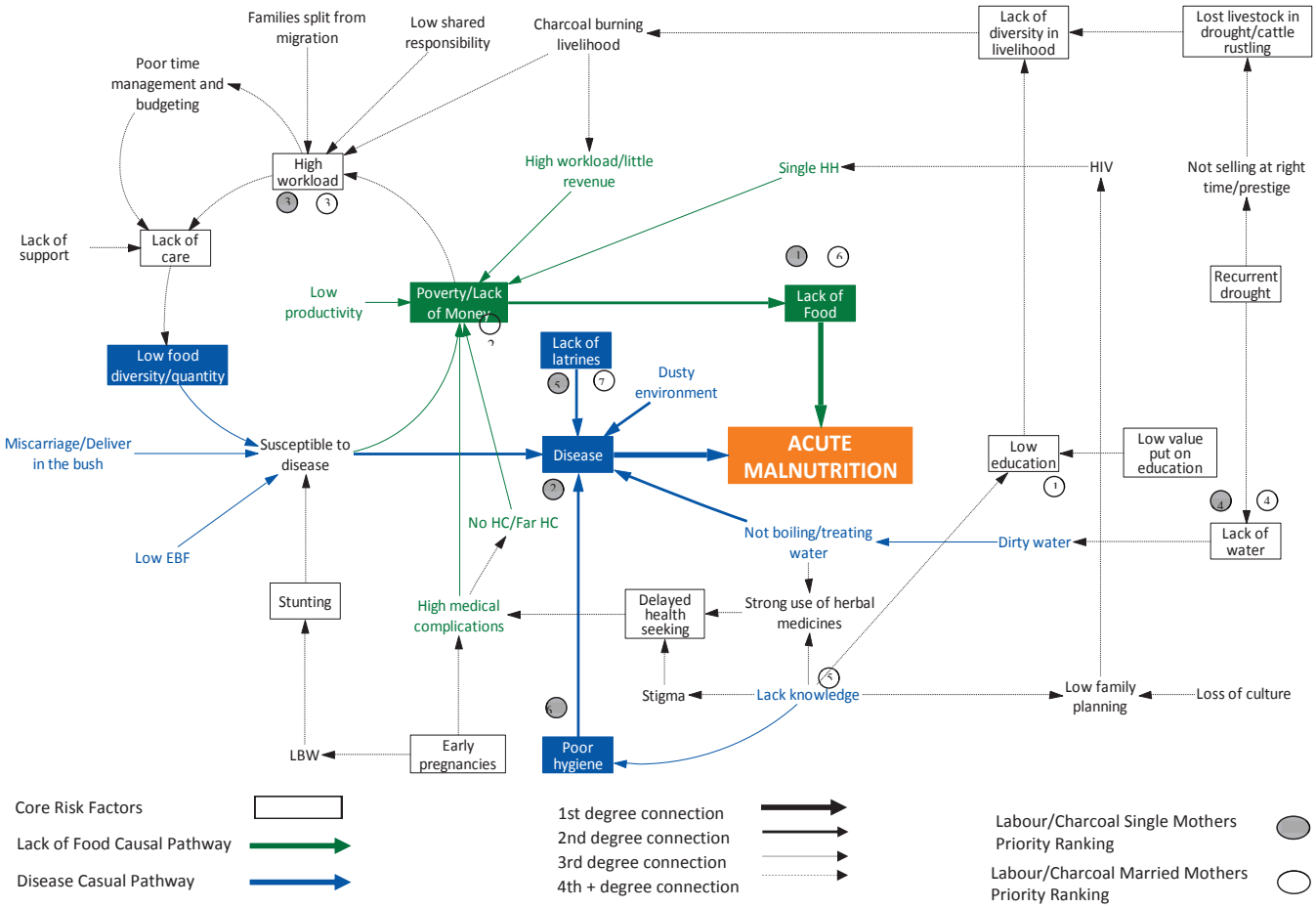
Table **4**, section 4.A.1.). There are slight differences in formulations as well as new risk factors not identified by experts.

Lack of food and disease were identified as the most proximate causes to acute malnutrition, linked to a number of interrelated secondary, tertiary, quaternary, etc. factors that include poverty, high workload, low education and drought.

Observations:

- Workload of women and lack of money/poverty were cited as common indirect links to acute malnutrition, ultimately caused by recurrent droughts in the community's mind, which leads to livestock loss and lack of water.
- Loss of livestock from a number of conflicts and cattle rustling were also important factors. Due to poor diversity in livelihoods, with little livestock left, the community has resorted to charcoal/firewood burning activities which generates a minimal income compared to the high workload and distances involved.
- Access to water, hygiene and sanitation were important themes highlighted by the community and through observations, particularly in this sampled village where there were no latrines – resulting in a lot of human faeces on the ground.
- Loss of culture was highlighted with resulting impacts on marriage. For example, due to poverty, many girls were looking to prostitution and casual labour at nearby army camps, resulting in a large number of single mothers.
- Women spoke of high levels of HIV and partners dying from this, as a result compounding their poverty and workload as they had little support after the death of their husbands.
- Stigma to be in the nutrition programs as others thought they had HIV, distance to the health centre and lack of importance in education (low school attendance), compounded with the loss of matrimonial cultural values seemed to be affecting the care practices of their children and mothers' health.

Diagram 7: Labour/Charcoal Livelihood - Local causal models



B.5. Summary of Field Findings

The perceived root cause of acute malnutrition for many communities was that of recurrent droughts, particularly several severe droughts that have devastated livestock numbers to a point where communities have been unable to restock. Money, food, good health, wealth are all intertwined in the value and importance communities place on their livestock. Disease in these communities is seen as occurring more frequently as immunity has declined, due to what is perceived as a lack of milk for children and adults to consume.

The prestige of households owning large numbers of livestock plays a critical role that in some cases has resulted in the demise of the family into poverty. Communities have seen that holding onto their livestock during drought, "has cost us a lot and we have learnt our lessons from the past". Women, particularly, recognize that households are healthier when livestock are sold more frequently on favourable markets, allowing more disposable income for diverse foods, paying school fees and debts, and allowing them to invest in other diverse livelihoods. Drought is not the only condition that greatly affects livestock numbers, recognising that in some communities there is a fragile balance of also trying to keep livestock numbers low to minimize security risks from cattle/herd rustling. One questions if the men, who are the main decision makers and often have access to the household money, can balance the strong pull of prestige, to sell at favourable times, while minimising the risks of cattle rustling.

As communities try to counteract the effects of livestock depletion, they are forced into other livelihood activities that result in settlement, such as agriculture and charcoal/firewood burning. This ultimately divides families as men migrate with the livestock they have remaining, while women stay behind to farm the *shambas* or burn the wood. Compounding this, is the value now seen in educating children to improve future access to money and employment. However, this also causes families to be divided, as there are limited mobile schools available, and thus women stay behind to ensure children can attend school. Ultimately, the workload of women is recognized by the communities (men and women), to have increased dramatically - working in the *shamba* or burning charcoal, collecting water, conducting normal domestic duties, and caring for children, all of this being alone while men have migrated. With inadequate time to care and feed children properly, in addition to children having less access to milk, as the father has migrated with the animals, children's poor nutritional status is compounded.

In all communities, when a household becomes so desperate for income that charcoal/firewood burning activities are commenced, it is seen as the "last resort" and health indices of the household decline. Agropastoral communities, who traditionally have been pastoralists, have seen the value of agriculture, and are desperate for skills development and resources in this area, stating that "if they could grow more diverse foods, they would be less dependent on milk". Thus, between the three studied livelihoods, although the workload of the women has become greater (working in the *shamba* while conducting other heavy domestic duties), agropastoral communities are recognising the health and economic benefits in diversifying diet and income, thus being less susceptible to cattle rustling, livestock disease and drought.

Other observed root causes were associated with:

1. Lack of education → when children don't stay in school, they get married younger and have earlier pregnancies, thus lacking IYCN and hygiene knowledge.

2. Lack of markets, and knowledge for creating trade/markets etc., inhibited communities ability to move out of their cycle of poverty and create diversity in their livelihoods.
3. Single headed households (particularly female headed) → often occurring due to conflict and disease (HIV). Prostitution then becoming an option of survival, particularly for single headed households in the Labour/Charcoal community, continuing the cycle of HIV and unwanted pregnancies.
4. Budgeting and time management → a major observation in individual interviews with healthy mothers/children was that despite their poverty they are trying to diversify the foods they buy, selling the animals at the right time, making sure they cook enough food in the morning for the day and educate the younger siblings/grandmothers to feed at e.g. 10am, 1pm, 4pm to the younger children. This is an area that should be investigated further.

C. RATING RISK FACTORS

The objective of the rating exercise is to classify risk factors based on their perceived relative contribution to undernutrition prevalence, drawing on a range of sources including the literature review, international scientific sources, results from quantitative survey; analysis of seasonality; ranking by communities and technical experts. Risk factors tested in the field are rated by the NCA analyst according to the following classification, following the completion of primary data collection.

Table 11: Risk factor categories, definitions and criteria

Rating	Meaning	Criteria
Major risk factor	The risk factor is interpreted as a major contributor to undernutrition prevalence	Prevalence of risk factor is classified as [+++] AND strength of association from literature review is classified as [++] or [+++] AND majority of [++] or [+++] for all other sources of information
Important risk factor	The risk factor is interpreted as an important contributor to undernutrition prevalence	Prevalence of risk factor is classified as [++] AND strength of association from literature review is classified as [++] or [+++] AND majority of [++] or [+++] for all other sources of information
Minor risk factor	The risk factor is interpreted as a limited or sporadic contributor to undernutrition prevalence.	Prevalence of risk factor is classified as [+] or [++] AND strength of association from literature review is classified as [+] or [++] AND majority of [+] for all other sources of information
Rejected risk factor	When there is consensus on rejecting the risk factor because it is interpreted as irrelevant to the context or as a marginal contributor to undernutrition prevalence.	Prevalence of risk factor is classified as [-] AND Majority of [-] or [+] for all sources of information
Untested risk factor	When there is consensus that there is not enough information to rate the risk factor	Information gathered not complete or not available

It was found that risk factors seen as important by experts in the initial technical expert workshop were in some cases seen differently by communities. For example, community members will refer health problems to a traditional healer first or herbs are used initially and if symptoms do not subside, they will then seek advice at the health centre. Although the community did not prioritise health seeking behaviour as a major risk factor for acute malnutrition, nor did the workshop experts, through community discussions it was evident that health seeking is delayed or herbs are used to produce physiological effects that may harm the sick individual e.g. inducing vomiting to clear the chest infection. This ultimately hinders families in terms of transport costs and further medical treatment due to complications from delayed treatment. The communities highlighted how the cost of medical treatment/transport to a health centre is compounding their poverty and as a result children are pulled out of school or the family goes without food due to lack of money. Ultimately, community prioritised poverty as a risk factor to acute malnutrition – with poverty representing the end result of a long chain of causal factors – rather than underlying conditions and behaviours that compound acute malnutrition and were identified by technical experts in the initial workshop.

Further examples of risk factors where differences of opinion occurred between technical experts and the community include undernourished PLW and child acute malnutrition; and early marriages & birth spacing and child acute malnutrition. Experts and communities both recognise the importance of birth spacing; but experts erroneously believe communities are not aware of its importance. Qualitative inquiry results revealed that community explicitly recognize that women and children are healthier with longer birth spaces and mothers' workload is reduced if they have fewer children. It was generally felt that 1.5-3 years birth spacing was adequate to achieve that, being practiced in the community.

The results of the rating exercise are presented below, shown alongside the preliminary ratings from the initial technical expert workshop.

Table 12: Results of rating exercise

RISK FACTORS	Preliminary Rating from Initial Workshop*	Rating based on Field Investigation findings**
1. LIMITED HH FOOD SECURITY		
A. Inadequate access to food	3.6	MAJOR
B. Poor availability of foods	3.7	MAJOR
C. Inadequate utilisation of food and water	3.5	MINOR
D. Poor or fluctuating stability (climatic, market prices, conflict, economic, political)	3.4	MAJOR
E. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	3.9	MAJOR
F. Poor storage of food, seeds, grains, livestock in home	2.9	MINOR
2. POOR MATERNAL AND CHILD HEALTH		
A. Early pregnancies and inadequate birth spacing	3.6	IMPORTANT
B. High childhood morbidity	3.6	MAJOR
C. Immunisation is not 100% covered in U5 and PLW	3.1	MINOR
D. Poor access to health/nutrition programs due to insecurity and nomadic movement	3.5	MINOR
E. Poor operational HC coverage	3.2	IMPORTANT
F. HC staff providing inadequate health and care practices	2.8	MINOR
G. Stigma attached to malnutrition or admission to program	2.8	IMPORTANT
H. Poor perception/identification of disease and management	3.1	IMPORTANT
I. Health problems are often referred to a traditional healer first	2.9	IMPORTANT
3. POOR MATERNAL AND INFANT & YOUNG CHILD NUTRITION INDICATORS		
A. EBF rates to 6mths are low/Inappropriate introduction & timeliness of complementary foods	3.6-3.7	IMPORTANT
B. Inadequate quantity and diversity of age-specific foods	3.8	MAJOR
C. Pregnant women restrict their diet to ensure an easier delivery	2.7	MINOR
D. Pregnant and lactating women are malnourished	3.6	UNTESTED
4. WATER, SANITATION & HYGIENE		
A. Access to water for livelihood use	3.5	IMPORTANT
B. Access to safe water for HH use	3.7	MAJOR
C. Inadequate coverage of latrines	3.2	MAJOR
5. VULNERABLE GROUPS & GENDER IMBALANCES IN THE HH, WORKPLACE & SOCIETY		
A. Women do not have power in the HH and the society	2.9	IMPORTANT
B. Low levels of maternal education	3.9	IMPORTANT
C. OVC not receiving the appropriate care and education they require	3.4	UNTESTED
D. Mother spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	MAJOR
E. Siblings feeding the younger child while mother is working	2.7	IMPORTANT
F. Distance and access to water is taking a large proportion of women's time and duties	3.3	MAJOR
G. Domestic duties are not reduced during pregnancy and lactation of women	3.1	MAJOR
H. Animal responsibility vs gender	2.9	UNTESTED
6. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION OF U5 AND PLW		

A. Some food are taboo for PLW and children	2.8	MINOR
B. Socio-cultural barriers to hygiene and sanitation practices	2.7	IMPORTANT
C. Disease is seen as a result of a supernatural force	2.6	REJECTED

*** 1= minor contributor to undernutrition, 5= major contributor to undernutrition. ** major, important, minor, rejected, untested**

D. VALIDATING RESULTS

The objective of this step is to build consensus around the findings in order to generate stakeholder buy-in. Agreement on major risk factors and associated causal pathways is achieved through a participatory validation process where technical experts and key stakeholders are gathered to discuss and validate results**.**

In this final stakeholder workshop, findings from the qualitative inquiry and secondary data review and the resulting rating of causal pathways are presented to stakeholders in order to support a review of initial causal hypotheses and to agree on priority causal pathways through deliberation and assigning of confidence notes. This iterative approach allows conclusions to be drawn from stakeholders, the NCA analyst and community based on discussion; points of difference or discord deliberated and resolved; and consensual agreement on pathways reached (best case scenario).

D.1. Reviewing proposed analyst ratings

In a few cases, deliberation and interpretation of field findings led stakeholders to modify the rating proposed by the NCA analyst or to reformulate or remove certain risk factors. For example, stakeholders reformulated the original risk factor *Pregnant women restrict their diet to ensure an easier delivery (3B)* to *Inadequate maternal diet due to cultural factors (3B)* in order to better reflect the complexity surrounding maternal choices on diet; and upgraded it from Minor to Important. Conversely, stakeholders deleted *Siblings/relatives/neighbours feeding the younger child while mother is working (5E)* base on a review of the evidence that did not support the veracity of the statement.

Changes in ratings are indicated in the final column. Changes in formulation of risk factors or their elimination are shown in red or strikethrough.

Table 13: Risk factor ratings reviewed by stakeholders

RISK FACTORS	Preliminary Rating from Initial Workshop*	Rating based on Field Investigation findings**	Rating change based on Deliberation in Final Workshop**
1. LIMITED HH FOOD SECURITY			
A. Inadequate access to food	3.6	MAJOR	
B. Poor availability of foods	3.7	MAJOR	
C. Inadequate utilisation of food and water	3.5	MINOR	
D. Poor or fluctuating stability (climatic, market prices, conflict, economic, political)	3.4	MAJOR	
E. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	3.9	MAJOR	
F. Poor storage of food, seeds, grains, livestock in home	2.9	MINOR	
2. POOR MATERNAL AND CHILD HEALTH			
A. Early pregnancies and inadequate birth spacing	3.6	IMPORTANT	
B. High childhood morbidity	3.6	MAJOR	
C. Immunisation & supplementation is not 100% covered in U5 and PLW	3.1	MINOR	
D. Poor access to health/nutrition programs due to insecurity and nomadic movement	3.5	MINOR	
E. Poor operational HC coverage	3.2	IMPORTANT	
F. HC staff providing inadequate health and care practices	2.8	MINOR	
G. Poor perception/Stigma attached to malnutrition or admission to program	2.8	IMPORTANT	
H. ~~Poor perception/~~identification of disease and management related to caregiver's health knowledge	3.1	IMPORTANT	
I. Health problems are often referred to a traditional healer first	2.9	IMPORTANT	
3. POOR MATERNAL AND INFANT & YOUNG CHILD NUTRITION			
A. EBF rates to 6mths are low/Inappropriate introduction & timeliness of complementary foods	3.6-3.7	IMPORTANT	
B. Inadequate quantity and diversity of age-specific foods	3.8	MAJOR	
C. ~~Pregnant women restrict their diet to ensure an easier delivery~~ Inadequate maternal diet due to cultural factors	2.7	MINOR	IMPORTANT
D. Pregnant and lactating women are malnourished	3.6	UNTESTED	
4. WATER, SANITATION & HYGIENE			
A. Access to water for livelihood use	3.5	IMPORTANT	MAJOR
B. Access to safe water for HH use	3.7	MAJOR	
C. Inadequate coverage of latrines	3.2	MAJOR	
5. VULNERABLE GROUPS & GENDER IMBALANCES IN THE HH, WORKPLACE & SOCIETY			
A. Women do not have decision-making power in the HH and the society	2.9	IMPORTANT	
B. Low levels of maternal education	3.9	IMPORTANT	
C. OVC not receiving the appropriate care and education they require	3.4	UNTESTED	
D. ~~Mother~~ Caregivers spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	MAJOR	

E. ~~Siblings/relatives/neighbours feeding the younger child while mother is working~~	2.7	IMPORTANT	DELETED
F. Distance and access to water is taking a large proportion of women's time and duties	3.3	MAJOR	
G. Domestic duties are not reduced during pregnancy and lactation of women	3.1	MAJOR	
H. ~~Animal responsibility vs gender~~ Gender roles & inequality affecting malnutrition	2.9	UNTESTED	
6. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION OF U5 AND PLW			
A. ~~Some food are taboo for PLW and children~~	2.8	MINOR	DELETED
B. Socio-cultural barriers to hygiene and sanitation practices	2.7	IMPORTANT	
C. Disease is seen as a result of a supernatural force	2.6	REJECTED	

D.2. Assigning confidence notes

The NCA methodology allows for and acknowledges the limitations of the conclusions by delivering a confidence note. The confidence note is an indication of how reliable partners and experts think a particular hypothesised risk factor is. The confidence note is based on the perceived strength of information gathered for each risk factor and the number of pathways through which the risk factor operates. It is generated during the final stakeholder workshop. During the workshop, risk factor ratings are presented and debated and the NCA analyst asks stakeholders to assign a confidence note for each risk factor of the study; which are then averaged across the group; in order to validate final results.

The confidence note proposed has three levels: high, medium and low (see Table below).

Table 14: Definition of confidence note levels

Confidence note	Meaning
High	The participant is convinced by the rating, based on the quality of the process and the coherence of the information collected as well as her/his technical and field experience
Medium	The participant is fairly convinced by the rating although some points need some clarification
Low	The participant is not convinced by the rating and has some doubts about the quality of the process and/or about the information collected. Or: key information is missing
Unknown	The participant does not think his/her opinion is relevant for this particular result

The level of confidence expressed in the note depends on a range of factors, including the level of resources available to carry out the study, the quality of the secondary information and the transparency and quality of the process. A high confidence note is not per se a scientific proof of causality, but conveys that a large majority of stakeholders, after reviewing quality data triangulated from several sources, are similarly convinced of the causal relevance of the risk factor. For example, if risk factor 4A (classified as major) receives a mean confidence note score of 2.6 out of 3, this would indicate that stakeholders had a relatively high confidence that 4A is a major risk factor to malnutrition.

The confidence notes below are presented according to the major ratings of risk factors generated from the fieldwork (major, important, minor, rejected, untested).

Major risk factors

Major risk factors identified by communities also featured strongly in the top priority risk factors agreed by stakeholders (2B, 3B and 4B), illustrating a major convergence of opinion between community and workshop stakeholders. All were assigned a high confidence note by stakeholders. The top priority risk factors are:

- ✓ High childhood morbidity (malaria, diarrhoea, ARI) affecting malnutrition in U5 children
- ✓ Inadequate quantity and diversity of age-specific foods
- ✓ Access to safe water for household use (bathing, cooking, drinking, cleaning)

Stakeholders also recognised the importance of women's workload, emphasised by communities as one of the key factors underlying acute malnutrition (5F, 5G & 5D):

- ✓ Distance to access water is taking a large proportion of women's time and duties
- ✓ Domestic duties are not reduced during pregnancy and lactation of women
- ✓ Caregivers spending inadequate time with the U5 child both psychosocially and nutritionally

Further observations from workshop participants on risk factors where opinions were divided or overall confidence was weaker include:

- Access to water for livelihood use (4A) scored a lower confidence note, with the majority of voters agreeing with the rating and the median vote being 3. However, the minority who disagreed thought this risk factor should be labelled "Important" because they considered it was a strong factor for food security in that animals need to migrate further for water and thus food and milk shortages occur, with indirect effects on nutrition.
- The one community priority risk factor not highlighted strongly by experts but emphasised by communities was lack of money (and in many cases lack of livestock which the communities view in the same light) and its link to poverty. Poverty impacts ability to access diverse foods, clean water and taking their children to a health centre for check-ups and vaccinations.

Table 15: Major risk factors

No.	RISK FACTORS	Confidence Note*
2B	High childhood morbidity (malaria, diarrhoea, ARI) affecting malnutrition in U5 children	3.0
3B	Inadequate quantity and diversity of age-specific foods	3.0
4B	Access to safe water for household use (bathing, cooking, drinking, cleaning)	3.0
5F	Distance to access water is taking a large proportion of women's time and duties	2.9
5G	Domestic duties are not reduced during pregnancy and lactation of women	2.9
1A	Inadequate access to food – physical, financial, social, infrastructure, communications (poor access to food due to low levels of HH incomes amidst high food prices)	2.9
1D	Poor or fluctuating stability (climatic, markets, conflict, economic, political)	2.9
1E	Inadequate access to milk and animal products during dry seasons (inc. extended dry)	2.9

4C	Inadequate coverage of latrines	2.9
1B	Poor availability of foods – no/limited fruits and vegetables at local market, under-developed markets, inadequate production and reserves, poor transport access, inadequate availability of food at household level, Poor land/livestock management and productivity	2.8
5D	Caregivers spending inadequate time with the U5 child both psychosocially and nutritionally	2.8
4A	Access to water for livelihood use (animals, farming)	2.6

* High=3, Medium=2, Low=1

Important Risk Factors

The majority of important risk factors were assigned a high confidence note by stakeholders, while some were assigned a medium note. Most of the risk factors in this group are related to behaviour change, gender empowerment and education, with the highest confidence notes assigned to the following factors:

- ✓ Low levels of maternal education
- ✓ Early pregnancies and inadequate birth spacing
- ✓ Identification of disease and management related to caregiver health knowledge

Programmatically, activities aimed at improving these risk factors would involve less hardware, but would require longer term and more intensive BCC interventions.

Further observations from workshop participants on risk factors where opinions were divided or overall confidence was weaker include:

- Health problems are often referred to a traditional healer first or herbs are used initially (2I) scored an average confidence note of 2.6, while the median vote was still 3, to agree with the importance of this factor. The minority that voted otherwise felt that it could be combined with risk factor 2H and/or felt that it should not be such an important factor to acute malnutrition as communities were still going to the health centres.
- Poor operational health centre coverage (2E) – the minority who did not agree with the rating, did so as they believe even those who are close to a health centre have poor health seeking behaviours, while others believe the centres are far and understaffed which could have a more major effect on management of health and nutrition, thus affecting acute malnutrition.
- Socio-cultural barriers to hygiene and sanitation practices (6B) – while the median vote was still in agreement with the importance of this factor, there were a number of voters who felt there was not enough information to agree or disagree, while others did not feel it was relevant to this community and water treatment was more important.
- Poor perception/Stigma attached to malnutrition or admission to program (2G) – the minority of voters who disagreed with this rating believe that stigma is not a cause but an effect, and would be better to combine with risk factor 2H.

Table 16: Important risk factors

No.	RISK FACTORS	Confidence Note*
5B	Low levels of maternal education	2.9
2A	Early pregnancies and inadequate birth spacing	2.8
2H	Identification of disease and management related to caregiver health knowledge	2.8
3A	Exclusive breastfeeding rates to 6mths are low / Inappropriate introduction and timeliness of complementary foods	2.7
3C	Inadequate maternal diet due to cultural factors	2.7
5A	Women do not have decision making power in the household and the society	2.7
2I	Health problems are often referred to a traditional healer first or herbs are used initially	2.6
2E	Poor operational health centre coverage	2.5
6B	Socio-cultural barriers to hygiene and sanitation practices (e.g. proportion of water used for religious acts, gender access and importance to its use, women not able to share a latrine with men etc.)	2.5
2G	Poor perception/Stigma attached to malnutrition or admission to program	2.3

* High=3, Medium=2, Low=1

Minor Risk Factors

Many of the minor factors to acute malnutrition are localised and/or contextual and cannot necessarily be generalised to Isiolo County or the 3 livelihoods. Although these are underlying risk factors, their effect on acute malnutrition is not considered immediate. The highest confidence notes in this group were assigned to the following factors:

- ✓ Inadequate utilisation of food and water
- ✓ HC staff providing inadequate health and care practices
- ✓ Immunisation & supplementation is not 100% covered in U5 and PLWs

Further observations from workshop participants on risk factors where opinions were divided or overall confidence was weaker include:

- Poor storage of food, seeds, grains, livestock in home (1F) – of those that disagreed with this risk factor being “Minor”, some said it should be “Important” as some communities lose 20% of the small quantity of stored grains that they do have, to rodents etc., while others stated there is no direct link to acute malnutrition with this risk factor.
- Poor access to health/nutrition programs due to insecurity and nomadic movement (2D) - the minority that disagreed with the rating of this factor were split between believing that nomadic movement and insecurity was more important. Others stated it was more of an issue in border areas and with communities settling more, nomadic movement is not so much of an issue.

Table 17: Minor risk factors

No.	RISK FACTORS	Confidence Note*
1C	Inadequate utilisation of food and water – food preferences (e.g. fish), food storage, water access, food preparation.	2.7
2F	HC staff providing inadequate health and care practices	2.6
2C	Immunisation & supplementation is not 100% covered in U5 and PLWs	2.6
1F	Poor storage of food, seeds, grains, livestock in home	2.5
2D	Poor access to health/nutrition programs due to insecurity and nomadic movement	2.4

* High=3, Medium=2, Low=1

Untested or Rejected Risk Factors

Due to insufficient evidence able to be gathered in the course of the field investigation due to time constraints, lack of convergence or triangulation of the data or other limitations, three risk factors were ranked as needing further investigation and received medium confidence notes:

- ✓ Gender roles & inequality affecting malnutrition
- ✓ Pregnant and lactating women are malnourished (includes wasting and MND)
- ✓ OVC not receiving the appropriate care and education they require

However, workshop participants recognized these as being important factors in affecting acute malnutrition.

Risk factor 6C (Disease is seen as a result of a supernatural force) was rejected as it did not seem to have a great impact on community's health seeking attitude and behaviour, receiving a low confidence note.

Table 18: Untested or Rejected risk Factors

No.	RISK FACTORS	Rating	Confidence Note*
5H	Gender roles & inequality affecting malnutrition	Untested	2.4
3D	Pregnant and lactating women are malnourished (includes wasting and MND)	Untested	2.2
5C	OVC not receiving the appropriate care and education they require	Untested	2.1
6C	Disease is seen as a result of a supernatural force	Rejected	1.9

* High=3, Medium=2, Low=1

D.3. Final results

Findings showed that **high child morbidity** linked to inadequate access to **safe water** coupled with poor access to appropriate **age-specific foods**, including milk in the dry season, were major causal factors underpinning acute malnutrition in Isiolo County. This was agreed by communities, technical experts and other critical stakeholders and is reflected in the top three major risks identified through the NCA process.

Causal pathways for each of these major risk factors were elaborated in the field consultations, and are shown below.

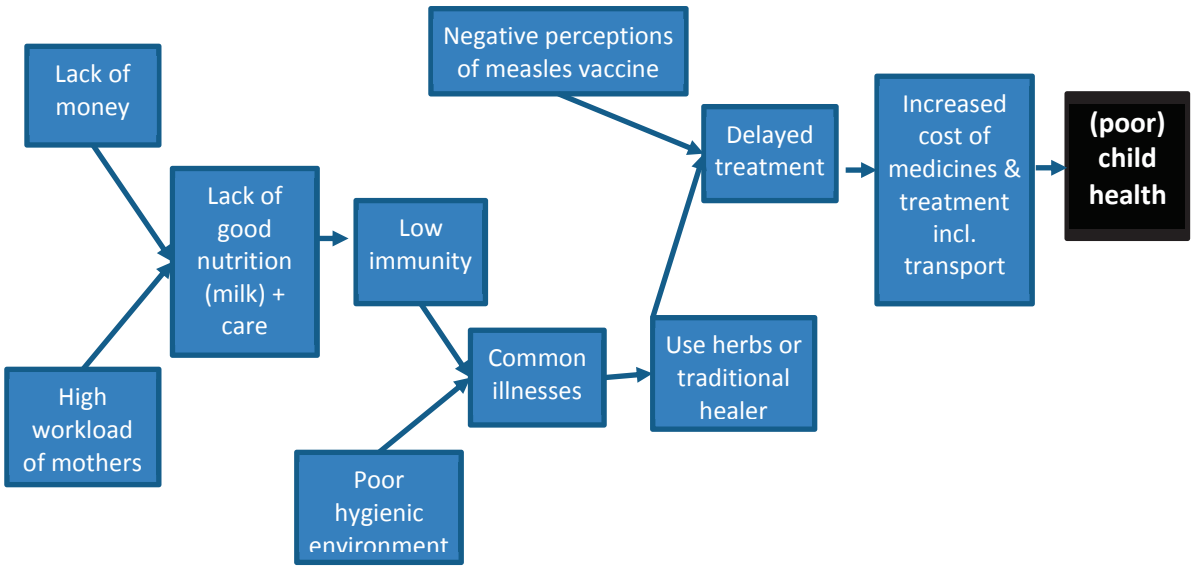


Figure 11: Causal pathway for child health & morbidity

Childhood health and morbidity was directly linked to the high cost of medication and treatment and delayed treatment, underpinned by negative perceptions of modern vaccines and use of traditional herbs and practices. Lack of money and women's high workload were identified as basic causes of high childhood morbidity.

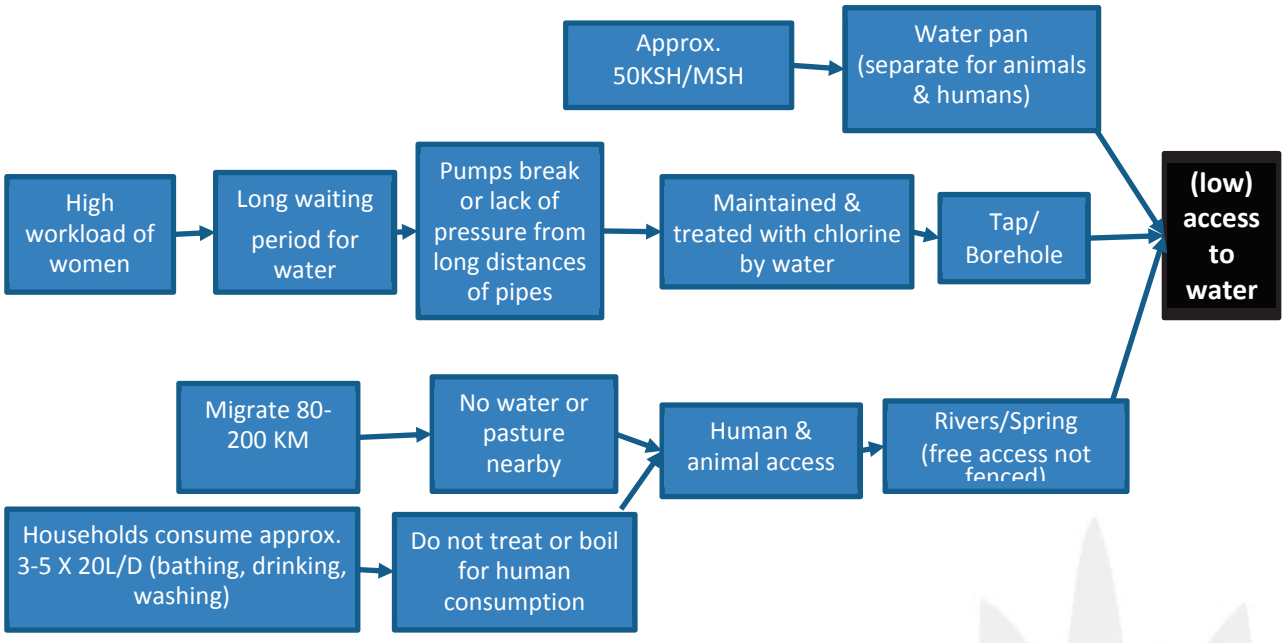


Figure 12: Causal pathway for access to safe water

Water sources that were identified include surface water (water pan, rivers and springs) and groundwater (boreholes). Low access to safe water was directly linked to contamination from mixed human/livestock usage of water and lack of routine treatment for surface water; and frequent breakdown of water pumps and long waiting periods for groundwater. Women's high workload was identified as a basic cause of low access to water.

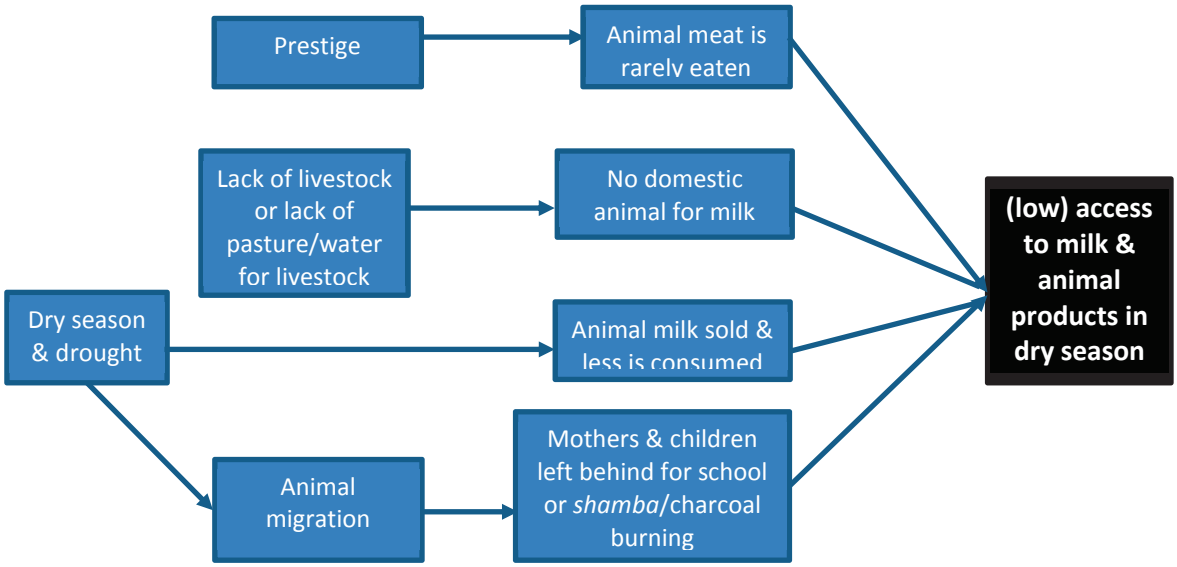


Figure 13: Causal pathway for access to milk and meat

Finally, low access to milk and animal products in the dry season, taken as a proxy for poor access to appropriate age-specific foods, was directly linked to the sale of animal milk for income purposes, to cultural norms preventing regular meat consumption, to women and children left at the homestead while animals migrate and to the absence of milking herds at the homestead. Recurrent drought and (extended) dry season were identified as a basic cause of low access to milk and other animal source foods.

Findings confirmed that the impacts of recurrent drought are increasing **women's workload** in significant and detrimental ways, and in turn affecting maternal health and care of young children.

The table below summarizes the main results, presenting the preliminary ratings given to individual risk factors in the initial technical expert workshop; the classification of risk factors into categories based on field investigation findings (major/important/minor/untested/rejected); and the final confidence note assigned by stakeholders in the last stage of the process. Changes in formulation or elimination of certain risk factors based on discussions in the final stakeholder workshop are shown in red or strikethrough.

Table 19: Evolution of importance of risk factors

RISK FACTORS	Preliminary Rating from Initial Workshop*	Rating based on Field Investigation findings**	Rating change based on Deliberation in Final Workshop **	Confidence Note from Final Workshop ***
1. LIMITED HH FOOD SECURITY				
A. Inadequate access to food	3.6	MAJOR		2.9
B. Poor availability of foods	3.7	MAJOR		2.8
C. Inadequate utilisation of food and water	3.5	MINOR		2.7
D. Poor or fluctuating stability (climatic, markets, conflict, economic, political)	3.4	MAJOR		2.9
E. Inadequate access to milk and animal products during dry seasons (inc. extended dry)	3.9	MAJOR		2.9
F. Poor storage of food, seeds, grains, livestock in home	2.9	MINOR		2.5
2. POOR MATERNAL AND CHILD HEALTH				
A. Early pregnancies and inadequate birth spacing	3.6	IMPORTANT		2.8
B. High childhood morbidity	3.6	MAJOR		3.0
C. Immunisation & supplementation is not 100% covered in U5 and PLW	3.1	MINOR		2.6
D. Poor access to health/nutrition programs due to insecurity and nomadic movement	3.5	MINOR		2.4
E. Poor operational HC coverage	3.2	IMPORTANT		2.5
F. HC staff providing inadequate health and care practices	2.8	MINOR		2.6
G. Poor perception/Stigma attached to malnutrition or admission to program	2.8	IMPORTANT		2.3
H. ~~Poor perception/~~identification of disease and management related to caregiver's health knowledge	3.1	IMPORTANT		2.8
I. Health problems are often referred to a traditional healer first	2.9	IMPORTANT		2.6
3. POOR MATERNAL AND INFANT & YOUNG CHILD NUTRITION				
A. EBF rates to 6mths are low/Inappropriate introduction & timeliness of complementary foods	3.6-3.7	IMPORTANT		2.7
B. Inadequate quantity and diversity of age-specific foods	3.8	MAJOR		3.0
C. ~~Pregnant women restrict their diet to ensure an easier delivery~~ Inadequate maternal diet due to cultural factors	2.7	MINOR	IMPORTANT	2.7
D. Pregnant and lactating women are malnourished	3.6	UNTESTED		2.2
4. WATER, SANITATION & HYGIENE				
A. Access to water for livelihood use	3.5	IMPORTANT	MAJOR	2.6
B. Access to safe water for HH use	3.7	MAJOR		3.0
C. Inadequate coverage of latrines	3.2	MAJOR		2.9
5. VULNERABLE GROUPS & GENDER IMBALANCES IN THE HH, WORKPLACE & SOCIETY				
A. Women do not have decision-making power in the HH and the society	2.9	IMPORTANT		2.7
B. Low levels of maternal education	3.9	IMPORTANT		2.9
C. OVC not receiving the appropriate care and education	3.4	UNTESTED		2.1

they require				
D. ~~Mother~~ Caregivers spending inadequate time with the U5 child (psychosocially and nutritionally)	3.1	MAJOR		2.8
E. ~~Siblings/relatives/neighbours feeding the younger child while mother is working~~	2.7	IMPORTANT	DELETED	2.7
F. Distance and access to water is taking a large proportion of women's time and duties	3.3	MAJOR		2.9
G. Domestic duties are not reduced during pregnancy and lactation of women	3.1	MAJOR		2.9
H. ~~Animal responsibility vs gender~~ Gender roles & inequality affecting malnutrition	2.9	UNTESTED		2.4
6. CULTURAL/RELIGIOUS/TABOOS AFFECTING MALNUTRITION OF U5 AND PLW				
A. ~~Some food are taboo for PLW and children~~	2.8	MINOR	DELETED	2.5
B. Socio-cultural barriers to hygiene and sanitation practices	2.7	IMPORTANT		2.5
C. Disease is seen as a result of a supernatural force	2.6	REJECTED		1.9

*** 1= minor contributor to undernutrition, 5= major contributor to undernutrition. ** major, important, minor, rejected, untested**

***** 1=low, 3=high**

As a final output of the NCA investigation, an Isiolo County local causal model capturing final agreed risk factors, pathways and their interlinkages is illustrated below. This model is a reflection of both community as well as technical experts and other key stakeholders.

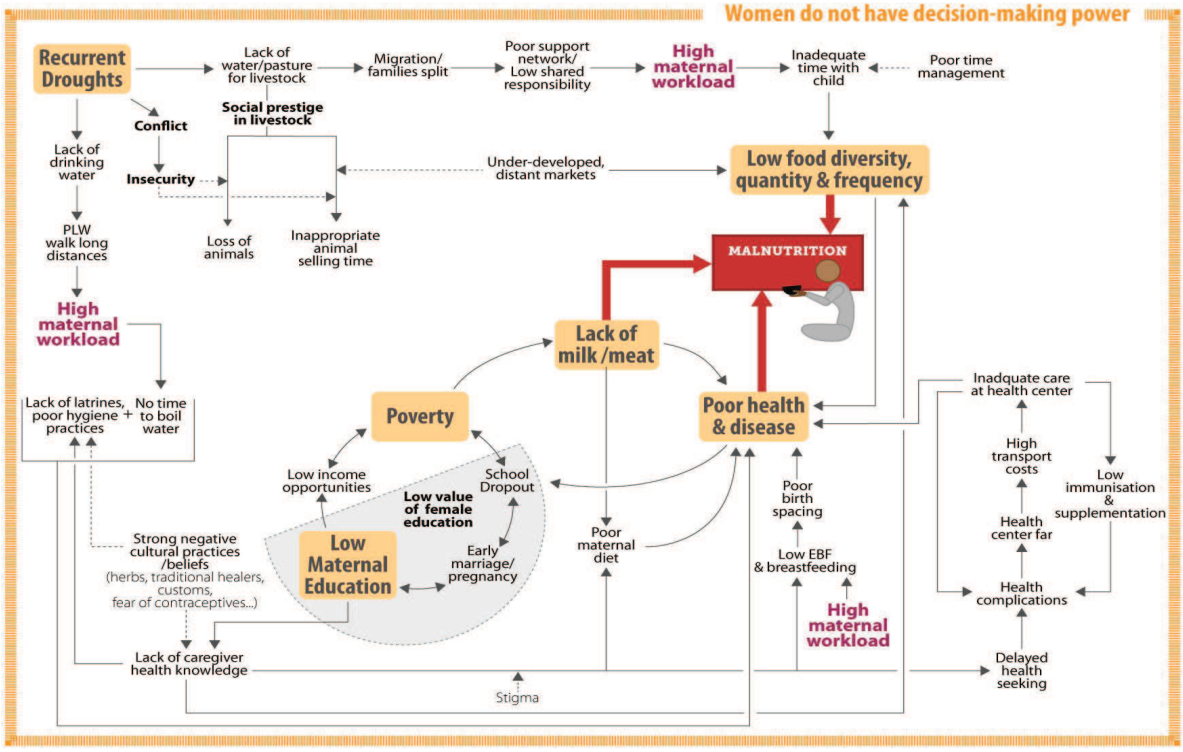


Figure 14: Final Summary Local Causal Model for Isiolo County

5. CONCLUSIONS

A. INTERPRETATION OF FINDINGS

Findings showed that **high child morbidity** linked to inadequate access to **safe water** for household use coupled with poor access to appropriate **age-specific foods**, including milk in the dry season, are the three major causal factors underpinning acute malnutrition in Isiolo County. This was agreed by communities, technical experts and other critical stakeholders and is reflected in the high confidence of stakeholders in these three major risk factors identified through the NCA process.

Findings also confirmed that the impacts of recurrent drought are increasing **women's workload** in significant and detrimental ways, and in turn affecting maternal health and care of young children. This was reflected across the other major causal factors identified in the study process.

While the three livelihood groups under study have unique features affecting the health and nutrition of their community, many of the risk factors to acute malnutrition that have been prioritised are very similar across the groups.

Findings from the fieldwork indicated that acute malnutrition typically occurs during the dry season or during droughts, peaking at the commencement of rains, and is linked to seasonal reductions in access to and consumption of milk. However, with increasing recurrence of droughts, increasingly sporadic rainfall and unreliable climatic patterns, communities are having less time to recover during the "typical" peaks. As a result, other risk factors are becoming more important than just the availability of milk during the dry seasons. For example, as communities are unable to restock their livestock, households become entrenched in poverty, and as water shortages occur more frequently, disease and women's workload are increasing. Thus, though wasting is considered by technical experts to be more of a concern in Isiolo County than stunting, it is becoming clear that chronic malnutrition is emerging as an issue of major concern.

The agreed major factors underlying acute malnutrition reflect the impact that recurrent drought is having on the **economic capacity** of communities (loss of livestock, vulnerability to food price hikes, reduced access to food and markets); as well as on its **access to water** (loss of livestock, splitting of families for migration, increased workload of women, hygiene and sanitation, disease). These factors, underlain by **women's increasing workload,** are having a detrimental effect on the care of U5 children and maternal health. The presence of three major risk factors among the top twelve that are linked to women's workload – i) distance to accessing water taking a larger proportion of women's time, ii) pregnant and lactating women with a high work burden, and iii) caregivers not spending adequate time with infants and young children – highlight the relationship between women's workload and acute malnutrition in this context.

Ongoing **social transformation** is resulting in families placing increased value on **education** compared to other generations. Impact on households is mixed: on the one hand literacy levels and knowledge of nutrition, health and hygiene are increasing, and girls are being kept longer in school to prevent early pregnancies. On the other hand, increased **tendency of communities to settle** in order to keep their children in school – due to low numbers of mobile schools – and to counteract the effects of livestock depletion from **recurrent droughts** through diversification of livelihoods into, for example, agriculture and labour/charcoal activities, is resulting in **splitting of families** while men

migrate, in turn increasing the workload of mothers as they work in the *shamba* or burn charcoal. While maternal education was seen as an important risk factor of acute malnutrition, value for education and access to schools did not come out as major risk factors per se, yet they are important underlying factors.

Long distances to **health centres** that are inadequately supplied and lack provision of quality service by medical staff, was also highlighted. As the MoH and many NGOs are focusing on supporting health centres and capacity building of staff, outreach services are becoming less and less - scaling up only during nutrition crises or epidemics and forcing the population to travel long distances or use transport they cannot afford. Provision of basic services are a vital foundation to ensure adequate coverage of health services takes place and reducing the onset of diseases that can directly affect the nutrition status of mothers and children.

Lack of infrastructure (mobile network and roads, electricity) also hinders access to healthcare, schools and markets, particularly during the wet season. Given the reliance on boreholes, borehole coverage and access to reliable power play a major role in access to safe drinking water.

Support by the government and agencies in the development and maintenance of **markets** would also go a long way in creating better access and availability of diverse foods, and would also create income generating activities, reduce the distance for animals to travel to markets (higher body weight and therefore greater profits per kilogram), and minimise security issues in transporting animals to markets. These livelihoods are heavily dependent on markets and vulnerable to market prices due to their dependence on the sale and purchase of livestock and foods, yet purchasing capacities are often compromised and compound food insecurity.

From the outlined major risk factors and basic causes to nutrition causality (education, infrastructure, provision of services), it is clear that it is important to consider how communities can be assisted in three key areas – **1. Disaster Risk Reduction & Resilience, 2. Water, Sanitation & Hygiene** and **3. Food Security and Livelihoods**, while at the core ensuring that a **main objective of these programs is to decrease the workload of women.**

These NCA results are considered representative of the wider Isiolo County, but not beyond. Given commonalities across Northern Kenya's arid and semi-arid land communities however, particularly regarding pastoral activities and lifestyles, certain identified causal factors may indeed be important in other ASAL localities with similar seasons, ethnicity, and cultural backgrounds or in neighbouring sub-counties such as Wajiir or Marsabit County. Risk factors such as education, poverty and the workload of women could equally be important at national level. However, further study is required prior to extrapolating results to broader areas, as the added value of the NCA lies essentially in its context-specific conclusions.

B. LIMITATIONS OF THE STUDY

The methodology used is indeed a **causal analysis** although **causality is not demonstrated from an epidemiological or statistical point of view**. A low confidence note for certain results would signify that the information gathered is not convincing enough and advocates for complementary research to be conducted.

There are three types of limitations to consider for the interpretation and use of the NCA results. Firstly, the results of the NCA are elaborated from different sources of information, each having potential bias and limits which must be recognized. Secondly, the limits of the final interpretation of nutrition causality need to be acknowledged. Finally, the degree to which results are representative of Isiolo County and to which they may be extrapolated at a broader level must also be considered.

B.1. Sources of bias

Technical experts

Despite invites being extended to a number of sector representations, due to conflicting meetings, the initial workshop participants were mainly experts in Nutrition, with a few from the WASH sector. However, to counteract this, a number of individual meetings were scheduled with the missing sectorial groups to gain feedback on the risk factors, nutrition vulnerable groups, methodology and interview questions. The final stakeholder workshop contained a more multi-sectorial panel of experts.

Approximately 7 out of the 27 initial workshop and 8 of the 32 final workshop participants were either from the county level ministries or field managers from various NGOs working in Isiolo County. Although lacking in greater representation from the County level, those that did come gave valuable insight into some of the nutrition vulnerable groups, health seeking behaviours, hygiene and cultural practices of the Isiolo County population.

Technical experts may have preconceived ideas of causes of undernutrition that may not be relevant.

While some of the below risk factors were identified as possible risks to acute malnutrition, during the data collection, it was found that the community did not perceive these issues to be as relevant as others:

- Poor land/livestock management (overgrazing)
- Poor storage of food, seeds, grains, livestock in home
- Animal responsibility vs gender
- Poor access to health/nutrition programs due to insecurity and nomadic movement
- Disease is seen as a result of supernatural force
- Livestock not vaccinated

Community voices

People's perceptions of what is or is not a problem often differ from that of the technical experts.

This was a constraint, particularly in the workshops where experts were constantly reminded to vote based on the evidence given from Isiolo County, not from their own general knowledge and perspective.

Qualitative inquiry requires highly skilled and knowledgeable personnel; time to explore the topic in depth in the field; time to transcribe, translate, and analyse the results.

Having animated translators that were able to speak at the language level of the community (e.g. not academic) was vitally important. Using voice recorders and reviewing this recording at the end of each day also served as important reminders of information that was not understood clearly or confirming the notes that were taken during the day. Daily team debriefings also assisted in summarising information, highlighting information that needed to be investigated further and

importantly, assisting in developing an overview picture of the local causal model of acute malnutrition.

An interview question template was used throughout the data collection, to ensure consistency in information collected from all the communities. Although this is vital, it is very easy for the translators and interviewee to become focussed on asking questions from this template and not deviating when other interesting information was shared. For this reason, it is important that each team contains an interviewee that has a thorough understanding of the causes of acute malnutrition through nutrition, food security, WASH, gender etc. issues, but who is also persistent and inquisitive in asking the "why" of information given from the community.

Although the objective of the NCA was not necessarily to explore solutions, it was felt that it was important to leave the community with some direction and motivation of how they can modify some of the problems in their community without or before external assistance can occur. However, due to the time constraints and number of FGDs to perform, the time allowed for discussing solutions was also limited and could be developed further in future NCAs.

The qualitative inquiry can be subject to a selection bias when selecting villages, when selecting participants or when distributing participants in different sub-groups.

During selection of the sample frame, the most up-to-date livelihood village database from NDMA was used, which did not include the new administrative boundaries that had changed in 2013. During the data collection, it was found that the livelihoods that some of the villages had been allocated to within the NDMA database were in fact more agropastoral than pastoral (e.g. Taqwa) and were part of the peri-urban periphery of a larger town (e.g. Taqwa had merged into Merti town). As a result, although Isiolo County is predominately pastoral, 2 of the 4 villages selected were agropastoral; the other 2 were pastoral and labour/charcoal. Yet, despite this, all 4 communities still classified themselves as being pastoralists.

B.2. Hypothesis review and validation

The data compiled from different sources of information are interpreted in a final causal exercise. The limits of this interpretation are not the sum of the limits for each source of information mentioned above, but rather lowering of these limits as various sources are triangulated and compiled.

The final confidence note is subjective and given the large amount of risk factors and data, final interpretations given in a one day workshop inhibit thorough investigation and analysis of the results.

B.3. Extrapolation of findings

Three of the sampled villages were from the Borana tribes (2 x agropastoral and 1 x pastoral), while the fourth sample was majority Turkana (labour/charcoal). The Borana tribes are typically Muslim, while Turkana are typically Christian. Although each sub-county was represented within the given livelihoods, Isiolo County has quite diverse tribes (Borana, Turkana, Samburu, Meru, Somali).

In addition to cultural and ethnic diversities, three of the villages were situated on main roads (2 x agropastoral (Goda & Taqwa), 1 x Labour/Charcoal (Chokaa)), while the pastoral community (Biliqi) was more remote/isolated. Taqwa had largely amalgamated into Merti town on the periphery, and thus was more "urban" than the other rural communities. Thus, access to services may be quite

diverse within each livelihood, again highlighting the need for careful selection of a representative livelihood village.

Despite the above mentioned diversities, there are still many similarities in risk factors to acute malnutrition shared across the four study sites e.g. workload of women, loss of livestock, lack of water, distance to health centre, poor hygiene, lack of markets, use of herbs, etc., that indicate these factors may be extrapolated to the wider Isiolo County, particularly the rural setting.

6. RECOMMENDATIONS

The UNICEF Conceptual Framework illustrates that the causes of malnutrition are multi-factorial and that all three levels (basic, underlying and immediate causes) are vital to ensuring a healthy outcome for mother and child. Depending on the mandate of an organisation, programming often aims to address the immediate and underlying causes, often assuming that the impact of the program towards reducing undernutrition has directly been achieved by their single-pronged approach, and often neglecting the vital aspect of advocacy towards policy change, infrastructure and provision of basic services.

Through the field study of this NCA, it was evident that often what is believed, for example, to be increasing food security, or educational knowledge, may in fact be affecting the care of a child in a detrimental way e.g. increased maternal workload, divided families to keep children in school, etc. Although food security may be improved in one aspect, the workload of a woman is increased in another. Programming often neglects the importance of the workload of women who bear much of the family responsibilities, and rarely if at all, makes the **reduction of women's workload** an explicit programming objective.

Although the NCA was conducted in sites representative of Isiolo County livelihoods, it is important to remember that the NCA is applicable for the local context that it was undertaken in, and as such the following recommendations may not be suited to other contexts.

A. COMMUNITY SOLUTIONS

Communities proposed a number of insightful solutions to the risk factors affecting acute malnutrition which can be viewed in the Table below. With limited budgets, it is even more vital to involve the community from the outset in any decision-making. For this reason, to follow through from the information sharing at community level and the wealth of solutions proposed by communities, a **Participatory Vulnerability and Capacity Analysis** would be appropriate whereby **communities design their own DRR and resilience strategy plans** to be **integrated with county level planning.** The NCA also provides the foundation to advocate to the government and agencies to collaborate further with these communities in supporting them in the process.

The table below outlines the many solutions that the communities proposed, and as such it is important that stakeholders assist these communities, while exercising caution regarding the creation of aid dependency. As mentioned previously, the sampled Labour/Charcoal community who demonstrated the greatest levels of poverty, hygiene and undernutrition, had no government or NGO support. Yet, they were the most thankful, innovative and willing of all the communities to improve their life. Other communities also highlighted that they don't want food aid, but require skills and tools/resources so that they can become independent.

Table 20: Community Solutions & Recommendations

SECTOR	COMMUNITY SOLUTIONS	NCA RECOMMENDATIONS
WATER, SANITATION & HYGIENE	• If the government could provide the resources and tools, the community could provide the labour to dig more shallow wells or latrines • Cut bushes around home, drain stagnant water around home and have a clean environment to reduce the levels of mosquitoes • Purchase more water containers to collect water (inc. for water harvesting) • Boil water at night (share responsibility with men and through women's groups) • Build latrines with local materials (e.g. wood, reeds/grass) • Shallow well protection • Desilting of pans • Introduce green houses around water pans	• Assist the government and community with resources to increase latrine coverage • Assist the government in providing consistent supply of Pur (seasonal solution) • Training of water committees on treatment, maintenance of pumps, increasing pressure by not using so many taps etc.
FOOD SECURITY & LIVELIHOODS	• If given the skills, resources and means to irrigate, community could diversify livelihood or improve current productions in farming • Formation of women's groups (businesses e.g. beading, community children's crèche, communal water boiling, communal domestic animals for milk, forming markets through buying/selling of goods and livestock) • Formation of youth groups for funding of businesses e.g. beading • Grants to restock livestock • Education on market development to develop livestock and agriculture produce markets, to reduce the need to travel so far • Approach the forestry department for a "Ready Market" to burn charcoal e.g. decreasing the distance to market (buyers come to Chokaa) • Educate children on farming • Workshop to teach men on the importance of responsibility sharing • Sharing responsibilities with men e.g. charcoal burning • Improve storage for grains and food stocks • Preservation of foods (particularly of fruit and vegetables) – need to learn skills • Budgeting and time management skills e.g. cooking in morning before going to collect water or burn charcoal	• Focus on skills development in farming techniques, selection of quality seeds, farming tools/resources to reduce the workload • Market development of agriculture products, charcoal/firewood, livestock sale, traditional goods e.g. beading • Grants for communal domestic animals for milk availability • Food preservation skills particularly fruits and vegetables e.g. drying, salting • Diversifying livelihoods • Time management and budget skills, particularly in relation to nutrition, infant feeding frequencies, and dietary diversity
HEALTH & NUTRITION	• Use clothes as mosquito nets • Empowering CHWs – fundraising for their training • Fundraise for emergency ambulance (boda boda, donkey cart) • Train community on health related issues • Advocate to MPs for a closer health dispensary	• Education on use of herbs, costs of delayed treatment etc. • Family planning education and health staff education on adapting contraception to patient needs • Training of CHW and traditional healers on health, hygiene and IYCN

B. STAKEHOLDER RECOMMENDATIONS

An Isiolo County NCA Dissemination Workshop held in January 2014 provided a forum for multi-sectorial groups at county level to enrich proposed community solutions with two key

recommendations: 1. ***Reduce the workload of women*** and 2. ***Minimise the splitting of families***. Programming needs to be integrated to ensure that one activity that might be reducing the workload in one sector is not impacting indirectly with the outcomes of another sector e.g. to ensure creating an income generating activity for women, is not resulting in less time to nutritionally care for the child.

The two key recommendations are detailed below.

A. Recommendations to minimize maternal workload

Gender:

- Incorporating gender sensitive policies and programming with objectives around reducing the workload of women and minimising the division or splitting of families
- Empowering women and creating space for their involvement in decision making
- Lobbying for rights of women and employment opportunities
- Sensitisation and advocacy for behaviour change in men supporting mothers in their workload through mosques, elders etc.

Health

- Education on family planning
- Lobbying for increased health care provisions and coverage
- Lobby or look for punitive measures to ensure increased coverage of latrines to reduce the disease burden
- Increase access to mobile and integrated outreaches; bringing services closer to the community (medicine; HR)

Food Security and Livelihoods:

- Introduction of community kitchen gardens (involving both men and women) to minimise travel to get to markets, enhance access to foods and establish as an Income Generating Activity (IGA)
- Improved knowledge on how to preserve vegetables

Water Availability and Access:

- DRR and procedures to supply communities with water in the extreme dry spells (Kentanks, water trucking an expensive option)
- Increasing coverage of water pans and boreholes

B. Recommendations to minimise the splitting of families

Reducing distance to markets:

- Designing programs to improve markets, local economy, education services and reducing the level of poverty will only gain the momentum it needs if priorities for **improving transport infrastructure** are set at a national level.
- DRR and procedures to supply communities with water in the extreme dry spells (Kentanks, water trucking an expensive option)

Environment:

- Capacity building on sustainability of management of resources e.g. forage, firewood etc. to reduce distances travelled
- Promotion and linkage with the private sector on of alternative ways of safe fuel to conserve the environment and reduce distances travelled for firewood collection e.g. energy saving jikos; training mothers to make these from locally available materials Establish and strengthen pasture management committees

Education:

- Ensure the **national school curriculum** contains adequate time per semester on **nutrition, health** and **hygiene** topics.
- Educating the communities on grants, activities and opportunities available to them from the government in livelihood support or economic opportunities as many rural and remote communities were not aware of the services available to them
- Introduction of marriage counselling within the community (social measures to reduce divorce)
- Enforcement of social law to cater for matrimonial injustices (cultural set ups e.g. Kadhi's court)

The table below contains proposed stakeholder recommendations to assist the communities in modifying their risk to acute malnutrition.

Table 21: Stakeholder recommendations to assist communities in modifying their risk to acute malnutrition

LIVESTOCK	• Construction of cattle crush • Train animal health workers • Take livestock for vaccinations • Introduce grazing scheme (dry and wet season grazing) • Empower Dedha grazing committees • Offtake of livestock when drought is looming but before drought strikes e.g. during rainy season • Fodder production and baling of hay	• Education on encouraging right timing of sale of livestock • Ensure consistent and efficient cold chain supply of animal vaccines • Support the government in training and supply of community animal health workers
EDUCATION	• Advocate with MP's for a closer school • Adults to have opportunity for adult education/learning e.g. approach the school teachers • Ensure children are educated (especially girls) to increase likelihood of higher salaries and employment	• Feasibility study on increasing mobile school access • Assist in formation of youth health clubs (education on health, nutrition, hygiene family planning, grants for advocacy or employment opportunities etc.) • Assist schools in forming kitchen gardens • School feeding
DISASTER RISK REDUCTION	• Carry out Peace Dialogues (Dedha and peace committees), observe the "peace declaration" with neighbours, and establish and empower community peace committees • Establish disaster management committees • Redirect flood waters away from settlements • Sensitise community to prevent tree felling/deforestation • Plant more trees • Sensitisation to prevent bush fires	• Education and assisting the government in supply of trees or vegetation to replant and seedling farms • Education and incentive in environment management (e.g. minimising waste and waste removal)

	• Regular patrols to prevent bush fires and deforestation; and penalize culprits • Introduce a police line and KPR (Kenya Police Reservists) • Lobby for mobile phone booster • Lobby for having passable roads (murram and tarmac)	

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8. LIST OF ANNEXES

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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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Pour plus d'informations concernant la conception ou la mise en œuvre d'une Link NCA, visitez notre site internet :
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