TURKANA NUTRITION SURVEY

FINAL DRAFT

Consultant Nutritionist:
Sophie Ochola (PhD)
Telephone: 651755/552086
Cell Phone: 0721 449 803
sochola@yahoo.com/ocholasa55@gmail.com

Co-funded by UNICEF

Coordinated and implemented by: Ministry of Public Health and Sanitation, OXFAM GB, World Vision –Kenya, Merlin, Samaritan's Purse and International Rescue Committee

May 2010

ACKNOWLEDGEMENTS

This survey was made possible through the input of various people from the following organizations and government departments; Ministry of Public Health and Sanitation (MOPHS), Ministry of Medical Services (MOMS), Oxfam (GB), World Vision Kenya, Merlin, Samaritan's Purse, International Rescue Committee (IRC) and UNICEF. I wish to acknowledge the role played by the following people in the planning and coordination of the survey: District Medical Officer of Health (DMOH) Turkana Central district, Dr. Gilchrist Lokoel; Regional Emergency, Food Security and Livelihoods Manager OXFAM GB, Mary Karanja; the Nutrition Manager WVK, Daniel Muhinja; Merlin Nutrition Coordinator, Zinet Nezir; Nutrition Manager IRC, Jemimah Hamadi; and Nutrition Programme Coordinator Samaritan's Purse, Evelyn Owiyii. I also wish to acknowledge Peter Mwangi of Merlin for ably managing the logistics; organization of transport, ensuring photocopying of questionnaires was done on time as well adequate provision of stationery..

I also wish to acknowledge the role played by Esther Ogadhoh the assistant consultant in the planning, supervision and compiling of this report. My sincere gratitude also goes to Festus Kiplamai for his role in data entry and analysis. Special thanks are expressed to the district nutrition officers (DNOs) for field coordination of the survey and to the members of the survey teams for their tireless efforts to ensure that the survey was conducted professionally and on time. I am also indebted to the community members who willingly participated in the survey and provided the information needed.

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Background 1
1 OBJECTIVES OF THE SURVEY 5
1.1 Purpose of the Survey 5
1.2 Specific Objectives 5
2 SURVEY METHODOLOGY 5
2.1 Survey Design 5
2.2 Target Population 5
2.3 Sampling Technique and Sample Sizes 5
2.4 Selection of the survey team, training and pre-testing of the questionnaires 7
2.4.1 Survey Team 7
2.4.2 Training of team leaders, measurers and interviewers and pre-testing of questionnaire . 7
2.5 Data collection 7
2.6 Variables Measured 7
2.7 Data Analysis 12
2.8 Methodological Challenges 12
3 RESULTS 13
3.1 Household Demography 13
3.2 Livestock Ownership 13
3.3 Anthropometry 14
3.3.1 Age and sex distribution of the sampled children 14
3.3.2 Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006) 16
4.3.3 Weight for height z-score distribution based on WHO Standards 2006 17
4.3.4 Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema (WHO Standards 2006) 18
North East District 19
4.3.5 Distribution of acute malnutrition and oedema based on weight for height Z scores WHO Standards 2006 20
4.3.6 Mean weight for height Z scores WHO Standards 2006 22
3.3.3 Prevalence of acute malnutrition based on Percentage of the Median and/or oedema (WHO Standards 2006) 23
4.3.7 Prevalence of acute malnutrition based on MUAC 23
4.4 Child Morbidity 24
4.5 Maternal Health Seeking Behaviour 25
4.6 Coverage of Selective Feeding Programmes 25
4.6.1 SFP Coverage rate 26
4.6.2 Coverage of OTP 26
4.6.3 Coverage of Blanket Supplementary Feeding Programme (BSFP) 27
4.7 Immunization Coverage for Children 6-59 months of age 28
4.7.1 BCG Immunization Coverage 28

4.7.2 OPV Immunization Coverage 28
4.7.3 DPT Immunization Coverage 29
4.7.4 Measles Immunization Coverage for children 9-59 months of age 30
4.7.5 Fully Immunized (Children 12-23 months old) 30
4.8 Vitamin A Supplementation Coverage for children 6-59 months of age 31
4.9 De-worming of Children 24-59 months of age 31
4.10 Infant and Young Children Feeding (IYCF) Practices 32
4.10.1 Breastfeeding Practices 32
4.10.2 Complementary Feeding Practices 34
4.11 Maternal Nutritional Status 35
4.11.1 Malnutrition among pregnant and lactating women 35
4.11.2 Malnutrition among non-pregnant and non- lactating women 36
4.12 Mosquito Bed Net Ownership and Utilization 36
4.13 Household Water Consumption 37
4.13.1 Sources of Household Water 37
4.13.2 Main sources of drinking water 38
4.13.3 Time taken to water source and amount of water used by households 38
4.13.4 Treatment of drinking water 39
4.13.5 The cost of water 39
4.14 Sanitation 40
4.14.1 Sanitation Practices by households in Turkana Central District 40
4.14.2 Sanitation Practices by households in Turkana South District 40
4.14.3 Sanitation Practices by households in Turkana North East District 41
4.14.4 Sanitation Practices by households in Turkana North West District 42
4.15 Household Food Security 43
4.15.1 Food Aid 43
4.15.2 Food aid received and their utilization 44
4.15.3 Frequency of meal Consumption 45
4.15.4 Household members who missed meals the day prior to the survey and reasons for missing meals in all the districts 48
4.15.5 Household Dietary Diversity 49
4.15.6 Variety of foods consumed 49
4.16 Coping Strategies 50
4.17 Mortality 51
5. DISCUSSION 53
5.1 Nutrition Situation in Turkana 53
5.2 Coverage of Selective Feeding Programmes 54
5.3 Immunization, de-worming and Vitamin A supplementation coverage 54
5.4 Child Morbidity and Maternal Health Seeking Behaviour 55
5.5 Infant and Young Child Feeding Practices (IYCF) 55
5.6 Maternal Nutritional Status 56
5.7 Availability and Utilization of mosquito bed nets 56

5.8 Water and Sanitation and hygiene practices 56
5.9 Household Food Security 57
5.10 Factors associated with malnutrition in Turkana 58
5.10.1 Immediate Causes 58
5.10.2 Underlying causes of malnutrition 58
5.10.3 Basic causes of malnutrition 59
6 CONCLUSIONS 59
7. RECOMMENDATIONS 59

LIST OF TABLES

Table 1: General Food Distribution (GFD) Food Basket 4
Table 2: Definitions of acute malnutrition using WFH and/or oedema in children aged 6–59 months ... 11
Table 3: Household Demographic Characteristics 13
Table 4: Livestock Ownership 14
Table 5: Verification of age of index child/children by survey sites 14
Table 6: Distribution of the children in Turkana Central District by age and sex 15
Table 7: Distribution of the children in Turkana South District by age and sex 15
Table 8: Distribution by age and sex of children in Turkana North East 15
Table 9 : Distribution by age and sex of children from North West 16
Table 10: Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006) 16
Table 11: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in Central Turkana District 19
Table 12: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in South Turkana District 19
Table 13: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in North East District 20
Table 14: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema (WHO Standards 2006) in North West District 20
Table 15 : Distribution of acute malnutrition and oedema based on weight-for-height z-scores in Central District 21
Table 16: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in South District 21
Table 17: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in North East District 21
Table 18: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in North West District 22
Table 19: Mean z-scores, Design Effects and excluded subjects in Central District 22
Table 20: Mean z-scores, Design Effects and excluded subjects in South District 22
Table 21: Mean z-scores, Design Effects and excluded subjects in North East District 23
Table 22: Mean z-scores, Design Effects and excluded subjects in North West District 23
Table 23: Prevalence of acute malnutrition based on Percentage of the Median and/or oedema for all the districts 23
Table 24: Prevalence of Malnutrition based on MUAC in all the four districts 24
Table 25: Prevalence of morbidity among the children in all the four survey sites 24
Table 26: Health seeking behaviour by mothers for their sick children 25
Table 27: SFP coverage based on percentage of the median 26
Table 28: SFP coverage based on MUAC for all the districts 26

Table 29: Coverage of OTP based on percentage of the median in all the districts 26
Table 30: OTP Coverage based on MUAC 27
Table 31 Measles Immunization Coverage (Children ≥9 months) 30
Table 32: Breastfeeding practices 33
Table 33: Complementary feeding practices 35
Table 34: Nutritional Status for Women of reproductive age based on MUAC measurements 36
Table 35: Mosquito bed net ownership 36
Table 36: Sources of household water 38
Table 37: Sources of drinking water 38
Table 38: Amount of time taken to water source and back and the amount of water (litres) used per day 39
Table 39: Treatment of drinking water 39
Table 40: Cost of water 39
Table 41: Sanitation Practices by households in Turkana Central District 40
Table 42: Sanitation Practices by households in Turkana South District 41
Table 43: Sanitation Practices by households in Turkana North East District 42
Table 44: Sanitation Practices by households in Turkana North West District 43
Table 45: Households that received food aid in the three months prior to the survey 43
Table 46: Foods received and their Utilisation 45
Table 47: Household members who missed meals the day prior to survey and reasons for missing meals 48
Table 48: Household dietary diversity score based on a 24-hour recall 49
Table 49: Foods consumed by households based on a 24-hour recall 50
Table 50: Coping strategies employed during food shortage 51
Table 51: Crude and Underfive Death Rates in all the four districts 52

LIST OF FIGURES

Figure 1: Livelihood Zones in Turkana 2
Figure 2: Trends of malnutrition in Turkana 2
Figure 3: Weight for height Z-score distribution in Central district 17
Figure 4: Weight for height Z-score distribution in South district 17
Figure 5: Weight for height Z-score distribution in North East 18
Figure 6: Weight for height Z-score distribution in North West district 18
Figure 7: BCG Immunization Coverage for all the Districts in Turkana 28
Figure 8: OPV1 immunization coverage for all the districts in Turkana 28
Figure 9: OPV3 immunization coverage for all the districts in Turkana 29
Figure 10: DPT1 immunization coverage for all the districts in Turkana 29
Figure 11: DPT3 immunization coverage for all the districts in Turkana 30
Figure 12: Fully immunized children 12-23 months old from all the districts in Turkana 31
Figure 13: Vitamin A supplementation coverage for children 6-59 months old from all the districts in Turkana 31
Figure 14: De-worming coverage of children 24-59 months of age from all the districts in Turkana 32
Figure 15: Exclusive breastfeeding rate of children 0-5 months old from all the four districts in Turkana 34
Figure 16: Mosquito bed net utilization from all the districts in Turkana 37
Figure 17:Number of times food aid received in the last three months 44
Figure 18: Frequency of meals usually eaten and that eaten the day prior to the survey in Central 46
Figure 19: Frequency of meals usually eaten and that eaten the day prior to the survey in South 46
Figure 20: Frequency of meals usually eaten and that eaten the day prior to the survey in North East 47

Figure 21: Frequency of meals usually eaten and that eaten the day prior to the survey in North West48
Figure 22: Changes in wasting by district in Turkana (2009-2010) 53

ACRONYMS AND ABBREVIATIONS

AIC	African Inland Church
ALRMP	Arid Lands Resource Management Project
ANC	Ante-natal clinic
ASAL	Arid and Semi-Arid Lands
BSFP	Blanket Supplementary Feeding Programme
CSB	Corn-Soya Blend
CTC	Community Therapeutic Care
DNOs	District Nutrition Officers
ENA	Emergency Nutrition Assessment
FFA	Food for Assets
FGDs	Focused Group Discussions
GAM	Global Acute Malnutrition
GFD	General Food Distribution
HDDS	Household Dietary Diversity Score
IRC	International Rescue Committee
IYCF	Infant and Young Child Feeding
KAP	Knowledge, Attitudes and Practices
KCSE	Kenya Certificate Secondary of Education
KFSSG	Kenya Food Security Steering Group
KII	Key Informant Interviews
MOH	Ministry of Health
MUAC	Middle Upper Arm Circumference
NGOs	Non-governmental Organizations
OTP	Therapeutic Feeding Programme
OTP	Outpatient therapeutic Programme
PPR	Peste de Petits
SC	Stabilization Centre
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transition
TLDP	Turkana Livestock Development Project
VCT	Voluntary Counselling and Testing
WFH	Weight for Height
WFP	World Food Programme
WHO	World Health Organization
WVK	World Vision Kenya

EXECUTIVE SUMMARY

Introduction

This report summarizes the outcomes of four independent nutrition surveys undertaken in May 2010 in Turkana Central District, Turkana South District, Turkana North East and Turkana North West. The main purpose of the nutrition survey was to estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months of age.

The primary objectives of the survey were to:

1. Estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months of age;
2. Assess the factors likely to influence malnutrition in young children;
3. Determine the coverage of selective feeding programmes, immunization, de-worming and vitamin A supplementation among children 6-59 months of age;
4. Determine the Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age; and
5. Investigate household food security and food consumption practices.

Methodology

The survey used a two-stage cluster sampling methodology based on proportion to population size to select 45 clusters of 16 households each from each of the districts surveyed. The clusters were selected from a comprehensive list of the smallest geographical unit (sub-locations) for which population statistics was available. Data was collected from 703 households in Turkana Central, 721 in South Turkana, 719 in Turkana North East and 684 Turkana North West. Data was collected on the anthropometric measurements of 603 children in Central, 687 from South, 662 in North East and 618 in North West. Data was also collected on morbidity status, immunization and vitamin A supplementation coverage, feeding programmes' coverage, infant and young child feeding practices, food security status of the households and household dietary diversity. The Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessment of Relief and Transitions (SMART) was used for the planning, training and for data entry and analysis of anthropometry data. The rest of the data were entered and analyzed in SPSS version 16.0 for Windows. Focus group discussions were conducted with men and women from the community to solicit their perceptions on the causes and possible solutions to the problems of health and nutrition in the camp as well as on the food security situation in Turkana.

SUMMARY OF KEY FINDINGS TURKANA NUTRITION SURVEY MAY 2010

	TURKANA CENTRAL	TURKANA SOUTH	TURKANA NORTH EAST	TURKANA NORTH WEST
Nutritional Status (Children 6-59 months of age) (WHO Standards 2006)	**N=603**	**N=687**	**N=662**	**N=618**
Weight-for-height Z scores Global Acute Malnutrition (GAM)	(98) 16.3% (95% CI: 13.0 – 20.1)	(85) 12.4% (95% CI: 9.7 – 15.7)	(113) 17.1% (95% CI: 14.1 – 20.5)	(91) 14.7% (95%CI: 11.7 – 18.4)
Severe Acute Malnutrition (SAM)	(12) 2.0% (95% CI: 0.9 – 4.1)	(6) 0.9% (95% CI:0.4 – 1.9)	(25) 3.8% (95% CI: 2.4 – 5.9)	(10) 1.6% (95% CI: 0.9 – 3.0)
Plausibility Check (Data Quality)				
Overall score WHZ	10% (Acceptable)	8% (Acceptable)	15% (Poor)	14% (Poor)
Age Ratio	1.0	1.11	1.06	1.05
% Flags WZ	0.1	0.1	0.0	0.0
WHZ SD	0.99	0.91	1.03	0.96
Skewness	0.50	0.22	0.13	0.06
Kurtosis	-0.11	0.07	0.17	-0.12
Weight digit preference	4 (Good)	8 (Acceptable)	9 (Acceptable)	7 (Acceptable)
Height digit preference	4 (Good)	10 (Acceptable)	7 (Acceptable)	7 (Acceptable)
Nutritional Status (Children 6-59 months of age) (NCHS Reference 1977)	**N=603**	**N=688**	**N=662**	**618**
Weight-for-height Z scores Global Acute Malnutrition (GAM)	(89) 14.8% (95% CI: 11.7 – 18.5)	92(13.4%) (95% CI:10.1-17.4)	(114) 17.2% (95% CI:14.3-20.6)	(90) 14.6% (95% CI:11.8-17.8)
Severe Acute Malnutrition (SAM)	(7) 1.2% (95% CI: 0.5-2.9)	(2) 0.3% (95% CI: 0.1-1.2)	(10) 1.5% (95% CI:0.8-2.7)	(3) 0.5% (95% CI:0.2-1.5)

	TURKANA CENTRAL	TURKANA SOUTH	TURKANA NORTH EAST	TURKANA NORTH WEST
Immunization Coverage	**N=608**	**N=711**	**N=691**	**N=647**
BCG:				
Card	65.3%	71.2%	65.4%	61.1%
Scar	29.3%	21.0%	15.8%	26.9%
Total	95.0%	95.0%	81.0%	88.0%
OPV1				
Card	65.0%	72.4%	65.4%	63.1%
Recall	27.8%	19.4%	14.9%	24.0%
Total	93.0%	92.0%	80.0%	87.0%
OPV3				
Card	57.8%	59.6%	58.6%	57.0%
Recall	24.1%	16.9%	11.2%	20.0%
Total	82.0%	76.0%	70.0%	77.0%
Measles (children ≥ 9 -59 months				
Card	58.1%	59.3%	57.6%	55.6%
Recall	23.8%	16.1%	11.5%	21.0%
Total	82.0%	75.0%	69.0%	77.0%
Fully Immunized (children 12-23 months)	77.4%	63.1%	57.8%	78.4%
Vitamin A supplementation	**N=624**	**N=711**	**N=700**	**N=636**
NO	225 (26.1%)	343 (48.2%)	392 (56.0%)	136 (21.4%)
YES (Card)	217 (34.8%)	266 (37.4%)	220 (31.4%)	288 (45.3%)
YES (Recall)	168 (26.9%)	75 (10.5%)	81 (11.6%)	203 (31/9%)
Do not know	13 (2.4%)	27 (3.8%)	7 (1.0%)	9 (1.4%)
TOTAL	**385 (61.7%)**	**341 (47.9%)**	**301 (43.0%)**	**491(77.2%)**

	TURKANA CENTRAL	TURKANA SOUTH	TURKANA NORTH EAST	TURKANA NORTH WEST
Morbidity (children 6-59 months old)	**N=618**	**N=697**	**N= 795**	**N=725**
Watery Diarrhoea	76 (12.3%)	106 (14.3%)	112 (13.6%)	131 (18.1%)
Bloody Diarrhoea	9 (1.5%)	9 (1.2%)	15 (1.8%)	19 (2.6%)
ARIs	86 (13.9%)	186 (25.2%)	127 (15.5%)	173 (23.9%)
Fever	171 (27.7%)	227 (30.7%)	90 (10.9%)	191 (26.3%)
Fever with chills/malaria	48 (7.8%)	47 (6.4%)	93 (11.3%)	103 (14.2%)
De-worming (Children 12-24 months)	**N=365**	**N=446**	**N=436**	**N=376**
Children de-wormed	18.4%	12.6%	21.1%	36.7%
Coverage of feeding programmes				
Supplementary Feeding Programme (SFP)	50.0%	74.3%	56.7%	44.2%
Outpatient Therapeutic Programme (OTP)	100%	100%	100%	100%
Blanket Supplementary Feeding Programme	65.8%	62.5%	72.4%	77.5%
Infant and Young Child Feeding Practices				
<u>Breastfeeding Practices:</u> Timely Initiation of Breastfeeding (within 1 hour)	48.6%	18.7%	36.6%	49.3%
Exclusive breastfeeding for 6 months	47.0%	45.6%	53.1%	68.6%
Continued breastfeeding at 2 years	56.6%	58.3%	60.9%	66.7%

Complementary Feeding Practices: Minimum dietary diversity (children 6-23 months who received foods from ≥4 out of 7 groups	14.1%	8.0%	6.8%	9.3%
Mean meal frequency: ○ Children 6-8 old who ate ≥2 times /day	38.7%	22.3%	20.7%	39.5%
Children 9-23 months old who ate ≥2 times /day	23.8%	23.0%	16.0%	24.1%
Food Aid				
Houses that received food aid in three months prior to the survey	27.5%	46.1%	51.3%	35.9%
Household Dietary Diversity				
Mean Dietary diversity (Food groups eaten out of 15)	4.8 (sd 2.4)	3.8 (sd 2.0)	2.9 (sd 1.4)	4.2 (sd 2.1)
Maternal Nutritional Status (MUAC)				
Pregnant and lactating women MUAC <23cm	43.4%	39.5%	46.7%	41.1%
Non-pregnant and non-lactating women MUAC <21 cm	15.0%	7.8%	11.7%	11.3%
Mortality Rates				
Crude Death Rate (CDR)	0.88 (95%CI :0.61-1.26)	0.94 (95% CI: 0.67-4.00)	1.08 (95% CI:0.77 – 1.51)	0.43 (95% CI: 0.15 – 1.25)
Underfive Death Rate (U5DR)	1.62 (95% CI:0.91- 2.89)	2.58 (95% CI: 1.66-4.00)	2.61 (95% CI:1.71-3.96)	1.36 (95% CI: 1.00 – 1.86)

RECOMMENDATIONS

- An integrated approach, tackling both the immediate and underlying causes of malnutrition should be put into place and/or scaled up. Such approach is necessary because of the range of factors that interact with each other to contribute to malnutrition. Despite the fact that the addition of BSFP to the existing nutrition programmes contributed significantly to the overall reduction in malnutrition, more concerted efforts, probably in terms of dealing with the underlying and basic causes of malnutrition need to be put into place to mitigate malnutrition in a sustainable manner. Most of the interventions in the region are humanitarian in nature, dealing with the immediate causes of malnutrition. Whereas these relief services are critical, they need to go hand in hand with developmental activities so as to provide sustainable solutions to the problem of malnutrition. Efforts to diversify livelihoods should be scaled up for greater impact. There is need for example, to think of or to scale up projects which will make food more available at the household level. More boreholes should be sunk to make water available for both human and animal use. The community members expressed a desire to have increased developmental activities in place. Suggestions of such activities included; capacity building in farming techniques, re-stocking livestock and involvement of the community in income generating activities;

- BSFP should continue to be used as a stop-gap measure in times of high food insecurity and vulnerability of the target population. It is suggested that beneficiaries be registered to allow for verification of those admitted in the programme;

- There is need for interventions that will improve the health status of children such as scaling up of mobile clinics, staffing of the health facilities and ensuring that the facilities are well equipped and drugs are available. Such interventions will also help to improve immunization and vitamin A coverage;

- Documentation of vaccination needs to improve. A significant proportion of the children did not have health cards and vaccination status was based on recall. Documentation of vaccination on cards is important to prevent unnecessary re-vaccination and monitoring of coverage. All vaccinations given during campaigns should be documented. Lost cards should be replaced as soon as possible;

- There is need for continued and more intensive health and nutrition education focusing on: the value of timely health seeking behaviour and the dangers of self-diagnosis and self prescription of medicine; importance of proper sanitation and hygiene especially using latrines, washing of hands after visiting the toilet; appropriate IYCF feeding practices with special focus on the value and duration of exclusive breastfeeding and the importance of timely introduction of complementary feeding, dietary diversity and appropriate frequency of feeding;

- It is recommended that all available channels such as SFP and OTP distribution points, MCH, ANC, SC and mobile clinics be used to provide health and nutrition education for wider coverage and reinforcement of the information; and

- Upscale the distribution of bed nets to help prevent malaria which is endemic in Turkana.

The following administrative recommendations are made to improve the quality of the data collected during the survey:

- Local calendars of events that are district specific should be developed at the local level, with the help of the District Nutrition Officers (DNOs) prior to the commencement of the survey. This is critical given that it is not feasible to develop such calendars centrally during the training session because of lack of information on the important events taking place in the different districts. The development of appropriate and applicable calendar of events is critical for age determination of children because many mothers do not know the birthdates of their children. This would go a long way in improving the quality of anthropometric data; and

- To improve the quality of data, it is also suggested that data collection take place concurrently in two districts at a time and not the four at the same time as has been the practice. Training and data collection could start with, for example, Turkana Central and Turkana South before the team moves on to the North to train and undertake data collection in Turkana North East and Turkana North West. This will assist in improving the quality of supervision of data collection which is a major challenge because of the vastness, poor communication, transportation and insecurity in Turkana.

1. INTRODUCTION

This report summarizes the outcomes of a nutrition survey whose aim was to determine the prevalence of global and severe malnutrition in Turkana. The assessment was commissioned by Ministry of Public Health and Sanitation (MOPHS) and its implementing partners and was meant to monitor the nutritional situation in Turkana. Four surveys were conducted to cover the whole of Turkana; in Turkana Central, Turkana South, Turkana North East and Turkana North West districts. This survey was conducted in May 2010.

1.1 Background

The greater Turkana region lies in Rift Valley province of Kenya and is situated in the arid north western region of the country. The region borders Uganda, Sudan and Ethiopia to the East, North East and North West respectively. It has area coverage of about 77,000 square kilometres. Until recently, Turkana has been the largest district in Kenya. It has since been sub-divided into six districts namely; Turkana North, Central, West, East, South and Loima. Turkana is classified among the Arid and Semi-Arid Lands (ASALs). The region has been repeatedly classified as a humanitarian emergency (level 4) under the Integrated Food Security Humanitarian Phase Classification (IPC).

Being an ASAL district, Turkana is a drought prone area that experiences frequent, successive and prolonged drought. Turkana has two rainy seasons (April-June & October-December) but rains are often scarce and erratic with frequent total failures. However, Turkana received heavy rains in December 2009 to January 2010 and in April to May of the same year, in amounts that it has not received since 2007. The drought-affected pastoral livelihood experienced a marked resurgence in environmental indicators which were slowly translating into improved household food security, through enhanced availability of milk and livestock products at the household and market levels, coupled with significant improvement in pastoral terms of trade.[1]

The soil type in Turkana is mainly rocky/sandy scattered with clay and black cotton soils in certain areas. There are numerous seasonal dry riverbeds across many parts of the district. According to Arid Lands Resource Management Project (ALRMP) definitions, the district has four main livelihood zones and categories (Figure 1). Nearly 60% of the population is considered pastoral (rearing of mixed herd: goats, sheep, cattle, camels and donkeys), 20% agro-pastoral (pocket areas keep livestock plus grow crops like maize, beans, sorghum, cowpeas and green grams), 12% fisher-folks (people living along the coast of Lake Turkana) and the remaining 8% are in the urban/peri-urban formal employment/casual waged labour/business category. Livestock is considered the mainstay of Turkana household economy that also determines the wealth across all livelihoods (including non-pastoral livelihood)[2].

The larger Turkana district is the second poorest district in Kenya with poverty levels of approximately 20% above the national average. Turkana is constrained by the harsh environment, remoteness coupled with the poor infrastructure and low access to essential services in addition to other underlying causes of poverty that are experienced elsewhere in Kenya.

[1] Food Security Steering Group KFSSG Turkana Short Rains Assessment Report, 2009-2010
[2] Kenya Food Security Steering Group KFSSG Turkana Short Rains Assessment Report, 2009

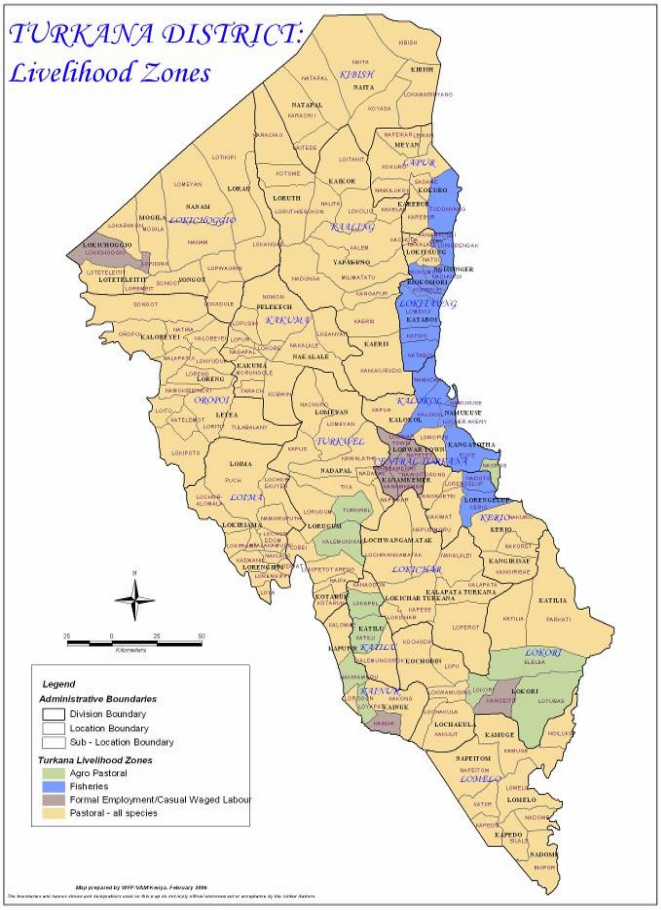
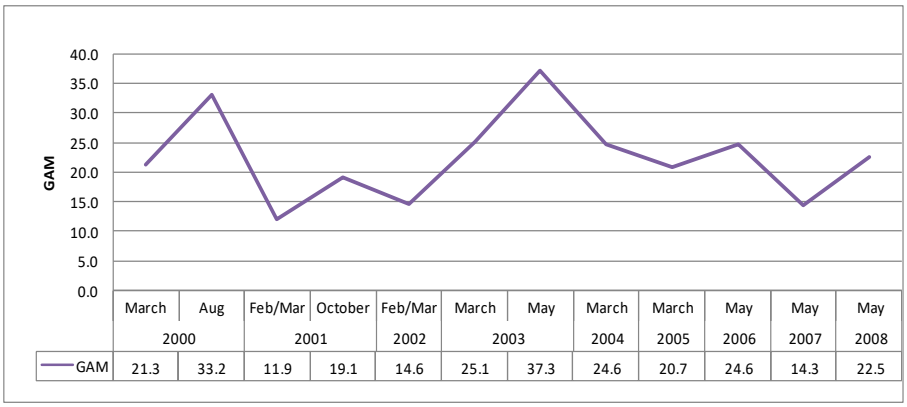


Figure 1: Livelihood Zones in Turkana

The nutrition situation in Turkana has remained above the emergency threshold (GAM >15%) in accordance with the WHO guidelines for emergencies[3] for a number of years. The only years since 2000 to 2009 when the GAM rates were below the 15% threshold were in 2001 and 2007, indicating a protracted critical nutrition situation in Turkana (Figure 2). The major cause of malnutrition has been reported to be food insecurity necessitating Turkana to be dependent on relief food since colonial days to the present time. The findings on the nutritional situation indicate a need for periodical monitoring, so that strategies can be put into place to prevent further worsening of the situation.



	March 2000	Aug 2000	Feb/Mar 2001	October 2001	Feb/Mar 2002	March 2003	May 2003	March 2004	March 2005	May 2006	May 2007	May 2008
GAM	21.3	33.2	11.9	19.1	14.6	25.1	37.3	24.6	20.7	24.6	14.3	22.5

Figure 2: Trends of malnutrition in Turkana

[3] WHO-OMS (1995). Field Guide on Rapid Nutritional Assessment in Emergencies

Nutrition surveillance data in Turkana is routinely collected by ALRM, located in the Office of the President. This is done using mid upper arm circumference (MUAC) of children 12-59 months old as its early warning system data gathering on a monthly basis. Other organizations; World Vision Kenya (WVK), OXFAM-GB, IRC and Samaritan's Purse in collaboration with MOPHS, and supported by UNICEF have conducted nutrition surveys in Turkana since 2002.

Nutrition and Health Activities in Turkana

Many agencies, UN and NGOs are working in collaboration with the MOPHS in child survival activities. The main responsibility of MOPHS is quality assurance of the nutrition and health-related activities through the coordination of all activities in Turkana. The NGOs implementing health and nutrition programmes include:

- Merlin working in: Turkana Central (Central, Kalokol, Kerio, Turkwell and Loima divisions); Turkana North East (Lokitaung', Lapur and Kalang' divisions); and Lokichar in Turkana South district. Merlin's activities include targeted supplementary feeding programme (SFP), outpatient therapeutic feeding programme (OTP) and from January 2010 was involved in blanket supplementary feeding programme (BSFP) that ended on 31st May 2010 targeting children 6-59 months of age, pregnant mothers and lactating mothers up to 6 months. Merlin also supports a stabilization centre (SC) at the Lodwar hospital by providing personnel to run the centre. Merlin also supports health services mainly through 32 outreach sites where screening for selective feeding admissions is conducted and consultations and treatment for minor ailments is carried out. During these outreach sessions, health and nutrition education is conducted with particular emphasis on hygiene and infant and young child feeding (IYCF) practices. It was reported that due to constraints in funding, some of the activities had been put on hold until June 2010. Some of these activities included IYCF, safe motherhood and water and sanitation;

- World Vision Kenya works in: Turkana Central district in Kalokol, Kerio and Central divisions; Turkana South district, in Lokichar, Lomelo, Katilu, and Kainuk divisions. WVK conducts SFP, OTP in these divisions and SC in Turkana South district. In addition, WVK has been implementing BSFP in the areas of its operation since January to May 2010;

- International Rescue Committee (IRC) started working in Lokichogio Township in Kakuma division in September 2009. IRC conducted its activities in collaboration with Kakuma Mission hospital and AIC Church. Currently, with funding from UNICEF, IRC conducts outreach activities in the whole of Kakuma division where it implements a community therapeutic care (CTC) programme comprising of 2 SCs in the two hospitals. IRC has since added one more health facility, Kakuma dispensary from where it offers outreach services. From January to end of May 2010, IRC has offered BSFP targeting children 6-59 months of age, pregnant mothers and lactating mothers up to 6 months; and

- OXFAM-GB strategy has shifted from purely humanitarian to an *Intergrated Project Approach*, what they call *One Programme Approach.* In this approach, humanitarian activities are implemented alongside development and advocacy activities. This approach is considered appropriate to facilitate sustainability of the project activities and impact even after the project life. The OXFAM-GB food security and livelihood activities include the following:

    - The livestock health and marketing a project which links pastoralists to terminal markets for better prices;
    - Ad hoc Cash for Work projects. The most vulnerable households willing to participate are selected and undertake activities such as fish-net making and boat repair. The community members are paid for the work done and the articles produced are given to them. Such households do not receive food aid; and
    - Hunger-Safety Net Programme a project funded by the government and DFID aimed at improving the lives of the most vulnerable sub-population groups in the community. This is a pension scheme targeting the elderly, disabled, widows and orphans in the community.

In addition to the NGOs, World Food Programme (WFP) provides General Food Distribution (GFD) in addition to providing food for the BSFP. Following improvement in the food security situation because of the significant rains received from October to December 2009, the number of people requiring assistance went down to 265, 000 from 316,000. With effect from May 2010 this change was effected and the food basket reduced to provide 75% of the full ration (Kcal 2100) as shown in Table 1 below:

Table 1: General Food Distribution (GFD) Food Basket

Food Item	**Amount (Kg) provided per person per month**
Cereals	10.35
Pulses (split lentils)	1.8
Corn Soya Blend (CSB)	1.2
Oil	0.6

WFP also provided food (100%) for BSFP from January to May 2010. The ration size was as follows:

- CSB 7.5 kg/person/month for all target groups
- Oil 0.75 kg /person/month for all target groups

WFP partnered with the following agencies in the distribution of BSFP in the districts indicated:

- Merlin (Turkana North and Turkana Central)
- IRC (Turkana North)
- WVK (Turkana Central and South Turkana)
- Samaritan's Purse (Turkana North West)

In addition, WFP implements food for assets (FFA) targeting communities which carry out agriculture viable activities in North, Central and South districts. This activity is growing very fast because of the benefits of the programme to the target group. Activities in FFA include assisting the community to carry out irrigation by being provided with farm implements, capacity building and the resulting crops are given to those admitted in the programme. The government provides the technical expertise for such programmes. This is a developmental strategy that would have a longer-term impact than the relief services that form the majority of the interventions dealing with food insecurity in Turkana. Nonetheless, FFA is implemented on a much smaller scale compared to the relief services.

<u>Main challenges in the implementation of health and nutrition activities in Turkana</u>

- The vastness of Turkana especially Turkana North East making it a challenge to reach all the population;
- Some of the areas have no implementing partners on the ground because of insecurity;
- Poor infrastructure (poor or no roads, and few inaccessible and poorly staffed health facilities);
- Cultural practices constraining the uptake of some interventions for example, IYCF practices;
- Chronic food insecurity due to persistent drought and insecurity in the district;
- Inadequate basic needs such as water and latrines;
- Low levels of literacy and education hence the communities' low understanding of critical issues in health and hygiene and developmental issues. This consequently affects people's perceptions and uptake of interventions;
- Nomadic lifestyle; people migrate to access water and pasture for their livestock hence the services offered by the government and various agencies may not reach them at all times;

1 OBJECTIVES OF THE SURVEY

1.1 Purpose of the Survey

The main purpose of the nutrition survey was to estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months of age.

1.2 Specific Objectives

- Determine the Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age;
- Investigate household food security and food consumption practices;
- Estimate morbidity rates for children below five years;
- Determine the proportion of households with access to safe water and sanitation;
- Estimate coverage of the current nutrition interventions in the district; and
- To estimate crude and under-five mortality rates.

2 SURVEY METHODOLOGY

2.1 Survey Design

The survey used a cross-sectional study design involving two phases in which both quantitative and qualitative data was collected. In the first phase of the survey, desk review of the following: nutrition surveys; KFSSG Short Rains reports; Kenya Food Security Update reports; and Arid Lands Resource Management Project (ALRMP) Drought Monitoring Bulletin. In addition, informal interviews with MOPHS and its implementing partners (WVK, IRC, OXFAM-GB, Samaritan's Purse, Merlin, and WFP) were conducted to obtain information on the health and nutrition interventions conducted in Turkana. Information on the health and nutrition situation in the district and the challenges constraining the provision of services was also obtained. This phase also included a meeting with the MOPHS and its partners to review and agree on the scope of the questionnaire. The second phase of the survey involved training of the survey team and data collection.

Focus group discussions (FGDs) were conducted with a cross-section of the community members to solicit their perceptions on the causes and possible solutions to the problems of health and nutrition in Turkana region. The focus on the FGDs was on food security issues.

2.2 Target Population

The survey was conducted on children 6-59 months of age in order to determine their nutritional status. In addition, children 0-23 months old were targeted to assess infant and young child feeding (IYCF) practices as well as women of the reproduction age (18-45 years) so at to establish their nutritional status.

2.3 Sampling Technique and Sample Sizes

Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessment of Relief and Transitions (SMART) version November 2008 was used in the planning, training, data entry and analysis. As in 2009, four independent surveys were conducted in Turkana Central, Turkana South, Turkana North East and Turkana North West. These surveys covered the whole of Turkana.

The sampling frame constituted all households living in each of the four districts in Turkana. The population data was based on the Kenya National Bureau Statistics estimates[4]. Sample size calculation for all the four districts was based on the assumption that the GAM rate remained the same (≈20%) as it was in May 2009. A precision of ±3.5% was used for the survey and a design effect of 1.5 for the cluster methodology. The proportion of the underfives was estimated at 20% and the proportion per household was 0.90%. The average household size

[4] Turkana District; Kenya National Bureau of Statistics, May 2010

was 6. The non-response rate was estimated at 3%. The sample size was 718 households which was expected to yield 753 children underfive years of age for anthropometric measurements. The number of clusters visited per district was 45 each comprising 16 households. The resulting sample sizes for anthropometric measurements however varied from that anticipated. In Turkana Central the sample size was 603, Turkana South 688, Turkana North East 644 and Turkana North West 618.

The sample size for collection of data on IYCF indicators was 3 infants 0-5 months of age per cluster and 5 infants 6-23 months of age per cluster making a total of 460 infants per district. Again the resulting sample in Turkana Central was 411, Turkana South 403, Turkana North East 444 and Turkana North West 474.

For the mortality rates (both crude and underfive mortality) the sample sizes for each of the districts was also calculated using ENA for SMART. The sample size for all the districts was calculated based on the underfive and crude mortality estimates. A precision of ±1% was used for the survey, a design effect of 1.5 for the cluster methodology and the recall period was 90 days. The average household size was 6. The non-response rate was estimated at 3%. The calculated sample sizes for all the districts was less than the number of households to be visited for anthropometry and therefore questions on mortality was asked in all the households visited.

Selection of Clusters

A two-stage cluster survey, proportional to population size, using the smallest geographical administration (sub-location) was employed in carrying out the survey. The sampling unit/cluster was the sub-location because of lack of population statistics at the village level. In the first sampling stage, the population of children under 5 years of age for each of the sub-locations in each district were listed. Clusters were allocated to the sub-locations from the cumulative population list proportional to population size. Sampling was done using the ENA for SMART software 2008 (Annex 2 for selected clusters). Some sub-locations (with large population sizes) had more than one cluster assigned to them making it necessary to further sub divide them into smaller units using the best and most representative option so as to minimize bias. The sampling frame for the survey was limited to those sub-locations that were geographically accessible and safe in terms of security. In Turkana Central, all the sub-locations formed sampling frame. In Turkana South, Lomelo division was left out of the sampling frame, in Turkana North East, Kibish sub-location was left out whereas in Turkana North West Loteteleit division did not form part of the sampling frame.

Selection of Households

The definition of a household was a shelter or more whose residents eat from the same “cooking pot”. The principle of randomness was used in the selection of households. Each survey team moved to the approximate centre of the selected cluster from where a pen was spun to randomly determine the starting direction. The teams then moved along the identified direction and carried out a census of all the households from the centre to the edge of the village. The first household to be visited was randomly selected from the list of households using the lottery system. Thereafter, the next nearest household as one left the household already visited was selected. The team then carried out interviews in all eligible subsequent households until they visited 16 households per cluster.

If nobody was home at the time of the first visit, after checking with neighbours or family members, to ensure they were not close by, the team attempted to revisit the household at least 2 times. Households where interviews did not take place because the person refused or nobody was available, was recorded as such and the household was not replaced as the sample size took into account non-response.

Selection of children for anthropometry

All children between 6-59 months of age staying in the selected household were measured. The respondent was the primary care giver of the index child/children. If a child and/or the caregiver were temporarily out of the house, then the survey team re-visited the house to collect the data at an appropriate time. This process was repeated until the required number of households (16) per cluster was attained.

Selection of children for assessment of IYCF practices

For the IYCF practices 3 children less than 6 months of age were to be selected from the households visited in each of the 45 clusters making a total of 135 children. Similarly, 5 children 6-23 months of age were selected from each of the 45 clusters making a total of 225. The sample was attained by enlisting the children in these age categories as they were found in the households visited. In case the required sample size was not realized from the number of households visited, more households were sampled in a similar manner to those for the anthropometric survey (described above) until the required sample was realized.

Selection of women for determination of nutritional status

All women in the reproductive age (18-45 years) in the identified households were enlisted in the study and their MUAC measurements taken.

2.4 Selection of the survey team, training and pre-testing of the questionnaires

2.4.1 Survey Team

The survey was coordinated and supervised by an external consultant and an assistant consultant. The consultants were assisted by the: Regional Emergency, Food Security and Livelihoods Manager OXFAM GB; Nutrition Manager WVK; Nutrition Coordinator Merlin; Nutrition Manager IRC; and Nutrition Programme Coordinator Samaritan's Purse. District Nutrition Officers (one from each of the four districts) assisted in the coordination of data collection. The survey was undertaken by 20 teams, 5 teams per district. Each team comprised 4 members inclusive of a team leader. The team leader doubled as the interviewer while the rest of the team members translated the questions and responses and also took the anthropometric measurements. The team leaders were mainly from MOPHS, partner agencies, universities and middle level colleges while the rest of the team members were largely drawn from community members with at least Kenya Certificate of Secondary Education (KCSE) and with prior experience in surveys.

2.4.2 Training of team leaders, measurers and interviewers and pre-testing of questionnaire

A four-day training workshop was conducted before the commencement of the survey. The training took place from 19th to 22nd May 2010. The training focused on: the purpose and objectives of the survey; familiarization with the questionnaire by reviewing the purpose for each question; interviewing techniques and recording of data; how to take anthropometric measurements; and cluster and household selection. Role-plays on how to administer the questionnaire and record responses were conducted. Demonstrations on how to take anthropometric measurements were also conducted. This was followed by practice to standardize anthropometric measurements. The standardization of anthropometric measurements took one day.

A half day of the training was allocated to pre-testing of the questionnaire (in areas that had not been selected for inclusion in the survey) and reviewing of the data collection tools based on the feedback from the field (See Annex 3 for questionnaires). The anthropometric measurements from pre-testing were entered into the ENA for SMART software and a plausibility report developed for each team and this information was used to correct the teams' mistakes.

2.5 Data collection

Data collection took place concurrently in all the four districts. The data collection was from 25th May to 2nd June 2010. The consultant, assistant consultant, the representatives from the partner agencies and DNOs supervised the teams throughout the data collection period. Teams administered the standardized questionnaire to the mother or caregiver. Each survey team explained the purpose of the survey and issues of confidentiality and obtained verbal consent before proceeding with the interview.

2.6 Variables Measured

Age: The exact age of the child was recorded in months, based on information gathered from the caregiver and confirmed with information from health, baptismal or birth certificates. A calendar of events (Annex 4) was used for those children whose mothers could not remember the date of birth of their children and those who did not have any documentation of the date. A chart for calculation of age in months was used to enable accurate and fast determination of age (Annex 5).

Weight: Children were measured in the nude using a 25 kg hanging spring Salter scale to the nearest 100g.

Height: Recumbent length was taken for children less than 85 cm or less than 2 years of age while those greater or equal to 85 cm or more than 2 years of age were measured standing up.

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest mm. In the event of a disability the right arm was used or for those who are left-handed, MUAC was taken on the right arm. MUAC measurements were taken for children 6-59 months of age and for women in the reproductive age (18-45 years of age).

Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present and no pit or depression as oedema absent.

Enrollment in the selective feeding programmes: For all children 6-59 months of age, the caretakers were asked to state whether the child was enrolled in a supplementary feeding programme (SFP) or a therapeutic feeding programme (OTP) on the day of the survey. The coverage for the SFP was calculated as the proportion of children attending the programme divided by the number of cases not attending the programme plus the number of children attending the programme based on the percentage of the median and MUAC. The coverage rate for OTP was similarly calculated as the proportion of severely malnourished children enrolled in the programme. The coverage rate was calculated based on the survey findings and not on the number of children enrolled in the programme at the time of the survey. The coverage for blanket supplementary feeding programme (BSFP) was calculated by as the proportion of children 6-59 months of age who had been in the programme which ended beginning of May 2010.

Morbidity: Information on two-week morbidity prevalence was collected by asking the mothers or caregivers if the index child had been ill in the two weeks preceding the survey and including the day of the survey. Illness was determined based on respondent's recall and was not verified by a clinician.

Immunization status: For all children 6-59 months, information on BCG, Pentavalent 1-3, DPT 1-3, measles vaccinations and full immunization status was collected using health cards and recall from caregivers. When estimating measles coverage, only children 9 months of age or older were taken into consideration as they are the ones who were eligible for the vaccination and thus the coverage was calculated as the proportion of children 9 months and above who had received measles vaccination. The indicator for full immunization was the proportion of children 12-23 months who had received all (8) of the vaccinations. The vaccination coverage was calculated as the proportion of children immunized based on records and recall.

Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation in the 6 months prior to the survey date was collected using child health and immunization campaign cards and recall from caregivers.

De-worming status: Information was solicited from the caregivers as to whether children 24-59 months of age had received de-worming tablets or not in the previous 6 months. This information was verified by card where available.

Information on Infant Feeding Practices: Information on timely initiation of breastfeeding, giving of colostrum and pre-lacteal feeds, exclusive breastfeeding rates, maintenance of breastfeeding, frequency of feeding, diversity of complementary feeds was solicited based on a 24-hour recall, in line with WHO guidelines to

minimize recall bias and thus obtain more valid information. The indicators used were based on WHO guidelines[5]. The information was obtained for children 0-23 months of age.

Dietary diversity for children 6 to 23 months of age: The dietary diversity indicator is based on the premise that the more diverse the diets are the more likely they are to provide adequate levels of a range of nutrients. There is considerable evidence for this idea[6]. For this indicator, the minimum dietary diversity for children 6-23.9 months is ≥4 food groups out of 7 groups. The food groups are summed, with each of the groups scored "1" If the child had the food group yesterday, and "0" if not. This results in a diversity score ranging from 0 to 7 for each child. Higher scores correspond to a more adequate range of foods groups in the diet.

The food groups were as follows:

- Grains, roots and tubers
- Legumes and nuts
- Dairy products (milk, yoghourt, cheese)
- Flesh foods (meat, fish, poultry and liver/organ meats)
- Eggs
- Vitamin A-rich fruits and vegetables
- Other fruits and vegetables

Food security status of the households: Information on the number of meals usually eaten and the number of meals eaten on the day preceding the survey was solicited to establish the food security status of the households. Additionally, information on the family members who had missed a meal the day preceding the survey was also solicited.

Household food diversity: Dietary diversity is a qualitative measure of food consumption that reflects household access to a wide variety of foods, and is also a proxy of the nutrient intake adequacy of the diet for individuals. Dietary diversity scores were created by summing the number of food groups consumed over a 24-hour period to aid in understanding if and how the diets are diversified. (Annex 3). Household dietary diversity score (HDDS) is meant to reflect, in a snap shot the economic ability of a household to consume a variety of foods[7]. A score of 1 was allocated to each food group that was consumed by the household and a score of 0 for each of the food groups not consumed by the household, and thus the highest possible score was 15.

Food Aid: Information was also sought on whether a household had received any food aid in the past three months; when it was received, what foods were received; how the ration was used and the duration each commodity lasted.

Coping Strategies: Information on coping strategies households employ during times of food scarcity was obtained from respondents.

Household water consumption and utilization: The indicators used were main source of drinking and household water, time taken to water source and back, cost of water per 20-litre jerry-can and treatment given to drinking water.

---

[5] Indicators for Assessing Infant And Young Child Feeding Practices. Conclusions of a consensus meeting held 6-8 November 2007 in Washington DC., USA.

[6] Ruel M. T. (2002): *Is dietary diversity an indicator of poor food security or diversity quality? A review of measurement issues and research needs.* Food Consumption and Nutrition Division, International Food Policy Research Institute (IFPRI). FCND Discussion Paper NO. 140.

[7] Guidelines for measuring household and individual dietary diversity. Version 2, June 2007. Prepared by FAO Nutrition and Consumer Protection Division with the support from EC/FAO Food Security Information for Action Programme and the Food and Nutrition Technical Assistance (FANTA) Project. Rome, Italy

Sanitation: Information on household accessibility to a toilet/latrine, disposal of children's faeces and occasions when the respondents wash their hands was obtained.

Nutrition Indicators:

Nutritional Indicators for children 6-59 months of age
The following nutrition indicators were used to determine the nutritional status of the underfives:

- Weight-for-height (WFH) index

Acute malnutrition rates were estimated from the weight for height (WFH) index values combined with the presence of oedema. The WFH indices were compared with WHO Standards 2006. WFH indices were expressed in both Z-scores and in percentage of median. The expression in Z-scores has true statistical meaning and allows inter-study comparison. The percentage of median on the other hand is commonly used to identify eligible children for feeding programmes and both are reported.

Guidelines for the results expressed in Z-scores:
- Severe malnutrition is defined by WFH <-3 SD and/or existing bilateral oedema on the lower limbs of the child
- Moderate malnutrition is defined by WFH <-2 SD and >=-3 SD and no oedema

Guidelines for the results expressed in percentage according to the median reference:
- Severe malnutrition is defined by WFH < 70% and/or existing bilateral oedema on the lower limbs
- Moderate malnutrition is defined by WFH < 80% and >=70% and no oedema

Global acute malnutrition (GAM) is therefore defined as the proportion of children presenting with a weight for height index less than -2 Z scores or less than 80% percentage of the median with/without oedema.

MUAC

Guidelines for the results expressed as follows:
- Severe malnutrition is defined by measurements <115mm
- Moderate malnutrition is defined by measurements >=115mm to <125mm
- At risk is defined by measurements >=125mm to <135mm
- Normal >=135mm

Table 2: Definitions of acute malnutrition using WFH and/or oedema in children aged 6–59 months

Acute malnutrition (WFH)	**Percentage of the median**	**Z score**	**oedema**
Severe	< 70 %	< - 3 z scores	Yes / no
	> 70 %	> -3 z scores	Yes
Moderate	>= 70 % - <80%	< –2 z-scores to ≥ –3 z-scores	No
Global	< 80 %	< –2 z-scores	Yes / No

Adapted from SMART Manual, Version 1, April 2006

MUAC cut off points for the women[8]:
- Pregnant and lactating women: Cut off 23 cm with 20.7cm, signifying severe under nutrition
- Non-pregnant women: Cut-off 21cm and <18cm signifying severe under nutrition

[8] Kenya National Bureau of Statistics and Ministry of Public Health and Sanitation, Guidelines for Nutrition Assessments in Kenya, 2008

2.7 Data Analysis

Three data entry clerks were hired by WVK and an external data analyst were responsible for data entry under the coordination and supervision of the consultant. ENA nutrisurvey was used for data entry and analysis of anthropometry data. The rest of the data was analyzed in Statistical Package for Social Science (SPSS) version 16.0 for Windows.

2.8 Methodological Challenges

Age: Age determination was a major challenge as many mothers/caregivers did not know the birth dates of their children. Ages were thus approximated by the use of a local calendar of events developed for the whole of Turkana. It was however realized during data collection that the calendar of events was most relevant for Turkana Central district and therefore it is recommended that in future calendar of events be developed for each of the districts at the local level so that the events are relevant to the district. This should be done before the commencement of the survey (training) with DNOs taking the lead.

Supervision of data collection: Supervision of data collection was a major challenge due to the vastness of the district, poor communication and transportation and insecurity in some parts of Turkana. It is proposed that in future, the surveys not be conducted for the four districts concurrently. It is recommended therefore that the surveys for Turkana Central and Turkana South districts be conducted concurrently before the team moves on to do the same in Turkana North East and Turkana North West. This will facilitate more intensive supervision so as to improve on the quality of data collected.

Population statistics: There were no population statistics for the smallest geographical unit, the village. The sampling unit was therefore the sub-location for which population statistics were available.

The sampling frame for the survey was limited to those sub-locations that were geographically accessible and safe in terms of security.

3 RESULTS

The findings for the four survey sites; Turkana Central District, Turkana South District, Turkana North East and Turkana North West are presented concurrently, similarities and disparities are highlighted. The findings of the FGDs have been used to complement the quantitative findings while highlighting disparities where they exist.

3.1 Household Demography

The mean household sizes were more or less similar in Central and South Districts at 5.2 (sd 2.1), and 5.4 (sd 2.1) respectively. The same was true for North East and North West at 4.8 (sd 1.6) and 4.5 (sd 1.5) respectively (Table 3). Children below 5 years of age formed about one quarter of the total population in all the survey sites, with the Central and South Districts at 21.4% and 22.8% respectively while those from the North East formed 26.0% of the population and North West 26.4%. The proportions of the children less than five years of age, in all the survey sites were more than the 20% expected for the developing countries (Table 3). This may be partly explained by the fact that ages of many children were not documented. Many mothers could not remember the ages of their children.

Table 3: Household Demographic Characteristics

	Central	South	North East	North West
Demographic Characteristics				
Mean (sd) household size	5.2 (sd 2.1)	5.4 (sd 2.1)	4.8 (sd 1.6)	4.5 (sd 1.5)
Total population	3625	3827	3432	3264
Males	1728 (48.0%)	1823 (49.0%)	1545 (46.0%)	1505 (47.0%)
Females	1843 (52.0%)	1891 (52.0%)	1837 (54.0%)	1709 (53.0%)
Children underfive years of age	774 (21.4%)	873 (22.8%)	891 (26.0%)	863 (26.4%)

3.2 Livestock Ownership

Many of the households in three of the four survey sites reported owning livestock. North East registered the highest percentage (67.1%) of households owning livestock, followed by Central with 63.8% and South with 51.8% of households owning livestock. North West was the only district in which less than 50.0% of the households indicated livestock ownership (Table 4).

Of the households that reported ownership of livestock in the four districts, North West had the highest percentage (58.7%) of households with an increase in the size of their livestock in the six months prior to the survey. This was followed by North East at 56.7%. In Central, 39.4% of the households recorded an increase while only 11.5% of households in the South had an increase in the size of their livestock. Most of the livestock increase in the four districts was due to animals giving birth (Table 4).

As for the reduction in the size of livestock, a higher percentage of households in two districts reported a decrease compared to the proportion of households reporting an increase; Central, 47.8% and South 75.2%. In contrast, North East and North West reported a lower percentage of households with a reduction in the size of their livestock compared to those where there was increase at 33.5% and 28.8% respectively. Most of the livestock reduction was reported to be as a result of death caused by either disease or drought. Other causes of reduction were sale and raids of livestock. For about one-tenth of the households in all the four districts, there was neither reduction nor increase in livestock (Table 4).

Table 4: Livestock Ownership

	Central N=676		South N=718		North East N=715		North West N=696	
	n	%	n	%	n	%	n	%
Own Livestock	431	(63.8)	372	(51.8)	480	(67.1)	285	(40.9)
Livestock increased in last 6 months	170	(39.4)	43	(11.5)	272	(56.7)	165	(58.7)
Reasons for increase:								
• Animals gave birth	157	(92.9)	40	(88.9)	255	(96.2)	162	(95.9)
• Bought	10	(5.9)	2	(4.4)	7	(2.6)	7	(4.1)
• Donation/Given	2	(1.2)	3	(6.7)	3	(1.1)	0	(0.0)
Livestock decreased in the last 6 months	206	(47.8)	282	(75.2)	161	(33.5)	81	(28.8)
Reasons for decrease:								
• Sold	26	(8.3)	55	(11.2)	9	(4.1)	9	(6.6)
• Death caused by drought	121	(38.3)	131	(26.8)	69	(31.1)	50	(36.8)
• Raid	22	(7.1)	65	(13.3)	28	(12.6)	23	(16.9)
• Death caused by disease	142	(45.5)	234	(47.9)	112	(50.5)	53	(39.0)
• Dowry	0	(0.0)	0	(0.0)	1	(0.5	0	(0.0)
• Others	0	(0.0)	4	(0.8)	3	(1.4)	1	(0.7)
Livestock remained the same in the last 6 months	55	(12.8)	49	(13.1)	47	(9.8)	35	(12.5)

3.3 Anthropometry

3.3.1 Age and sex distribution of the sampled children

Verification of age of index child/children

The ages of children were determined by use of cards or by recall. Verification of age by cards was done using; health cards, birth certificates and baptismal cards. In the absence of these cards, age was determined by recall, in the majority of cases, based on a local calendar of events developed by the survey team prior to the commencement of the study. Even though some of the children's ages were verified by the use of a health card, it is important to note that for some, no exact date of birth was recorded on the card other than the date the child was first seen at the health facility which was not necessarily the date of birth. The teams thus had to probe and use the local calendar of events to estimate the age of the child in months.

In three of the four survey sites, age determination by health card was done for over 60% of the children, with North West recording the highest at 66.0%, followed by South at 65.8% and North East at 60.7%. Central had the lowest percentage of children (59.4%) whose ages were determined by health cards.

Over 30% of the ages of children from each of the survey sites were based on recall. The highest percentage of the ages determined by recall was from Central (38.8%), followed by North East (37.3%), North West (33.1%) and South (33.0%) [Table 5].

Table 5: Verification of age of index child/children by survey sites

	Central N=762		South N=848		North East N=868		North West N=846	
	n	%	n	%	n	%	n	%
Health card	453	59.4	558	65.8	527	60.7	558	66.0
Birth certificate	10	1.3	8	0.9	11	1.3	6	0.7
Baptismal card	3	0.4	2	0.2	5	0.6	1	0.1
Recall	296	38.8	280	33.0	324	37.3	280	33.1

Distribution of children by age and sex

In Turkana Central District, about half of the boys (50.1%) comprised the survey sample compared to 49.9% girls (Table 6). The overall ratio of boys to girls (calculated by diving the total number of boys with the total number of girls) was 1.0 which was within the recommended range of 0.8 – 1.2[9], demonstrating an unbiased sample. The ratio of boys to girls for most of the other age categories were also within the accepted range with the exception of 54-59 months whose ratio of boys to girls was unbalanced at 1.6. This may be due to recall bias in the age of the children because many mothers did not have health cards for their children.

Table 6: Distribution of the children in Turkana Central District by age and sex

	Boys		Girls		Total		Ratio
	n	%	n	%	N	%	boy:girl
6-17 months	81	49.4	83	50.6	164	27.2	1.0
18-29 months	98	53.3	86	46.7	184	30.5	1.1
30-41 months	54	43.9	69	56.1	123	20.4	0.8
42-53 months	46	48.4	49	51.6	95	15.8	0.9
54-59 months	23	62.2	14	37.8	37	6.1	1.6
Total	302	50.1	301	49.9	603	100.0	1.0

In Turkana South District, slightly over half (51.4%) of the surveyed children were boys while 48.6% were girls (Table 7). The overall ratio of boys to girls was 1.1 which was within the recommended range of 0.8 – 1.2 and thus the sample was unbiased. The sex ratios across majority of the child age groups were also within the accepted range except that of 54-59 months whose ratio of boys to girls was unbalanced at 1.8.

Table 7: Distribution of the children in Turkana South District by age and sex

	Boys		Girls		Total		Ratio
	n	%	n	%	N	%	boy:girl
6-17 months	100	54.3	84	45.7	184	26.6	1.2
18-29 months	89	49.2	92	50.8	181	26.2	1.0
30-41 months	79	52.0	73	48.0	152	22.0	1.1
42-53 months	56	44.4	70	55.6	126	18.2	0.8
54-59 months	31	64.6	17	35.4	48	6.9	1.8
Total	355	51.4	336	48.6	691	100.0	1.1

In Turkana North East, 51.4% of the children surveyed were boys and 48.6% were girls. The overall ratio of boys to girls was 1.1 and thus was within the recommended range of 0.8 – 1.2 indicating that the sample was unbiased. Majority of the sex distributions for the various age groups were within the acceptable ranges, with the exception of the age group 54-59 months that had a ratio of boys to girls at 2.6 (Table 8)

Table 8: Distribution by age and sex of children in Turkana North East

	Boys		Girls		Total		Ratio
	n	%	n	%	N	%	boy:girl
6-17 months	84	50.3	83	49.7	167	25.2	1.0
18-29 months	87	47.8	95	52.2	182	27.5	0.9
30-41 months	78	50.0	78	50.0	156	23.6	1.0
42-53 months	54	50.9	52	49.1	106	16.0	1.0
54-59 months	37	72.5	14	27.5	51	7.7	2.6
Total	340	51.4	322	48.6	662	100.0	1.1

[9] Assessment and Treatment of Malnutrition in Emergency Situations, Claudine Prudhon, Action Contre la Faim (Action Against Hunger), 2002.

The overall sex distribution by age categories in Turkana North West was unbiased as they were all within the acceptable levels of 0.8 – 1.2 (Table 9). Slightly over 50% of the sampled children were boys (51.1%) while girls were made up 48.9% of the sampled children.

Table 9 : Distribution by age and sex of children from North West

	Boys		Girls		Total		Ratio
	n	%	n	%	N	%	boy:girl
6-17 months	89	53.0	79	47.0	168	27.2	1.1
18-29 months	81	47.1	91	52.9	172	27.8	0.9
30-41 months	86	54.4	72	45.6	158	25.6	1.2
42-53 months	51	50.5	50	49.5	101	16.3	1.0
54-59 months	9	47.4	10	52.6	19	3.1	0.9
Total	316	51.1	302	48.9	618	100.0	1.0

3.3.2 Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006)

The malnutrition levels unveiled by this survey indicate rates above the emergency GAM thresholds (15.0%) in two of the survey sites indicating a critical situation[10]; Turkana Central and North East districts (Table 10). North East had the highest GAM level at 17.1% (95% CI: 14.1 – 20.5) followed by Central at 16.3% (95% CI: 13.0 – 20.1), North West District 14.7% (95% CI: 11.7- 18.4) and the lowest GAM rate was in South District, 12.4% (95% CI: 9.7 – 15.7). The trend was the same for SAM levels. The highest SAM rate was in the North East, 3.8% (95% CI: 2.4 – 5.9); Central 2.0% (95% CI: 0.9 – 4.1); North West 1.6% (95% CI: 0.9 – 3.0); and South 0.9% (95% CI: 0.4-1.9. The prevalence of SAM was within acceptable level (<3%) for all the survey sites except North East Turkana district (Table 10). Oedema cases were observed only in Central (0.3%) and in North East (0.2%).

Table 10: Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006)

Nutritional Status Indicator	Central N=603	South N=688	North East N=662	North West N=618
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(98) 16.3 % (13.0 - 20.1 95% C.I.)	(85) 12.4 % (9.7 - 15.7 95% C.I.)	(113) 17.1 % (14.1 - 20.5 95% C.I.)	(91) 14.7 % (11.7 - 18.4 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(86) 14.3 % (11.2 - 18.0 95% C.I.)	(79) 11.5 % (8.9 - 14.6 95% C.I.)	(88) 13.3 % (11.0 - 15.9 95% C.I.)	(81) 13.1 % (10.5 - 16.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(12) 2.0 % (0.9 - 4.1 95% C.I.)	(6) 0.9 % (0.4 - 1.9 95% C.I.)	(25) 3.8 % (2.4 - 5.9 95% C.I.)	(10) 1.6 % (0.9 - 3.0 95% C.I.)
% of oedema	(2) 0.3%	0%	(1) 0.2%	0%

[10] WHO cut off points for wasting using Z scores (<-2 Z scores in populations: <5% acceptable; 5-9% poor; 10-14% serious; >15% critical).

4.3.3 Weight for height z-score distribution based on WHO Standards 2006

Turkana Central District

The sample curve shows some displacement to the left of the reference population. This is an indication of poor nutrition status of the sampled population in comparison to the reference population. The standard deviation of this sample was 0.99, (which lies within the acceptable range 0.8 – 1.2), indicating representativeness in the sample selection (Figure 3).

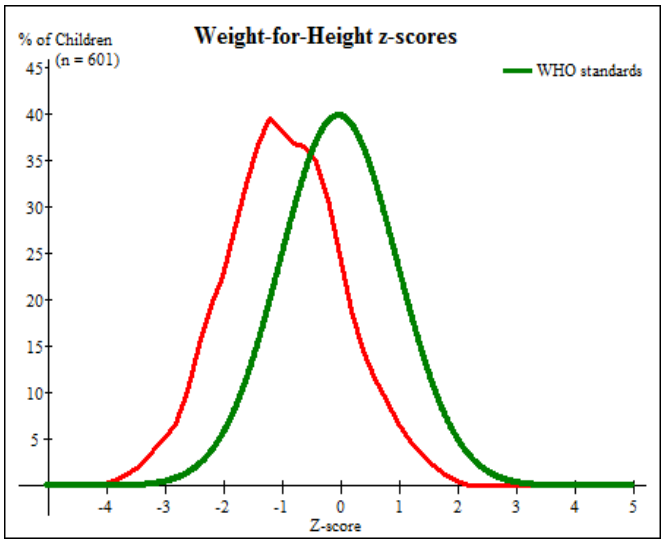


Figure 3: Weight for height Z-score distribution in Central district

Turkana South District

The sample curve shows a marked displacement of the curve of the sampled population to the left of the reference curve, indicating poor nutritional status of the sampled population. The WHZ standard deviation of the sampled population was 0.91, which was within acceptable levels (Figure 4).

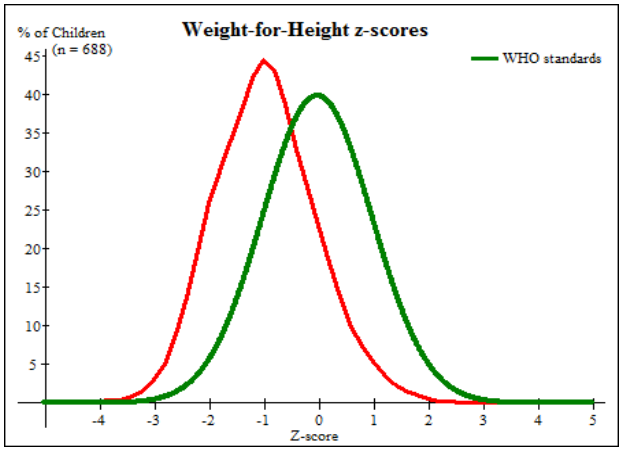


Figure 4: Weight for height Z-score distribution in South district

Turkana North East District

Figure 5 indicates a poor nutritional status of the sampled population, because their curve is skewed to the left of that of the reference population. Sample selection is representative since the WHZ standard deviation (1.03) was within the acceptable range.

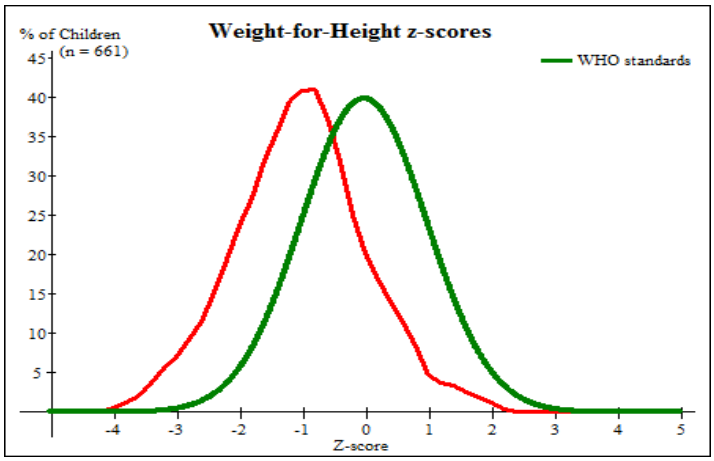


Figure 5: Weight for height Z-score distribution in North East

Turkana North West District

The WHZ distribution curve of the children from North West shows a similar trend like those for the other survey sites, indicating poor nutritional status. The standard deviation for the sampled population for WHZ was 0.96 indicating that it was representative of the study population (Figure 6).

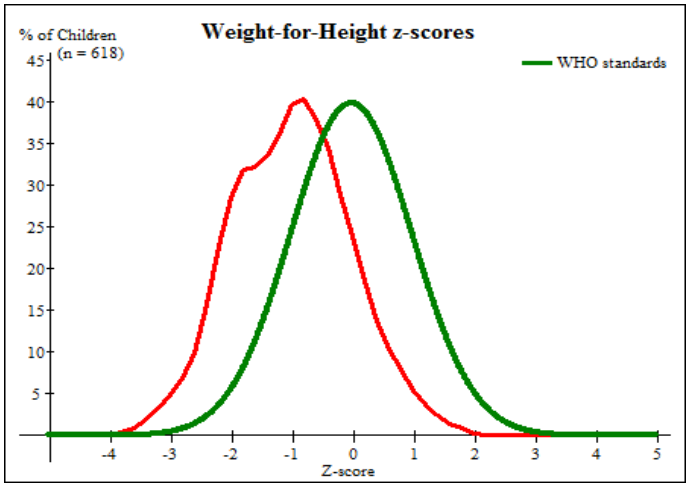


Figure 6: Weight for height Z-score distribution in North West district

4.3.4 Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema (WHO Standards 2006)

The children were categorized into age groups to examine the effect of age on nutritional status. This is necessary to guide the targeting of interventions taking into account the vulnerabilities in relation to a child's life cycle.

Turkana Central District

In Turkana Central district, acute malnutrition was high (GAM 25.0%) in the younger children (ages 6-17months), a time when the effects of poor or inappropriate feeding practices are experienced most. Acute malnutrition was also high (GAM 27.0%) in the age category 54-59 months. This relatively high level of GAM in this age group may probably be explained by the relatively small sample size (37 children) in this age category compared to the other categories which had more than 95 children each (Table 11). The smaller sample size is explained by the fact that this category comprises a range of 6 months whereas the other categories comprise a range of 12 months each.

Table 11: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in Central Turkana District

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mths)	n	N	%	n	%	N	%	n	%
6-17	164	3	1.8	38	23.2	123	75.0	0	0.0
18-29	184	1	0.5	22	12.0	161	87.5	0	0.0
30-41	123	2	1.6	10	8.1	109	88.6	2	1.6
42-53	95	2	2.1	8	8.4	85	89.5	0	0.0
54-59	37	2	5.4	8	21.6	27	73.0	0	0.0
Total	603	10	1.7	86	14.3	505	83.7	2	0.3

Turkana South District

In the South district, the age category 6-17 months also recorded a relatively high rate of undernutrition (12.0%) compared to age categories 18-29 months and 30-41months. Unlike in the case of Central district, the age catergory 42-53 months recorded a GAM of 14.3% probably indicating that nutritional status of the children was also influenced by factors other than feeding practices. Like Central district, the highest rate of GAM (21.3%) was observed in the age category 54-59 months. The sample size for this age category was small (47) compared to the other categories which were over 125 (Table 12).

Table 12: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in South Turkana District

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mths)	n	N	%	n	%	N	%	n	%
6-17	183	1	0.5	21	11.5	161	88.0	0	0.0
18-29	180	1	0.6	18	10.0	161	89.4	0	0.0
30-41	152	2	1.3	14	9.2	136	89.5	0	0.0
42-53	126	2	1.6	16	12.7	108	85.7	0	0.0
54-59	47	0	0.0	10	21.3	37	78.7	0	0.0
Total	688	6	0.9	79	11.5	603	87.6	0	0.0

North East District

Like in the other two districts, the highest rate of GAM (27.5%) was observed in the age category 54-59 months of age. Again, this could probably be explained by the small sample size (51) compared to over 100 in the other

age categories. The next high level of GAM (22.6%) was in the age category 42-53 months followed by 15.6% in the age category 6-17 months and the rest of the age categories at about 14.0% GAM each (Table 13).

Table 13: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema in North East District

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mths)	n	N	%	n	%	N	%	n	%
6-17	167	6	3.6	20	12.0	141	84.4	0	0.0
18-29	182	6	3.3	20	11.0	155	85.2	1	0.5
30-41	156	4	2.6	18	11.5	134	85.9	0	0.0
42-53	106	5	4.7	19	17.9	82	77.4	0	0.0
54-59	51	3	5.9	11	21.6	37	72.5	0	0.0
Total	662	24	3.6	88	13.3	549	82.9	1	0.2

North West District

Like in the other districts, the highest level of GAM (31.6%) was recorded in the age category 54-59 months. The second highest rate (20.9%) was in the age category 6-17 months probably indicating the influence of poor infant and young child feeding practices. This was followed by the age categorty 42-53 months and the rest of the categories had GAM rates of about one-tenth each (Table 14).

Table 14: Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or oedema (WHO Standards 2006) in North West District

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mths)	n	n	%	n	%	N	%	n	%
6-17	168	9	5.4	26	15.5	133	79.2	0	0.0
18-29	172	1	0.6	17	9.9	154	89.5	0	0.0
30-41	158	0	0.0	15	9.5	143	90.5	0	0.0
42-53	101	0	0.0	17	16.8	84	83.2	0	0.0
54-59	19	0	0.0	6	31.6	13	68.4	0	0.0
Total	618	10	1.6	81	13.1	527	85.3	0	0.0

4.3.5 Distribution of acute malnutrition and oedema based on weight for height Z scores WHO Standards 2006

Turkana Central District

There were no children with marasmic kwashiorkor, those with marasmus were 1.7% and those with kwashiorkor 0.3% (Table 15).

Table 15 : Distribution of acute malnutrition and oedema based on weight-for-height z-scores in Central District

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 2 (0.3 %)
Oedema absent	Marasmic No. 10 (1.7 %)	Not severely malnourished No. 591 (98.0 %)

Turkana South District

There were no children with marasmic kwashiorkor or kwashiorkor whereas those with marasmus were 0.9% (Table 16).

Table 16: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in South District

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 6 (0.9 %)	Not severely malnourished No. 682 (99.1 %)

North East District

There were no children with marasmic kwashiorkor whereas those who were marasmus were 3.6% and those with kwashiorkor were 0.2% (Table 17).

Table 17: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in North East District

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 24 (3.6 %)	Not severely malnourished No. 637 (96.2 %)

North West District

There were no children with marasmic kwashiorkor or kwashiorkor whereas those with marasmus were 1.6% (Table 18).

Table 18: Distribution **of acute malnutrition and oedema based on weight-for-height z-scores in North West District**

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 10 (1.6 %)	Not severely malnourished No. 608 (98.4 %)

4.3.6 Mean weight for height Z scores WHO Standards 2006

Turkana Central District

The mean weight-for-height Z scores was -0.95±0.99 with a design effect of 1.49 whereas the height-for-age mean Z scores -1.12±1.18 with a design effect of 1.64. There were no Z scores that were out of range whereas 2 were not available for weight-for-height and height-for-age each (Table 19).

Table 19: Mean z-scores, Design Effects and excluded subjects in Central District

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	601	-0.95±0.99	1.49	2	0
Weight-for-Age	601	-1.28±0.91	1.32	2	0
Height-for-Age	603	-1.12±1.18	1.64	0	0

* contains for WHZ and WAZ the children with edema.

Turkana South District

The mean weight-for-height Z scores was -0.96±0.91 with a design effect of 1.41 whereas the height-for-age mean Z scores -1.39±1.25 with a design effect of 1.05. There were no Z scores that were out of range but 3 were not available for weight-for-height and a similar number for the height-for-age (Table 20).

Table 20: Mean z-scores, Design Effects and excluded subjects in South District

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	688	-0.96±0.91	1.41	3	0
Weight-for-Age	691	-1.44±0.89	1.98	0	0
Height-for-Age	688	-1.39±1.25	1.05	3	0

* contains for WHZ and WAZ the children with edema.

Turkana North East District

The mean weight-for-height Z scores for Turkana North East District was -1.06±1.03 with a design effect of 1.19 whereas the height-for-age mean Z scores -1.35±0.90 with a design effect of 1.28. There were no Z scores that were out of range but one score was not available for weight-for-height (Table 21).

Table 21: Mean z-scores, Design Effects and excluded subjects in North East District

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	661	-1.06±1.03	1.19	1	0
Weight-for-Age	661	-1.35±0.90	1.28	1	0
Height-for-Age	662	-1.11±1.24	1.56	0	0

* contains for WHZ and WAZ the children with edema.

Turkana North West District

The mean weight-for-height Z scores for Turkana North West District was -0.98±0.96 with a design effect of 1.33 whereas the height-for-age mean Z scores -1.11±1.27 with a design effect of 1.36. There were no Z scores that were out of range and all were available for weight-for-height and height-for-age Z scores (Table 22).

Table 22: Mean z-scores, Design Effects and excluded subjects in North West District

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	618	-0.98±0.96	1.33	0	0
Weight-for-Age	618	-1.30±0.97	1.07	0	0
Height-for-Age	618	-1.11±1.27	1.36	0	0

* contains for WHZ and WAZ the children with edema.

3.3.3 Prevalence of acute malnutrition based on Percentage of the Median and/or oedema (WHO Standards 2006)

As is expected the GAM rates based on the percentage of the median in all the study sites were lower than that of Z scores. The highest GAM was in North East, 9.8% (95% CI; 7.3 – 13.1) and SAM was 0.2% (95% CI; 0.0 – 1.1). This was followed by Central with a GAM of 8.8 % (95% CI; 6.5 – 11.8) and SAM of 0.3% (95% CI; 0.0 – 2.4. North West had a GAM rate of 7.1% (95% CI; 4.9 – 10.2) and SAM of 0.0% (95% CI; 0.0 – 0.0). The lowest GAM was in South at 5.5% (95% CI; 3.6 – 8.3) and SAM of 0.0% (95% CI; 0.0 – 0.0) (Table 23).

Table 23: Prevalence of acute malnutrition based on Percentage of the Median and/or oedema for all the districts

	Central N=603	**South N=688**	**North East N=662**	**North West N=618**
Prevalence of global acute malnutrition (<80% and/or oedema)	(53) 8.8 % (6.5 - 11.8 95% C.I.)	(38) 5.5 % (3.6 - 8.3 95% C.I.)	(65) 9.8 % (7.3 - 13.1 95% C.I.)	(44) 7.1 % (4.9 - 10.2 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(51) 8.5 % (6.1 - 11.6 95% C.I.)	(38) 5.5 % (3.6 - 8.3 95% C.I.)	(64) 9.7 % (7.1 - 13.0 95% C.I.)	(44) 7.1 % (4.9 - 10.2 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(2) 0.3 % (0.0 - 2.4 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.2 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

4.3.7 Prevalence of acute malnutrition based on MUAC

MUAC is a rapid assessment tool and a good indicator of mortality among children. The findings showed that 38.3% of the children from Central, 37.5% from South, 48.3% from North East and 34.6% from North West were either malnourished and/or at risk of being malnourished (MUAC <135mm) [Table 24]. Overall, severe wasting

was low. The highest rate of severe wasting was recorded in the North East at 1.7%, followed by South at 1.2%, North West at 0.8%. No child was severely wasted in Central [Table 24].

Table 24: Prevalence of Malnutrition based on MUAC in all the four districts

	Central N=602		South N=688		North East N=660		North West N=615	
	n	%	n	%	n	%	n	%
Severe under nutrition < 115 mm	0	0	8	1.2	11	1.7	5	0.8
Moderate 115–<125 mm	49	8.1	55	8.0	95	14.4	57	9.3
At risk125 – <135 mm	181	30.0	193	28.1	213	32.3	151	24.6
Total malnourished/at risk	**230**	**38.3**	**256**	**37.5**	**319**	**48.3**	**213**	**34.6**
Well nourished ≥135mm	372	61.7	432	62.5	341	51.7	402	65.4

The MUAC cut-off points are based on the WHO guidelines

4.4 Child Morbidity

The prevalence of common illnesses was determined based on a two-week recall period prior to the survey thus yielding two-week point prevalence. Overall, the level of morbidity among the children was high in all the survey sites with South recording the highest point prevalence at 71.2%, followed by North West (66.4%), Central (61.9%) and North East at 49.3%. Fever was the most common illness in three of the four survey sites with the highest point prevalence registered in South (30.7%), followed by Central with 27.7% and North West (26.3%). North East had the lowest percentage of children (10.9%) with fever (Table 25). Slightly over one-quarter (25.2%) of the children from South and 23.9% from North West suffered from cough with difficulty in breathing whereas fewer children suffered from the same illness in Central and North East at 13.9% and 15.5% respectively (Table 25). Watery diarrhoea was the third most common illness in three of the four districts, with 12.3% prevalence in Central, 14.3% in South and 18.1% in North West having suffered from this illness in the two weeks preceding the survey. In North East, watery diarrhoea was the second most common cause of illness with 13.6% prevalence. North West had the highest proportion of children who suffered from watery diarrhoea (Table 25). The highest proportion of children who suffered from fever with chills like malaria were from North West (14.2%), followed by North East (11.3%), Central (7.8%), and lastly South with 6.4% (Table 25). Other illnesses identified included cough, skin rashes, vomiting, urinary tract infection, ear infection and measles that was recorded only in North West with at 2.1% prevalence (Table 25).

Table 25: Prevalence of morbidity among the children in all the four survey sites

Illnesses	Central N= 681		South N= 739		North East N= 822		North West N= 725	
	n	%	n	%	n	%	n	%
Watery diarrhoea	76	12.3	106	14.3	112	13.6	131	18.1
Bloody diarrhoea	9	1.5	9	1.2	15	1.8	19	2.6
Fever with chills like malaria	48	7.8	47	6.4	93	11.3	103	14.2
Cough with difficult breathing	86	13.9	186	25.2	127	15.5	173	23.9
Fever	171	27.7	227	30.7	90	10.9	191	26.3
Cough	68	10.0	18	2.4	24	2.9	20	2.8
Skin rashes	34	5.0	2	0.3	8	1.0	15	2.1
Vomiting	22	3.0	12	1.6	4	0.5	14	1.9
Urinary tract infection	0	0	33	4.0	0	0	0	0
Ear infection	9	1.3	9	1.2	12	1.5	26	3.6
Measles	0	0	0	0	0	0	15	2.1

****Multiple Responses***

4.5 Maternal Health Seeking Behaviour

Overall, majority of the mothers/caretakers (about 80.0% or more) sought assistance for their sick children. However, Central had the highest percentage (21.7%) of mothers who did not seek assistance for their sick children. This was followed by South with 19.8%, North East (16.7%) and North West (12.5%) of the mothers not seeking assistance. The relatively high proportions of mothers who did not seek assistance for their sick children is worrying and needs to be addressed through appropriate health education.

On the whole, of the mothers/caretakers who sought assistance, public health facility was the most common place for them to seek assistance for their sick children. The highest percentage of mothers who sought assistance from the public health facilities were from North East (58.6%); followed by those from North West (51.1%), then those from South (50.2%) and lastly Central at 45.9%.

Mobile clinics were visited by 6.3% of the mothers in Central, 3.8% in South, 6.6% from North East and 4.3% in North West. Additionally, herbs were used by 12.6% of the mothers from Central, 4.0% from South, 8.8% from North East and 7.3% from North West.

Assistance was also sought from traditional healers by less than 10% of mothers from all the survey sites, with the highest percentage of mothers/caregivers from North East (2.5%) followed by North West (2.0%), Central (1.4%), and 0.2% from South.

Shops/kiosks were also visited by less than 10% of the mothers from all the survey sites with the exception of those from South where 17.1% bought medicines from shops/kiosks (Table 26). This practice needs to be discouraged because the self-diagnosis conducted by mothers/caregivers and then the decision on what medicines to purchase for their sick children is likely to be a dangerous practice with adverse health consequences on the child.

Table 26: Health seeking behaviour by mothers for their sick children

	Central N= 364		**South N= 504**		**North East N= 396**		**North West N= 440**	
	n	%	n	%	n	%	n	%
Traditional Healer	5	1.4	1	0.2	10	2.5	9	2.0
Community Health Worker	2	0.5	6	1.2	4	1.0	14	3.2
Private clinic / Pharmacy	20	5.5	7	1.4	0	0	41	9.3
Shop / kiosk	16	4.4	86	17.1	17	4.3	29	6.6
Public Clinic	**167**	**45.9**	**253**	**50.2**	**232**	**58.6**	**225**	**51.1**
Mobile Clinic	23	6.3	19	3.8	26	6.6	19	4.3
Relative / Friend	5	1.4	12	2.4	5	1.3	3	0.7
No assistance sought	79	21.7	100	19.8	66	16.7	55	12.5
Herbs	46	12.6	20	4.0	35	8.8	32	7.3
Others	1	0.3	0	0	1	0.3	13	2.9

4.6 Coverage of Selective Feeding Programmes

Period coverage[11] expressed in the following formula was used to determine the coverage of the selective feeding programmes:

$$\frac{\text{Number of children attending the a selective feeding programme}}{\text{Number of cases NOT attending the feeding programme + Number of children attending the feeding programme}} \times 100$$

Coverage for the selective feeding programmes was calculated using both the percentage of the median and MUAC because both measures of acute malnutrition are used to admit children into SFP and OTP programmes.

[11] In, Myatt et.al., *A field trial of a survey method for estimating the coverage of selective feeding programmes,* Bulletin of the World Organization, January 2005, 83 (1).

4.6.1 SFP Coverage rate

SFP Coverage based on percentage of the median

Overall, the SFP coverage rates were within the SPHERE Standards 2004 (>50%) in three of the districts with the exception of North West which registered a coverage rate of 44.2%. Compared to 2009, there was a decrease in the rate of coverage in Central from 66.7% to 50.0%. The rate for South was more or less the same; 72.5% in 2009 versus 74.3% in 2010. North East recorded a slight increase from 51.1% to 56.7%. North West recorded a significant increase from 13.0% to 44.2% (Table 27). The increase in North West may be due to the presence of IRC in the district with effect from September 2009. During the 2009 survey there was no agency on the ground implementing SFP.

Table 27: SFP coverage based on percentage of the median

Coverage based on % of the Median	Central	South	North East	North West
Number of children in SFP	44	84	51	46
Children with WHM ≥ 70% - <80%	51	38	44	63
Number of cases in SFP	7	9	5	5
Number of cases not in SFP	44	29	39	58
Coverage rate	**50.0%**	**74.3%**	**56.7%**	**44.2%**

SFP Coverage based on MUAC

The coverage rates based on MUAC were generally lower than those based on percentage of the median for all the districts. The highest coverage was observed in South at 65.6% followed by Central at 54.3%, North East at 47.6% and lastly North West at 32.6% (Table 28).

Table 28: SFP coverage based on MUAC for all the districts

Coverage based on % of the Median	Central	South	North East	North West
Number of children in OTP	44	84	51	46
Children with 115mm - <125mm	49	61	67	106
Number of cases in OTP	10	17	11	11
Number of cases not in OTP	37	44	56	95
Coverage rate	**54.3%**	**65.6%**	**47.6%**	**32.6%**

4.6.2 Coverage of OTP

Coverage based on percentage of the median

The coverage of OTP was very high reaching 100% in all the districts (Table 29). In 2009, the coverage rates were also high in all the districts with the exception of North West which registered a coverage of 31.6%. There has been therefore, a very significant increase in the coverage rate for North West. This could be attributed to the presence of IRC in the district. At the time of the survey in 2009 there was no agency implementing OTP as Samaritan's Purse had left the district just before the survey.

Table 29: Coverage of OTP based on percentage of the median in all the districts

Coverage based on % of median	Central	South	North East	North West
Number in OTP	2	17	3	16
Children with WHM <70%	0	0	0	0
Number of cases in OTP	0	0	0	0
Number of cases not in OTP	0	0	0	0
Coverage rate	**100%**	**100%**	**100%**	**100%**

Coverage based on MUAC

The coverage based on MUAC was much lower than that by percentage of the median. The highest coverage was recorded in North East at 80.0% and the lowest in North West at 37.5% (Table 30).

Table 30: OTP Coverage based on MUAC

Coverage based on MUAC	Central	South	North East	North West
Number in OTP	2	17	16	3
Children with <115 mm	2	8	11	5
Number of cases in OTP	0	0	7	0
Number of cases not in OTP	2	8	4	5
Coverage rate	**50%**	**68%**	**80.0%**	**37.5%**

4.6.3 Coverage of Blanket Supplementary Feeding Programme (BSFP)

Coverage of BSFP for children 6-59 months of age was lower than expected given that the agencies concerned provided food in the whole of Turkana. The highest coverage was observed in North West at 77.5%, followed closely by North East at 72.4% and then Central at 62.5% (Figure 7). The lowest coverage was recorded in South at 62.5%. It should be noted that the programme ended just two weeks before the survey and it was very popular as expressed by the community members during the FGDs. It is suspected therefore that there was under reporting probably with the perception that a negative picture of the programme may lead to its resumption.

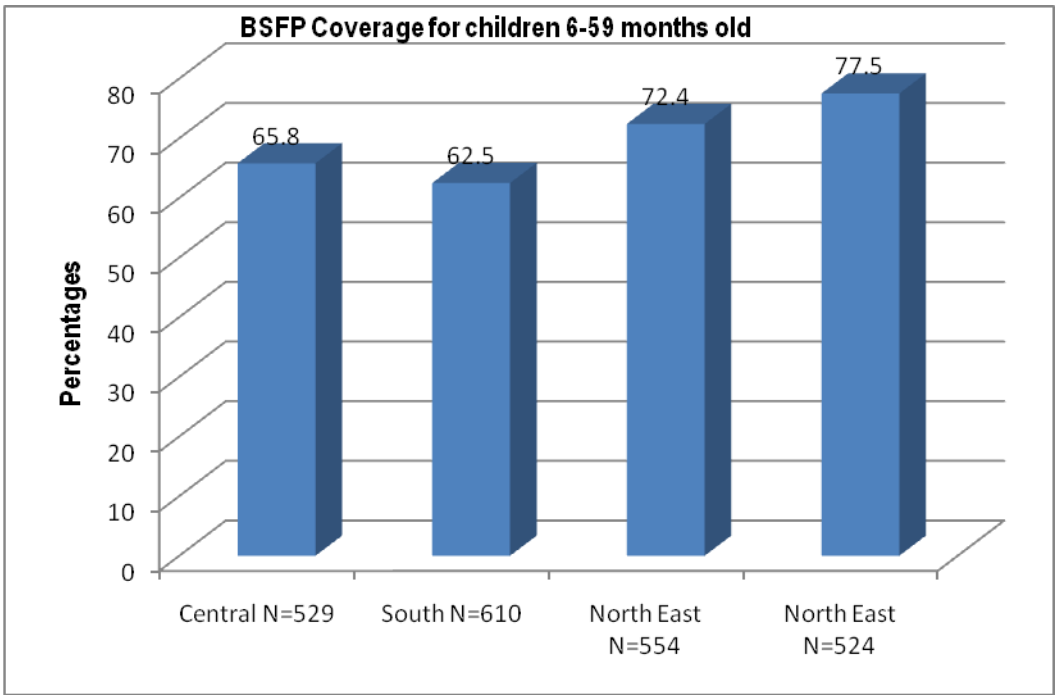


Figure 7: Coverage for Blanket Supplementary Feeding Programme for children 6-59 months old

4.7 Immunization Coverage for Children 6-59 months of age

4.7.1 BCG Immunization Coverage

The immunization coverage rates for BCG across the four survey sites was relatively high (over 80.0%) when those cases verified by card and by scar were considered. Overall, the highest coverage was recorded in Central (95.0%), followed by South (92.0%), North West (88.0%) and lastly North East (81.0%). South had the highest percentage (71.2%) of children whose BCG immunization was verified by card while North West had the least (61.1%). Additionally, the highest percentage of children whose BCG immunization status was verified by scar was in Central (29.3%) while North East had the least at 15.8% (Figure 7).

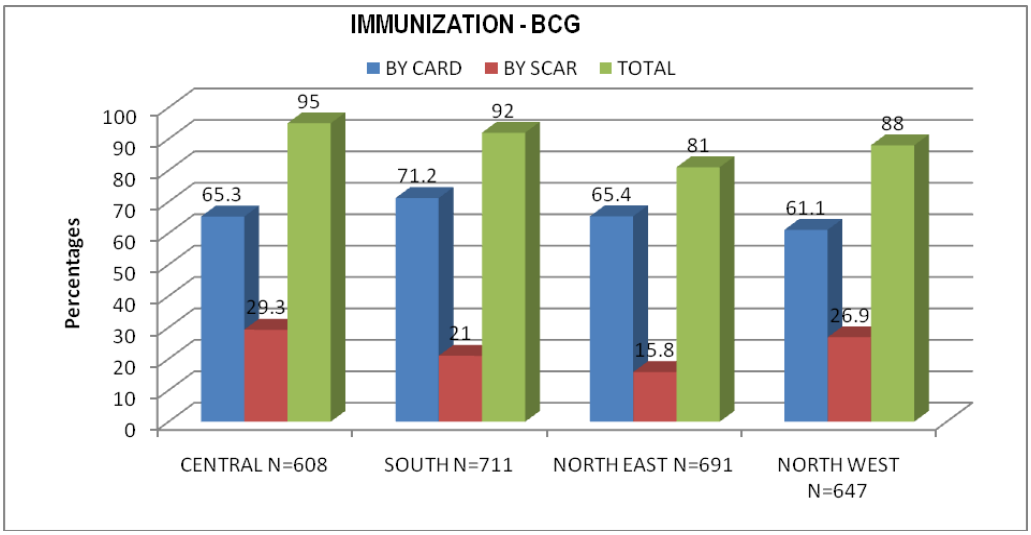


Figure 7: BCG Immunization Coverage for all the Districts in Turkana

4.7.2 OPV Immunization Coverage

OPV1 Immunization Coverage

The immunization coverage rates for OPV1 in all the survey sites were high (80.0% and above) when cases verified by card and those verified by recall were considered. The highest coverage rate (93.0%) was reported in Central while the lowest (80.0%) was in North East (Figure 8).

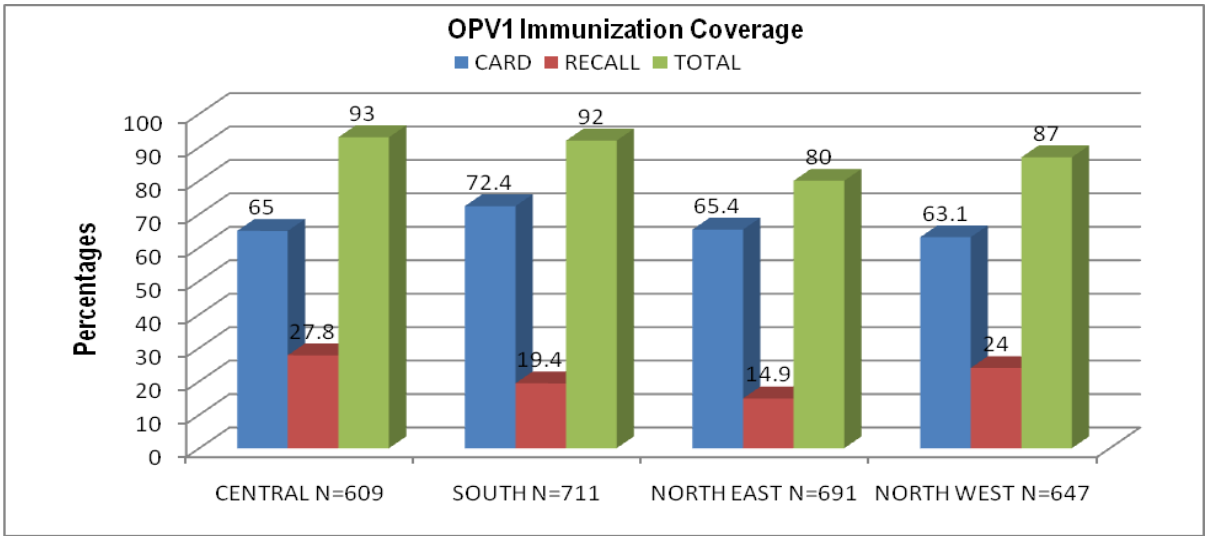


Figure 8: OPV1 immunization coverage for all the districts in Turkana

OPV3 Immunization Coverage

Immunization coverage rates for OPV3 were relatively lower than those for OPV1. When cases verified by card and those by recall were considered, the highest coverage rate was in Central with 82.0%, while the lowest was in North East at 70.0% (Figure 9).

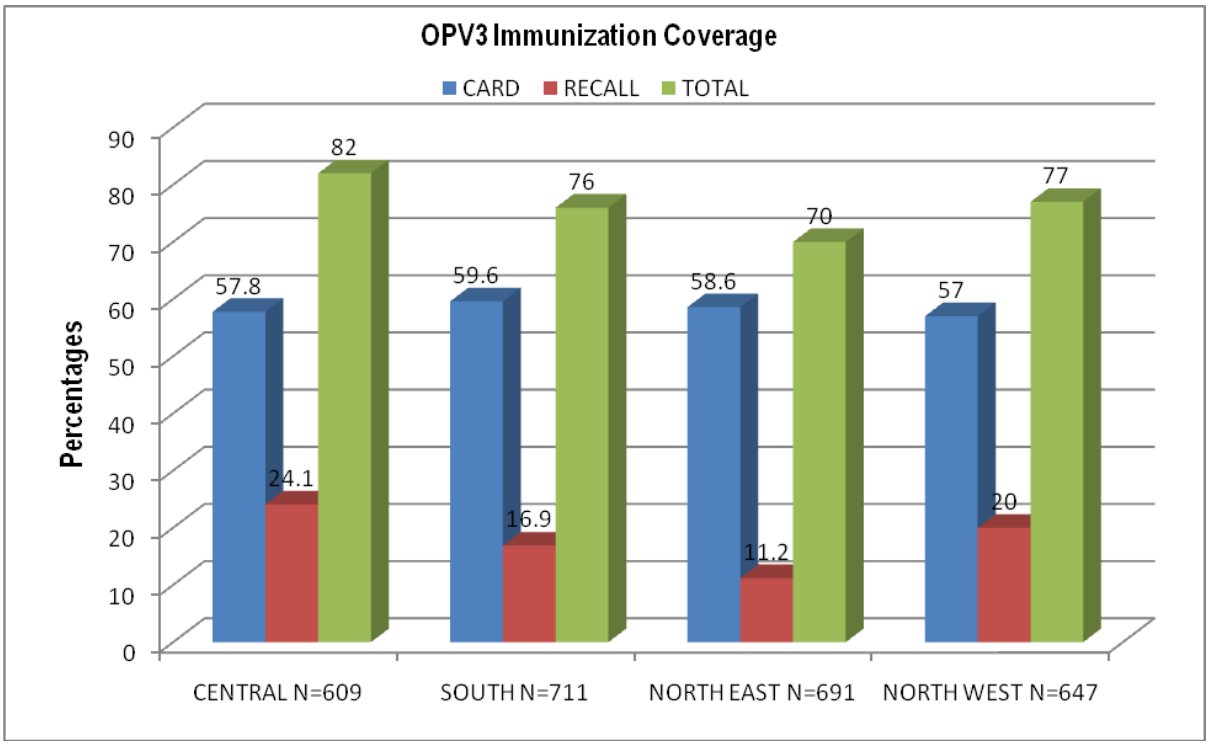


Figure 9: OPV3 immunization coverage for all the districts in Turkana

4.7.3 DPT Immunization Coverage

DPT1 Immunization Coverage

Immunization coverage rates for DPT1 were over 80.0% in three of the four survey sites when cases verified by card and those by recall were considered. Overall the highest coverage rate was in Central with 91.0%, while the lowest was in North East (79.0%). About one-third (60%) of the cases had health cards in the four districts (Figure 10).

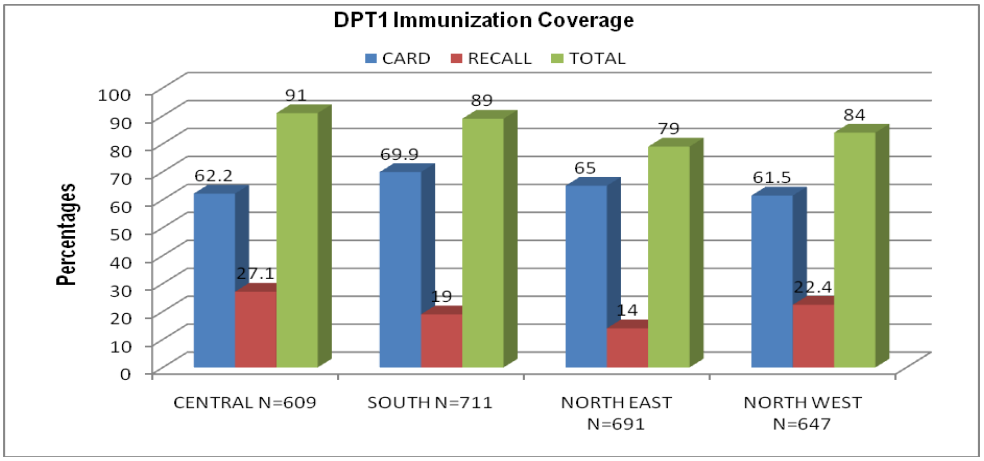


Figure 10: DPT1 immunization coverage for all the districts in Turkana

DPT 3 Immunization Coverage

Overall, DPT3 immunization coverage rates were relatively lower than those of DPT1. The highest coverage, after considering cases verified by both the card and recall, was Central with 81.0%, followed by North West (75.0%), South (73.0%) and lastly North East with (69.0%) In all the four districts, immunization coverage verified by card was more or less the same (Figure 11).

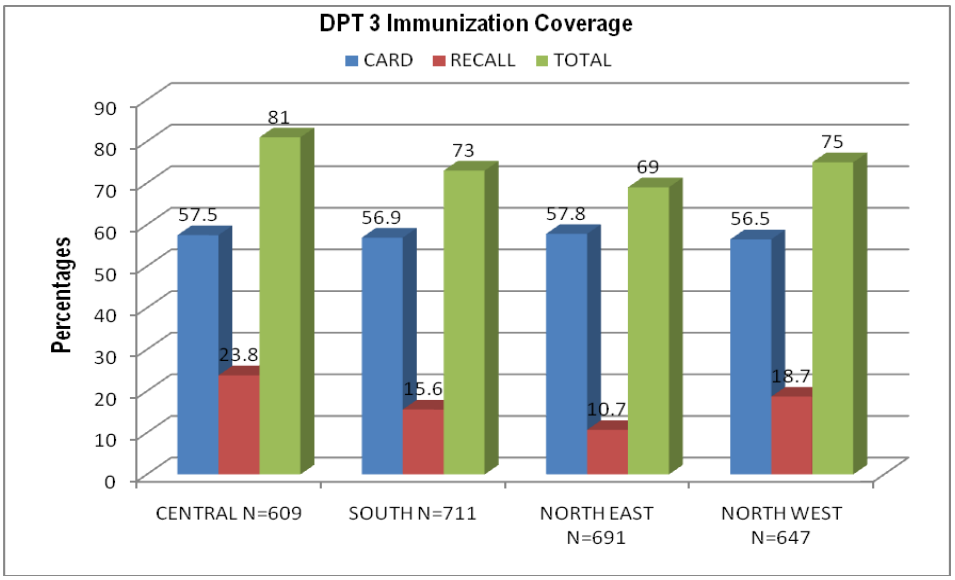


Figure 11: DPT3 immunization coverage for all the districts in Turkana

4.7.4 Measles Immunization Coverage for children 9-59 months of age

Based on both recall and those cases verified by card, high levels of measles immunization coverage rates were realized in all the survey sites. Coverage in Central was highest at 82.0%, followed by North West at 77.0%, South 75.0% and lastly North East 69.0% (Table 31).

Table 31 Measles Immunization Coverage (Children ≥9 months)

	Central N=542		South N=646		North East N=627		North West N=590	
	N	%	N	%	n	%	n	%
Card	315	58.1	383	59.3	361	57.6	328	55.6
Recall	129	23.8	104	16.1	72	11.5	124	21.0
Total	**444**	**82.0**	**487**	**75.0**	**433**	**69.0**	**452**	**77.0**
No	92	17.0	156	24.1	188	30.0	129	21.9
Don't Know	6	1.1	3	0.5	6	1.0	9	1.5

4.7.5 Fully Immunized (Children 12-23 months old)

Coverage for children 12-23 months old who were fully immunized varied across the four survey sites. North West registered the highest coverage at 78.0% followed by Central with 76.0%, South at 63.0% while North East had the lowest coverage (57.0%) of children 12-23 months who had been fully immunized (Figure 12)

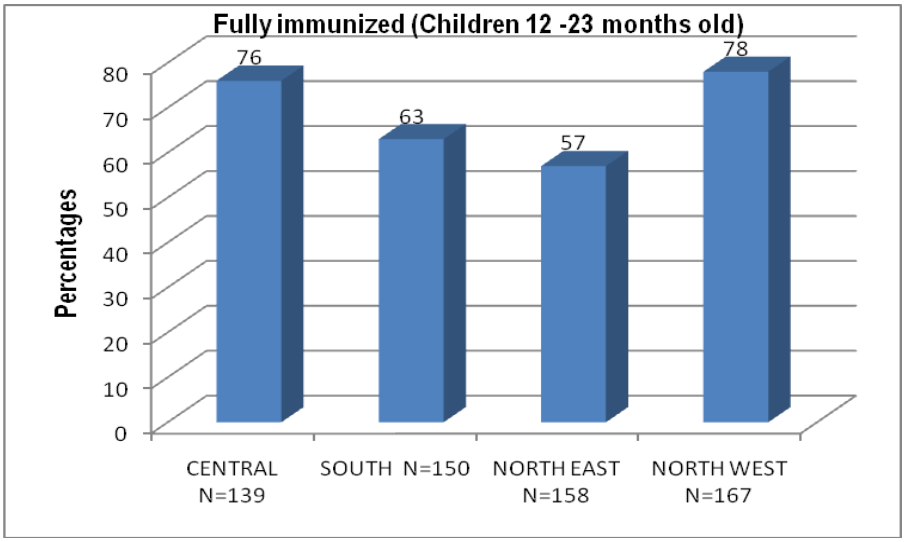


Figure 12: Fully immunized children 12-23 months old from all the districts in Turkana

4.8 Vitamin A Supplementation Coverage for children 6-59 months of age

Vitamin A supplementation coverage rates for children 6-59 months in the 6 months prior to the survey varied in the four survey sites. Overall, coverage was highest in North West with 77.0%, followed by Central at 61.0%. South and North East had very low coverage rates (below 50.0%), at 48.0% and 43.0% respectively (Figure 13).

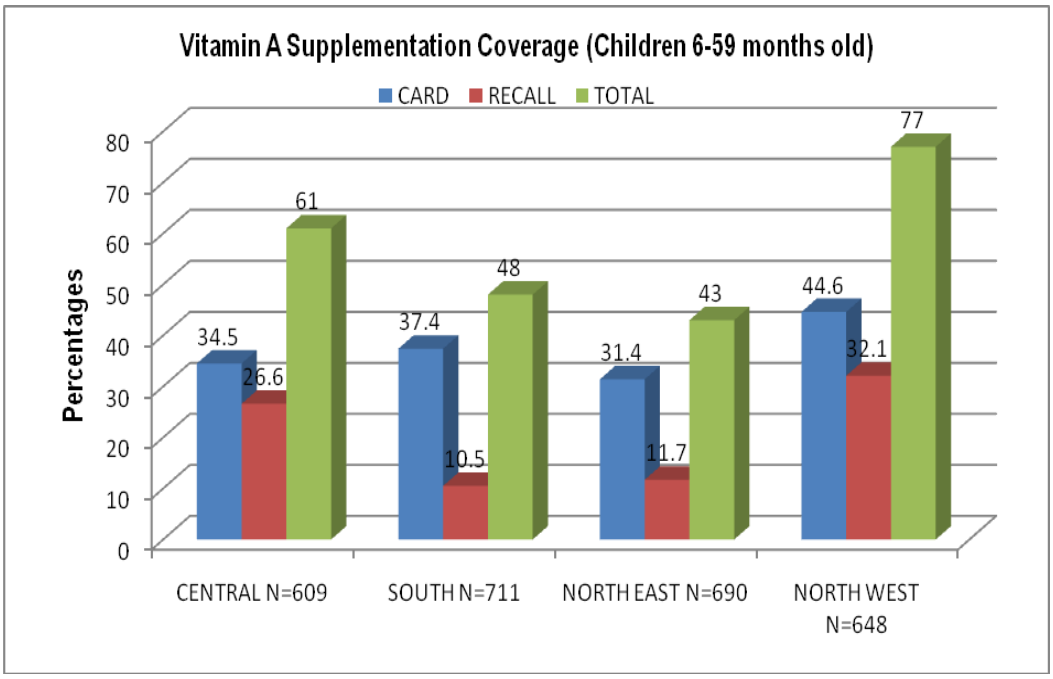


Figure 13: Vitamin A supplementation coverage for children 6-59 months old from all the districts in Turkana

4.9 De-worming of Children 24-59 months of age

De-worming coverage for children 24-59 months of age was established by asking mothers/caregivers whether their children had received de-worming tablets in the six months prior to the survey. De-worming coverage was low (40% and below) in three of the four districts surveyed, with South registering the lowest de-worming coverage at only 24.0%. North East had a coverage of 32.0% while Central was at 40.0%. North West had the highest coverage (65.0%) of children who had been de-wormed six months before the survey (Figure 14). Documentation of de-worming was poor; with three of the districts (Central, South and North West) having less

than 20.0% of those reported to have been de-wormed having cards to verify this. North West recorded the highest documentation of de-worming at 36.7%.

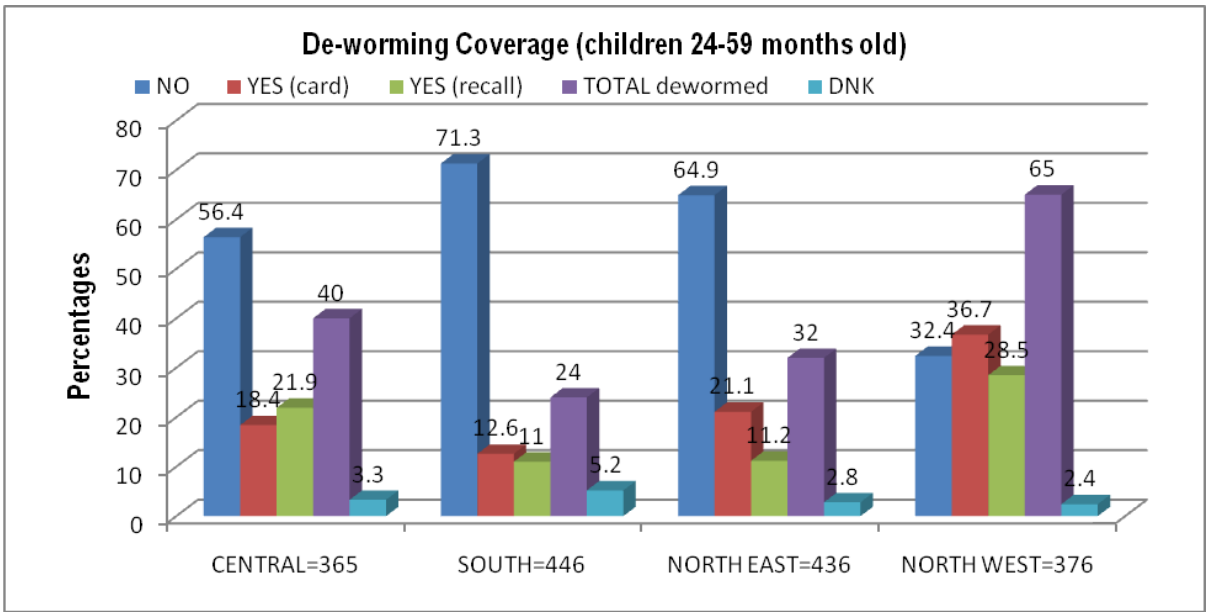


Figure 14: De-worming coverage of children 24-59 months of age from all the districts in Turkana

4.10 Infant and Young Children Feeding (IYCF) Practices

4.10.1 Breastfeeding Practices

Timing of initiation of breastfeeding

Respondents were asked whether their children were ever breastfed. In all the four districts surveyed, over 90.0% of children 0-23 months were initiated to breastfeeding, with South at 98.2%, Central 97.3%, North West 97.2% and North East 95.2%. However, less than 50% of the children 0-23 months had reportedly been initiated to breastfeeding within the WHO recommended 1 hour. North West had the highest percentage (49.3%) of children who had been breastfed within one hour of delivery, followed by Central at 48.6%, North East by 36.6% and lastly South by only 18.6% (Table 32).

Other breastfeeding practices

Majority of the children (80.0% and above) in all the survey sites had received colostrum. The South had the highest proportion (85.1%) of children who received colostrum and the lowest was North East at 80.3%. Less than half of the mothers in all the survey sites gave their children pre-lacteal feeds. The highest percentage of children given pre-lacteals were from South (48.7%), followed by 34.7% from Central, 33.4% from North East and lastly 24.9% from North West. The most common pre-lacteal feed given to children in Central was plain water (18.7%), while in South, sugar/glucose water was given to 23.7% of the children. In North East and North West, the most common pre-lacteal feed was powdered/animal milk to 13.6% and 8.6% of the children respectively (Table 32).

In all the survey sites, more than 85.0% of the children were still being breastfed at 1 year. The highest proportion of children being breastfed at 1 year was recorded in Central (97.6%) and the lowest was in North East at 88.5%. At 2 years only 66.7% in North West, 60.9% in North East, 58.3% in South and 56.6% in Central were receiving breastmilk (Table 32). This finding implies that overall for about one-third of the children aged 2 years, breastfeeding had been stopped prematurely and thus were missing the health benefits of breastmilk. WHO recommends breastfeeding for 2 years or longer. Nonetheless, many of the children 0-23 months of age

were still breastfeeding; 87.8% from Central, 91.4% from South, 87.6% from North East and 89.7% from North West (Table 32)

Table 32: Breastfeeding practices

	Central		South		North East		North West	
	n	%	n	%	n	%	n	%
Giving of colostrum	335/410	81.7	338/397	85.1	350/436	80.3	388/465	83.4
Ever breastfed	395/406	96.1	391/398	97.0	414/435	93.2	456/469	96.2
Timely Initiation of breastfeeding (within 1hr)	192/395	48.6	73/391	18.7	155/423	36.6	226/456	49.3
Pre-lacteal feeding:								
YES	139/401	34.7	193/396	48.7	145/434	33.4	116/465	24.9
NO	259/401	64.6	202/396	51.0	289/434	66.6	349/465	75.1
Types of pre-lacteal feeds:								
Plain Water	75/401	18.7	39/396	9.8	43/434	9.9	34/465	7.3
Sugar/Glucose water	33/401	8.2	94/396	23.7	30/434	6.9	32/465	6.9
Powdered/animal milk	23/401	5.7	41/396	10.4	59/434	13.6	40/465	8.6
Continued breastfeeding at 1 year (12 – 15.9 months)	40/41	97.6	52/54	96.3	46/52	88.5	50/56	89.3
Continued breastfeeding at 2 years (20- 23.9 months)	30/53	56.6	28/48	58.3	39/64	60.9	32/48	66.7
Continued breastfeeding (0 - 23.9 months)	360/410	87.8	363/397	91.4	381/435	87.6	418/466	89.7

Exclusive breastfeeding

Exclusive breastfeeding rates were analyzed for infants below 6 months. The rate of exclusive breastfeeding for children less than 6 months varied across the four districts. North West registered the highest rate (68.6%) followed by North East at 53.1%, Central 47.0% and lastly South with 45.6% having been exclusively breastfeed based on a 24-hour recall (Figure 15). These findings show a much higher rate of exclusive breastfeeding compared to the national rate of 32.0%[12].

[12] Kenya Demographic and Health Survey (KDHS) 2008-09

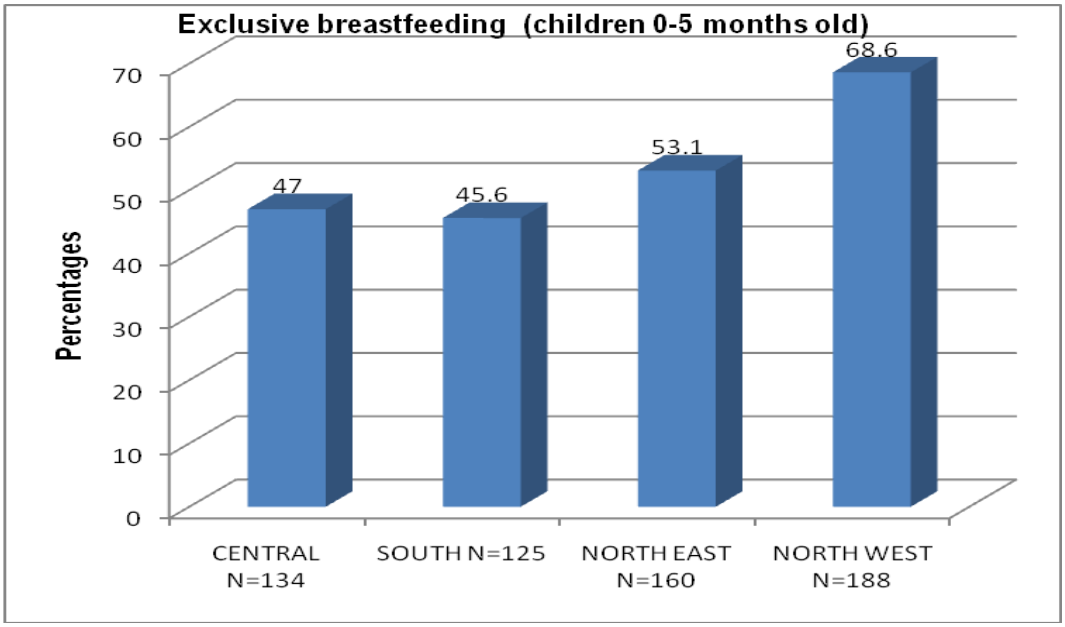


Figure 15: Exclusive breastfeeding rate of children 0-5 months old from all the four districts in Turkana

4.10.2 Complementary Feeding Practices

Complementary feeding rate

Complementary feeding rate is calculated based on the number of infants 6-8.9 months of age who received solid, semi-solid or soft foods the day preceding the interview (as the numerator) and all infants of the same age as the denominator. The proportion of infants who received these foods was highest in North West (76.1%) followed by Central at 72.3%. South and North East had complementary feeding rates of less than one-third; 56.9% and 52.5% respectively (Table 33). These findings indicate that a large number of infants (over 40%) in South and North East and over 20% in both Central and North West had not been introduced to complementary feeding as per the WHO recommendations.

Minimum dietary diversity of complementary foods

Minimum dietary diversity is considered to be consumption of foods from ≥4 food groups out of 7 food groups. The dietary diversity indicator is based on the premise that the more diverse the diets are the more likely they are to provide adequate levels of a range of nutrients. There is considerable evidence for this idea[13]. For this indicator, each of the groups is scored "1" if the child had the food group yesterday, and "0" if not. This results in a diversity score ranging from 0 to 7 for each child. Higher scores correspond to a more adequate range of food groups in the diet.

The minimum dietary diversity was analyzed for children 6-23.9 months of age. The findings showed that less than 20.0% of the children from all the survey sites attained the minimum dietary diversity. Central had the highest percentage (14.1%) of children 6-23.9 months of age having received food from at least 4 food groups, followed by North West at 9.3%, South at 8.0% and the least was North East at only 6.8% (Table 33). These findings imply that for majority of the children, the meals did not have an adequate range of food groups and were thus likely to be limited in the diversity of nutrients received. Additionally, a number of children 6-23 months

[13] Ruel M. T. (2002): *Is dietary diversity an indicator of poor food security or diversity quality? A review of measurement issues and research needs.* Food Consumption and Nutrition Division, International Food Policy Research Institute (IFPRI). FCND Discussion Paper NO. 140.

of age did not eat any complementary food the day prior to the survey. North East had the highest percentage (29.1%) followed by South (23.5%), Central (19.9%) and North West with (19.8%) of the children not having eaten any such foods. It is recommended that complementary foods be introduced at 6 months as breast milk is not adequate to provide all the necessary nutrients in the required quantities from this age onwards.

Minimum meal frequency

The minimum meal frequency indicators are based on the breastfeeding status of the children. The minimum meal frequency indicator is 2 times per day inclusive of snacks for the breastfed children 6-8.9 months of age. The proportion of breastfed children 6-8.9 months of age who ate ≥2 meals was below 40% in all the districts. The highest proportion of children who attained the minimum meal frequency was from North West (39.5%) and Central (38.7%) whereas 22.3% from South and 20.7% from North East attained the minimum meal frequency. The indicator for the minimum meal frequency for breastfed children 9-23.9 months of age is 3 times per day inclusive of snacks. Less than one-third of the children in all the districts attained the recommended minimum meal frequency. North East had the highest percentage of children who attained the minimum meal frequency (24.1%) followed by Central (23.8%), South (23.0%) and lastly North West (16.0%) [Table 33]. These findings suggest that many children are not getting the appropriate quantity of nutrients for adequate growth and healthy development.

Table 33: Complementary feeding practices

Complementary Feeding Practices	**Central**		**South**		**North East**		**North West**	
	n	%	n	%	n	%	n	%
Complementary Feeding rate: Proportion of infants 6-8.9 months who received complementary feeding	47/65	(72.3)	37/65	(56.9)	31/59	(52.5)	35/46	(76.1)
Minimum dietary diversity: Children 6-23.9 months of age who received ≥4 food groups	34/241	(14.1)	20/251	(8.0)	17/251	(6.8)	24/257	(9.3%)
Minimum meal frequency: Breastfed children 6-8.9 months who received complementary foods ≥2 times	24/62	(38.7)	14/62	(22.3)	12/58	(20.7)	17/43	(39.5)
Breastfed children 9-23.9 months who received complementary foods a ≥3 times	35/147	(23.8)	37/161	(23.0)	24/150	(16.0)	41/170	(24.1)

4.11 Maternal Nutritional Status

4.11.1 Malnutrition among pregnant and lactating women

MUAC was used to determine the level of under nutrition among pregnant and lactating women using the SPHERE 2004 guidelines[14]. Overall, the magnitude of under nutrition among pregnant and lactating women was high. North East had the highest proportion of undernourished pregnant and lactating women (46.7%) with 8.0% of them being severely undernourished. Central recorded the second highest rate at 43.4% with 8.2% being severely undernourished. In North West about two fifths (41.1%) of the women were undernourished and 7.3% severely undernourished. The lowest rate of undernourishment was observed in the South (39.5%) of whom 8.6% were severely undernourished (Table 34).

[14] Sphere Handbook 2004 revised edition

4.11.2 Malnutrition among non-pregnant and non- lactating women

On the whole, the magnitude of under nutrition among non-pregnant and non-lactating women was low in all the four districts compared to the pregnant and lactating women. The highest prevalence of under nutrition was observed in Central (15.0%), followed by North East (11.7%) and North West (11.3%). The lowest prevalence of under nutrition was recorded in the South at 7.8% (Table 34). The MUAC cut-off points were based on the Kenya National Guidelines[15].

Table 34: Nutritional Status for Women of reproductive age based on MUAC measurements

	Central		South		North East		North West	
Pregnant and Lactating Women	N=366		N=430		N=426		N=411	
	n	%	n	%	n	%	n	%
Severe under nutrition (<20.7 cm)	30	8.2	37	8.6	34	8.0	30	7.3
Moderate under nutrition (20.7 cm – 23 cm)	136	37.2	133	30.9	165	38.7	139	33.8
Total undernourished (<23 cm)	166	43.4	170	39.5	199	46.7	169	41.1
Non-pregnant and non-lactating women	N=113		N=90		N=111		N=124	
	n	%	n	%	n	%	n	%
Severe under nutrition (<18cm)	1	0.9	0	0.0	1	0.9	1	0.8
Moderate under nutrition (18-21cm)	16	14.2	7	7.8	12	10.8	13	10.5
Total undernourished (<21cm	17	15.0	7	7.8	13	11.7	14	11.3

4.12 Mosquito Bed Net Ownership and Utilization

Mosquito bed net ownership

As a whole, ownership of bed nets was low. South had the highest proportion of households (53.5%) owning bed nets followed by North West (48.1%), North East (46.8%) and lastly Central with 40.1% (Table 35). In Central, North East and North West, most of the bed nets were provided by MOH, while in the South, most bed nets were provided by partner agencies/Churches. In Central, 47.1% of the households reported having received bed nets from MOH, North East 43.5%, North West 37.0% and only 34.3% in the South. In contrast, in the South, 45.5% of the households received bed nets from an agency or Church, about the same proportion of households (36.3% and 36.1%) from North East and North West also received bed nets from the same source respectively. Fewer households reported having either purchased their bed nets or getting them from other sources (Table 35).

Table 35: Mosquito bed net ownership

	Central		South		North East		North West	
	n	%	n	%	n	%	n	%
Household that own mosquito bed net	270/673	40.1	384/718	53.5	333/711	46.8	338/702	48.1
Source of bed nets:								
• Shop	43/261	16.5	48/385	12.5	40/333	12.0	70/341	20.5
• Agency/church	77/261	29.5	175/385	45.5	121/333	36.3	123/341	36.1
• MOH	123/261	47.1	132/385	34.3	145/333	43.5	126/341	37.0
• Others	18/261	6.9	28/385	7.3	27/333	8.1	22/341	6.5

[15] Integrated Management of Acute Malnutrition. Ministry of Health – Government of Kenya. The Kenya National Guidelines – DRAFT. January 2008

Mosquito bed net utilization

To establish the utilization of the bednets, the respondents were asked to state the members of the household who used the bednet the night before the survey. In all the survey sites, the majority of those who used the bednets were mothers and children underfive years of age. In all the districts, children under five years of age had slept under the mosquito net in over three-quarters of the households. The highest percentage of bed net utilization by children under five years of age was in South (80.7%) followed by Central (78.0%), North East (76.3%) and North West (76.0%). A majority of the mothers (>80%) in all the districts reported having used the bed nets the night prior to the survey. The highest percentage of mothers (90.4%) was in North East followed by those from the South (84.0%) and almost equal percentages from North West (82.8%) and 82.0% from Central (Figure 16). Relatively fewer fathers used the bed nets the night before the survey. Of concern was the very low proportion of pregnant women who used bednets the night prior to the survey in all the districts.

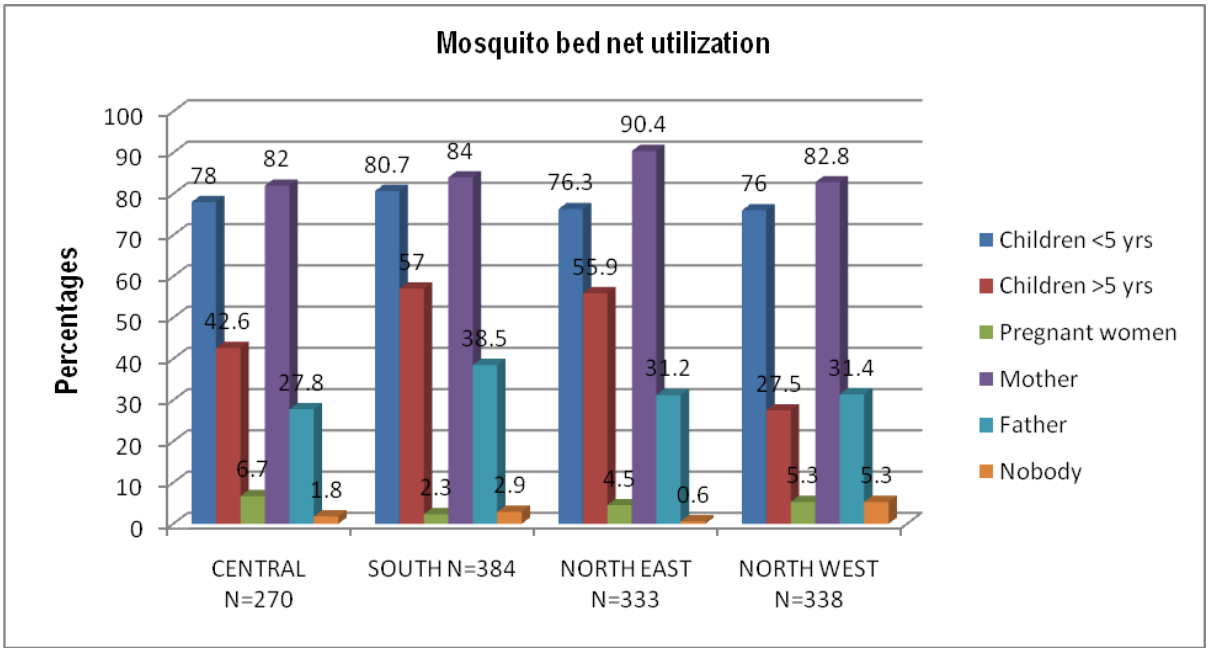


Figure 16: Mosquito bed net utilization from all the districts in Turkana

4.13 Household Water Consumption

4.13.1 Sources of Household Water

Respondents were asked to state their main source of water for household use. In Central, laga was the main source of household water for 23.8% of the households and for almost similar percentages of households (22.9% and 22.0%) borehole and unprotected well were the main sources of household water respectively (Table 36). In the South, unprotected well was the main source of water for household use for 42.8% of the households followed by borehole (30.7%) and water tap for 9.2% (Table 36). In North East, borehole was the main source of water for 32.8% of the households and unprotected well for 17.0% of the households. Water tap and river were main sources of water for household use for 16.8% of the households each. In North West, the river was the main source of household water for 27.2% of the households while the laga for 26.0%, water tap for 20.4% and borehole for 15.6% of the households surveyed (Table 36).

Table 36: Sources of household water

Main source of household water	Central N=686		South N=720		North East N=704		North West N=736	
	n	%	n	%	n	%	n	%
Laga	163	23.8	38	5.3	75	10.7	191	26.0
Borehole	157	22.9	221	30.7	231	32.8	115	15.6
Unprotected well	151	22.0	308	42.8	120	17.0	51	6.9
Water tap	67	9.8	66	9.2	118	16.8	150	20.4
River	66	9.6	53	7.4	118	16.8	200	27.2
Lake	44	6.4	0	0.0	14	2.0	1	0.1
Protected well	35	5.1	32	4.4	18	2.6	2	0.3
Public pan	1	0.1	1	0.1	2	0.3	15	2.0
Water tanks	1	0.1	1	0.1	0	0.0	0	0.0
Springs	1	0.1	0	0.0	1	0.1	5	0.7
Dam	0	0.0	0	0.0	7	1.0	3	0.4

4.13.2 Main sources of drinking water

Respondents were asked to state the main source of drinking water. The main source of drinking water varied from one district to another. In Central, the main sources of drinking water were the borehole for 23.8% the laga for 23.5% and unprotected well for 21.5% of the households. In the South, the unprotected well was the main source of drinking water for 42.6% of the households. This was followed by the borehole by 31.4% of the households. In North East, the borehole was the main source of drinking water for 32.7% followed by the river for 16.9% and the unprotected well for 16.5% of the households. In North West, the most common sources of drinking water were the laga (25.4%), river (25.0%), water tap (18.6%) and borehole for 16.1% of the households (Table 37).

Table 37: Sources of drinking water

Main source of drinking water:	**Central N=685**		**South N=719**		**North East N=703**		**North West N=735**	
	n	%	n	%	n	%	n	%
Borehole	163	23.8	226	31.4	230	32.7	118	16.1
Laga	161	23.5	36	5.0	74	10.5	187	25.4
Unprotected well	147	21.5	306	42.6	116	16.5	74	10.1
River	69	10.1	53	7.4	119	16.9	184	25.0
Water tap	69	10.1	66	9.2	121	17.2	137	18.6
Lake	40	5.8	1	0.1	13	1.8	0	0.0
Protected well	35	5.1	31	4.3	21	3.0	8	1.1
Water tanks	1	0.1	0.0	0.0	0	0.0	0	0.0
Public pan	0	0.0	0.0	0.0	2	0.3	13	1.8
Dam	0	0.0	0.0	0.0	7	1.0	3	0.4

4.13.3 Time taken to water source and amount of water used by households

The mean (sd) time taken to the water source and back varied across the four districts surveyed with Central at 45.3 minutes (sd 55.8), South 70.3 minutes (sd 85.3), North East 47.7 (sd 57.2) and North West 60.7minutes (sd 62.0) [Table 38]. There was not much difference in the amount of water used per household per day across the districts. The mean amount of water used by households in Central was 46.3 litres (sd 28.3), South 47.8 litres (sd 29.0), North East 48.4 litres (sd 38.0) and North West 47.1 litres (sd 23.6) (Table 38). The finding on the amount of water used per day is generally low indicating that scarcity of water is a major challenge in Turkana.

Table 38: Amount of time taken to water source and back and the amount of water (litres) used per day

	Central	South	North East	North West
Mean (sd) time taken (in minutes) to go to main water source and back	**N=686**	**N=715**	**N=701**	**N=737**
	45.3 (sd 55.8)	70.3 (sd 85.3)	47.7 (sd 57.2)	60.7 (sd 62.0)
Mean (sd) litres of water used by household per day	**N=682**	**N=704**	**N=699**	**N=729**
	46.3 (sd 28.3)	47.8 (sd 29.0)	48.4 (sd 38.0)	47.1(sd 23.6)

4.13.4 Treatment of drinking water

Overall, very few households (less than 20%), treated drinking water by either boiling or using chemicals. For those households that treated drinking water, the most common method in the four districts was boiling practiced by 17.0% of households in South, 8.8% in North East, 8.7% in Central and 4.5% in North West (Table 39). The treatment of drinking water needs to be encouraged particularly because of the unsafe sources of drinking water for the majority of the households.

Table 39: Treatment of drinking water

Treatment given to water before drinking	Central N=682		South N=716		North East N=690		North West N=711	
	n	%	n	%	n	%	n	%
Boiling	59	8.7	122	17.0	61	8.8	32	4.5
Use chemicals	10	1.5	55	7.7	31	4.5	6	0.8
Filters/sieves	9	1.3	0	0.0	1	0.1	2	0.3
Decant	5	0.7	0	0.0	1	0.1	8	1.1
Use of traditional herbs	0	0.0	21	2.9	0	0.0	0	0.0
Nothing	598	87.7	518	72.3	596	86.4	663	93.2

4.13.5 The cost of water

The majority of the households purchased water as it was required. The unit of measurement was the 20 litre jerry can. The cost of water was, on the average, between Kenya shillings (Kshs) 1 – 2 per 20 litre jerry-can in all the districts apart from South where the average cost of water was 3.4 (sd 6.6). For those households that paid water on a monthly basis, the cost varied across the districts. The households who paid the most for water was North East at a mean of Kshs 66.3 (sd 156.2), followed by Kshs 46.6 (sd 153.0), then Central Kshs 37.7 (sd 134.6) and the lowest cost was in South Kshs 31.2 (68.0) [Table 40].

Table 40: Cost of water

Cost of water	Central	South	North East	North West
Cost of water (Kshs) of per 20 litre jerry-can [mean(sd)]	**N=516**	**N=434**	**N=390**	**N=635**
	1.5 (sd 4.9)	3.4 (sd 6.6)	1.0 (sd 4.3)	1.7 (sd 4.1)
Cost of water (Kshs) per month [mean (sd)]	**N=396**	**N=269**	**N=543**	**N=366**
	37.7 (sd 134.6)	31.2 (sd 68.0)	66.3(sd 156.2)	46.6(sd 153.0)

4.14 Sanitation

4.14.1 Sanitation Practices by households in Turkana Central District

Access to toilet facilities in all survey sites was poor. In Central, only 14.8% of households had access to toilets or latrines. The most common type of toilet facility in Central was the traditional pit latrine (52.0%) followed by the ventilated improved pit latrine which was accessed by 45.1% of the households (Table 41). The majority (78.3%) of households with no access to toilet or latrine facilities defacaeted in the bush, followed by the open fields (11.0%) and 9.5% near rivers. Children's faeces was commonly disposed of in bush by 83.1% households, while only 12.6% disposed of children's faeces hygienically (Table 41). Over two-fifths of the respondents (41.6%) reported washing hands before eating or preparing a meal. In addition, 19.3% indicated that they washed their hands after attending to a child who had defecated while 18.6% washed their hands before feeding a child. Only 16.1% of the respondents reported washing hands after using the toilet and a further 3.9% after handling animals (Table 41). The relatively low level of respondents who reported washing their hands after defaceating is of concern because this is a dangerous source of contamination.

Table 41: Sanitation Practices by households in Turkana Central District

Sanitation practices	n	%
Households with access to toilets or latrines (N=702)	104	14.8
Type of toilet facilities for those with access to toilets or latrines(N=102)		
• Bucket	2	2.0
• Traditional pit latrine	53	52.0
• Ventilated improved pit latrine	46	45.1
Where households with no toilet or latrine facilities go to (N=600)		
• Bush	470	78.3
• Open field	66	11.0
• Near the river	57	9.5
How children's faeces is disposed of (N=596)		
• Immediately and hygienically	75	12.6
• Immediately to nearby bushes	495	83.1
• Not disposed (Scattered in compound)	20	3.4
• Use of dogs	3	0.5
• Other	3	0.5
Occasion when hands are washed (N=702)*		
• After using toilet	217	16.1
• After attending to child who had defecated	261	19.3
• Before feeding child	251	18.6
• Before eating or preparing a meal	562	41.6
• After handling animals	52	3.9
• Other	6	0.4

Multiple Responses

4.14.2 Sanitation Practices by households in Turkana South District

In the South, only 13.7% of the households had access to toilet or latrine facilities. The most common type of toilet facility was the ventilated improved pit latrine (51.6%) followed by the traditional pit latrine (45.3%) [Table 42]. Almost all (98.6%) the households with no access to toilet or latrine facilities defecated in the bush while others went to the open field (0.8%) and 0.5% went to near the rivers. About four-fifths of the households

(79.2%) indicated that children's faeces were disposed of in the bush. Only 9.9% of the households reported that they disposed of children's faeces hygienically (Table 42). About half of the respondents (48.6%) reportedly washed their hands before eating or preparing a meal while 17.8% washed their hands before feeding a child. In addition, 16.8% indicated that they washed their hands after attending to a child who had defecated and 13.0% of the respondents reported washing hands after using the toilet and a further 0.8% after handling animals (Table 42).

Table 42: Sanitation Practices by households in Turkana South District

Sanitation practices	**n**	**%**
Households with access to toilets or latrines (N=721)	99	13.7
Type of toilet facilities for those with access to toilets (N=95)		
• Bucket	1	1.1
• Traditional pit latrine	43	45.3
• Ventilated improved pit latrine	49	51.6
Where households with no toilet or latrine facilities go to (N=627)		
• Bush	618	98.6
• Open field	5	0.8
• Near the river	3	0.5
How children's faeces is disposed of (N=645)		
• Immediately and hygienically	64	9.9
• Immediately to nearby bushes	511	79.2
• Not disposed (Scattered in compound)	24	3.7
• Use of dogs	4	0.6
• Other	42	6.5
Occasion when hands are washed (N=721)*		
• After using toilet	168	13.0
• After attending to child who has defecated	218	16.8
• Before feeding child	231	17.8
• Before eating or preparing a meal	630	48.6
• After handling animals	11	0.8
• Other	39	3.0

Multiple Responses

4.14.3 Sanitation Practices by households in Turkana North East District

Of the four survey sites, Turkana North East district had the lowest (8.5%) percentage of households with access to toilet or latrine facilities. In North East, only 8.5% of the households had access to toilet facilities with most of them (55.2%) having access to ventilated improved pit latrine and 44.8% to the traditional pit latrine (Table 43). The most common place where households with no access to toilet facilities defecated was the bush (51.8%) followed by the river as reported by 28.0% of the households. About one-fifth (19.8%) of the households used the open field (Table 43). Majority of the households (85.9%) indicated that children's faeces were disposed of in the bush. Only 11.7% of the households disposed of children's faeces hygienically (Table 43). Slightly more than 40% of the respondents (43.9%) reported that they washed their hands before eating or preparing a meal. One-quarter (24.5%) of the respondents washed their hands after attending to a child who had defecated. In addition, 16.9% washed their hands before feeding a child while only 8.6% reported washing hands after using the toilet. A further 5.5% washed their hands after handling animals (Table 43).

Table 43: Sanitation Practices by households in Turkana North East District

Sanitation practices	n	%
Households with access to toilets or latrines (N=718)	61	8.5
Type of toilet facilities for those with access to toilets (N=58)		
• Bucket	0	0.0
• Traditional pit latrine	26	44.8
• Ventilated improved pit latrine	32	55.2
Where households with no toilet or latrine facilities go to (N=627)		
• Bush	342	51.8
• Open field	131	19.8
• Near the river	185	28.0
• Behind the house	2	0.3
How children's faeces is disposed of (N=690)		
• Immediately and hygienically	81	11.7
• Immediately to nearby bushes	593	85.9
• Not disposed (Scattered in compound)	7	1.0
• Use of dogs	8	1.2
• Other	1	0.1
Occasion when hands are washed (N=718)*		
• After using toilet	115	8.6
• After attending to child who has defecated	328	24.5
• Before feeding child	226	16.9
• Before eating or preparing a meal	589	43.9
• After handling animals	74	5.5
• Other	9	0.7

Multiple Responses

4.14.4 Sanitation Practices by households in Turkana North West District

In North West, only 15.1% of the households had access to toilet or latrine facilities. Of these, the majority (49.5%) indicated that they used the ventilated improved pit latrine while 47.6% used the traditional pit latrine (Table 44). Majority (88.9%) of the households with no access to toilet facilities relieved themselves in the bush. In addition, majority of the households (79.6%) indicated that children's faeces were disposed of in bush while only 14.8% of the households disposed of children's faeces hygienically (Table 44). About two-fifths of the respondents in North West (38.7%) reported that they washed their hands before eating or preparing a meal. Respondents who reportedly washed their hands after attending to a child who had defecated were 26.1%. Moreover, 19.8% washed their hands before feeding a child while 13.4% after using the toilet. Only 1.5% washed their hands after handling animals (Table 44).

Table 44: Sanitation Practices by households in Turkana North West District

Sanitation practices	n	%
Households with access to toilets or latrines (N=716)	108	15.1
Type of toilet facilities for those with access to toilets (N=103)		
• Bucket	3	2.9
• Traditional pit latrine	49	47.6
• Ventilated improved pit latrine	51	49.5
Where households with no toilet or latrine facilities go to (N=611)		
• Bush	543	88.9
• Open field	23	3.8
• Near the river	33	5.4
• Other	12	2.0
How children's faeces is disposed of (N=633)		
• Immediately and hygienically	94	14.8
• Immediately to nearby bushes	504	79.6
• Not disposed (Scattered in compound)	12	1.9
• Use of dogs	13	2.1
• Other	10	1.6
Occasion when hands are washed (N=716)*		
• After using the toilet	202	13.4
• After attending to child who has defecated	392	26.1
• Before feeding child	297	19.8
• Before eating or preparing a meal	582	38.7
• After handling animals	23	1.5
• Other	7	0.5

Multiple Responses

4.15 Household Food Security

4.15.1 Food Aid

Findings from the survey showed differences in the percentage of households that received food aid across the four survey sites in the three months before the survey. The highest percentage of households that received food aid was in North East (51.3%) followed by South with 46.1%, North West (35.9%) and lastly Central with 27.5% (Table 45).

Table 45: Households that received food aid in the three months prior to the survey

	Central N=663		**South 711**		**North East 711**		**North West N=727**	
	n	%	n	%	n	%	n	%
Received	182	27.5	328	46.1	365	51.3	261	35.9
Did not receive	481	72.5	382	57.3	346	48.0	465	64.0

Of those who received food aid, majority received it once in the three months prior to the survey, with North East registering the highest (63.4%) percentage of households, followed by Central with 60.7%, South with 47.8% and

lastly North West with 33.6% (Figure 17). Less than a third of the households reported receiving food aid twice during the same period. The highest percentage of households who received twice were from Central (28.2%) followed by North East (24.9%), South (21.4%) and lastly North West at 19.3%. The highest percentage of households that received thrice were in North West with 47.1% followed by South at 30.8%, North East (11.7%) and lastly Central with 10.4%. (Figure 17)

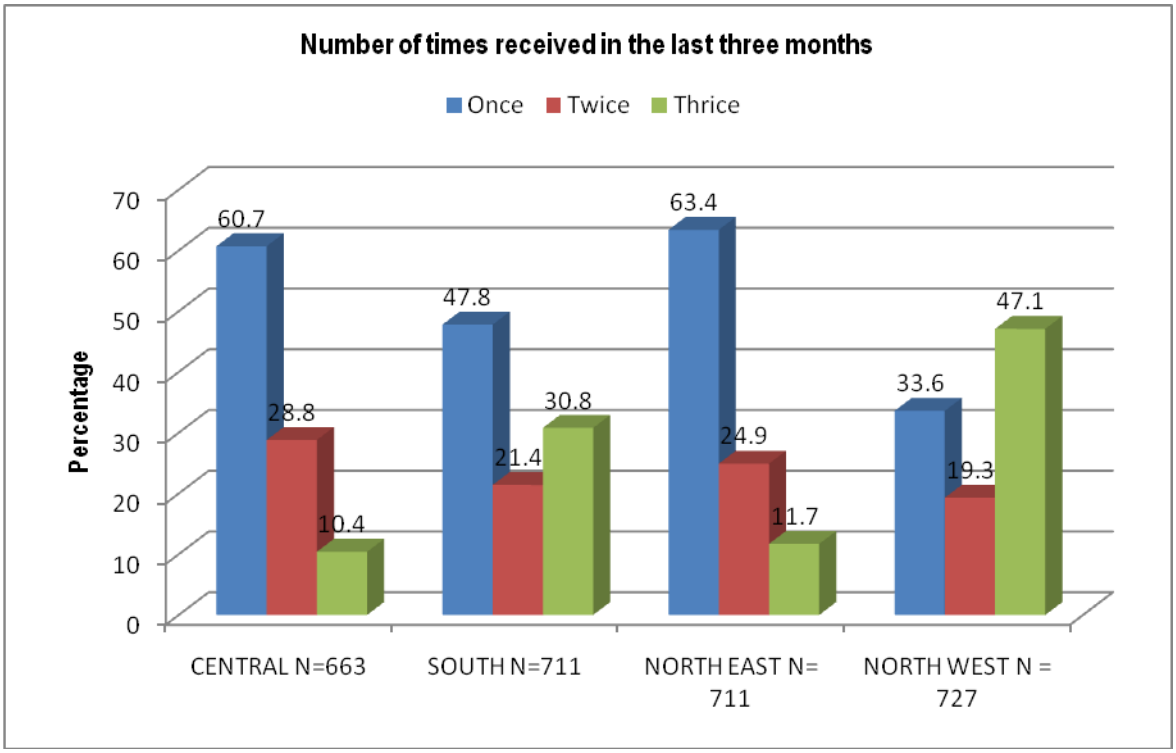


Figure 17:Number of times food aid received in the last three months

4.15.2 Food aid received and their utilization

About one-quarter of all the households in the all the districts received cereals (mainly in the form of maize grain or maize flour). The majority (over 90.0%) of the households consumed the cereals. This was followed by over two-thirds of households who shared the food with the highest percentage from North East (92.9%) followed by North West at 81.6%, then Central at 69.4% and South 64.8% (Table 46). On the whole, the cereals lasted for less than half the time (month) that it was meant to. The same scenario in the percentage of households that received the rest of the food commodities (CSB, pulses and oil), how they were utilized and the duration they lasted was observed. About one quarter of the households received CSB and over 90.0% consumed the food. The second most common way in which the food was utilised was sharing which varied across the districts. The highest percentage of households that shared CSB was reported in North East (88.0%) followed by North West at 82.0%. In Central 58.9% of the households shared CSB and lastly South at 48.6%. On the whole, CSB lasted on average 10 days, a third of the time it was meant to last. Similarly, about one-quarter of the households reported receiving pulses with over 90.0% consuming the commodity. Over 80.0% of the households in North East and North West shared the commodity whereas smaller percentages 63.1% and 62.8% in Central and South shared the commodity respectively. On the whole, pulses lasted for less than one-third of the period it was meant to last. Overall, about one-quarter of the households received oil and over 90.0% of the households in all the districts consumed the food item. As in the case of the other food items over 80.0% of the households in North East and North West shared the food item and fewer households in Central (61.9%) and South (55.4%) shared the food item. Again the food item lasted for less than one-third the time it was meant to last (Table 46).

The overall picture is that although the majority of the households consumed the food items provided in the food basket many households also shared the food with households that were not targeted. This finding is in agreement with those of the GFDs in which the respondents reported that they shared the food because in their opinion many needy households were not targeted. Consequently, this leads to less impact of the food aid in reducing the food insecurity of the targeted households.

Table 46: Foods received and their Utilisation

Foods received and their utilization	Central		South		North East		North West	
	n	%	n	%	n	%	n	%
CEREALS								
Households that received	196	27.0	287	25.2	337	24.7	190	23.1
Households that resold	4	2.0	3	1.0	8	2.4	9	4.7
Households that bartered	18	9.2	27	9.4	62	18.4	7	3.7
Households that shared	136	69.4	186	64.8	313	92.9	155	81.6
Households that consumed	181	92.3	285	99.3	335	99.4	182	95.8
Mean number of days lasted	14.5	(sd 9.5)	13.3	(sd 7.9)	18.0	(sd 6.8)	17.5	(sd 8.2)
CORN SOYA BLEND (CSB)								
Households that received	168	23.2	292	25.7	333	24.4	225	27.3
Households that resold	1	0.6	1	0.3	0	0.0	3	1.3
Households that bartered	6	3.6	8	2.7	6	1.8	3	1.3
Households that shared	99	58.9	142	48.6	293	88.0	185	82.2
Households that consumed	158	94.0	282	96.6	333	100.0	203	90.2
Mean number of days lasted	7.7	(sd 7.6)	6.9	(sd 6.1)	10.0	(sd 5.2)	12.8	(sd 7.4)
PULSES								
Households that received	179	24.7	274	24.1	336	24.6	150	18.2
Households that resold	0	0.0	1	0.4	0	0.0	1	0.7
Households that bartered	8	4.5	11	4.0	8	2.4	5	3.3
Households that shared	113	63.1	172	62.8	299	89.0	125	83.3
Households that consumed	166	92.7	270	98.5	335	99.7	145	96.7
Mean number of days lasted	8.5	(sd 7.4)	7.3	(sd 5.6)	12.2	(sd 5.7)	11.8	(sd 7.8)
OIL								
Households that received	181	25.0	285	25.0	360	26.4	255	31.0
Households that resold	0	0.0	2	0.7	0	0.0	3	1.2
Households that bartered	6	3.3	8	2.8	4	1.1	5	2.0
Households that shared	112	61.9	158	55.4	313	86.9	204	80.0
Households that consumed	169	93.4	283	99.3	359	99.7	234	91.8
Mean number of days lasted	8.2	(sd 6.7)	7.0	(sd 5.4)	10.3	(5.6)	13.0	(sd 7.8)

4.15.3 Frequency of meal Consumption

Frequency of meal consumption by households in Turkana Central District

The respondents were asked how many meals the household members usually ate per day and how many meals they ate the day before the survey. This was in order to get an indication of the household food security situation at the time of the survey. In Central, 17.4% of the households reported that they normally took one meal per day, 45.2% reported taking two meals while those who took three meals were 35.2%. Very few households (0.1%) indicated that they normally took no meals, while 0.3% in each case indicated that they took five and six meals per day (Figure 18). The distribution of the number of meals taken the day preceding the survey showed that there was a significant increase in the proportion of households who took one meal from less than 17.4% to 42.7%. There was no significant difference in the proportion of households that took two meals the day preceding

the survey (44.9%) compared to the 45.2% who usually took two meals per day (Figure 18). Households that normally took three meals per day also decreased to 11.1% from 35.2%. These findings indicate a worsening food security situation. The timing of the worsening of the food security situation cannot be stated because this information was not solicited during the survey.

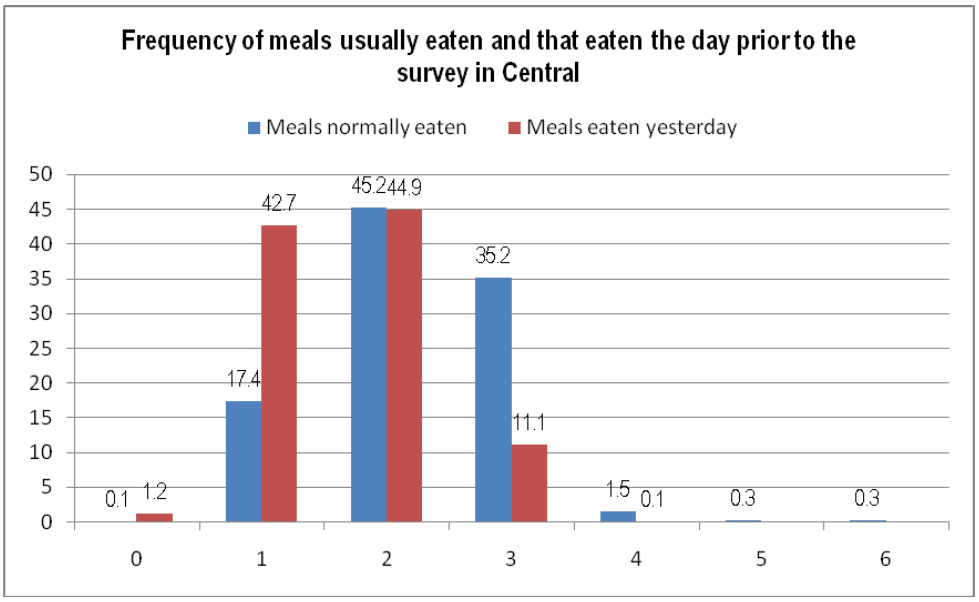


Figure 18: Frequency of meals usually eaten and that eaten the day prior to the survey in Central

Frequency of meal consumption by households in Turkana South District

In South, 19.8% of the households reported that they usually took one meal per day. About two-fifths (41.6%) usually took two meals and 37.2% took three meals. Very few households took four or five meals (0.9% and 0.1% respectively) [Figure 19].The distribution of the number of meals taken the day preceding the survey showed a marked increase in those who took one meal (37.7%) compared to those who normally took one meal. The proportion of households that reportedly took two meals the day before the survey was higher (45.0%) compared to those who normally took two meals (Figure 19). There was also a significant decrease, by almost half, of those who ate three meals the day preceding the survey compared to those who normally ate three meals (Figure 19). As a whole, the findings indicate a deteriorating food security situation in the households at the time of the survey compared to normal times.

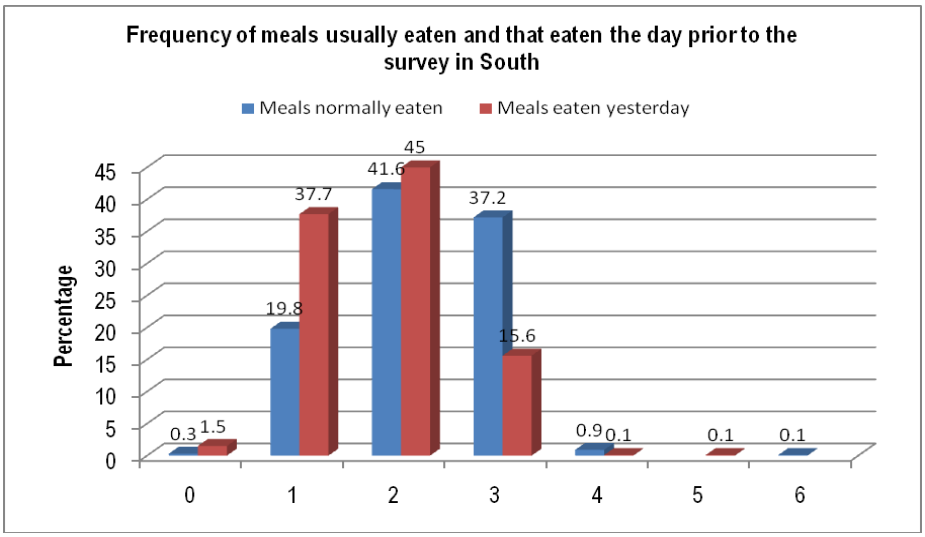


Figure 19: Frequency of meals usually eaten and that eaten the day prior to the survey in South

Frequency of meal consumption by households in Turkana North East District

In North East, 29.8% of the households reported that they usually took one meal per day, 32.1% two meals per day while those who took three meals were 36.0% (Figure 20). A few households (1.9%) indicated that they normally took four meals. On the day preceding the survey, the proportion of households that took three meals was much lower (6.9%) than those who usually took three meals. There was also a significant increase in those that took one meal (54.0%) on the day prior to the survey compared to those who usually take one meal (Figure 20). These findings imply a decreased food security status of the households at the time of the survey compared to normal times.

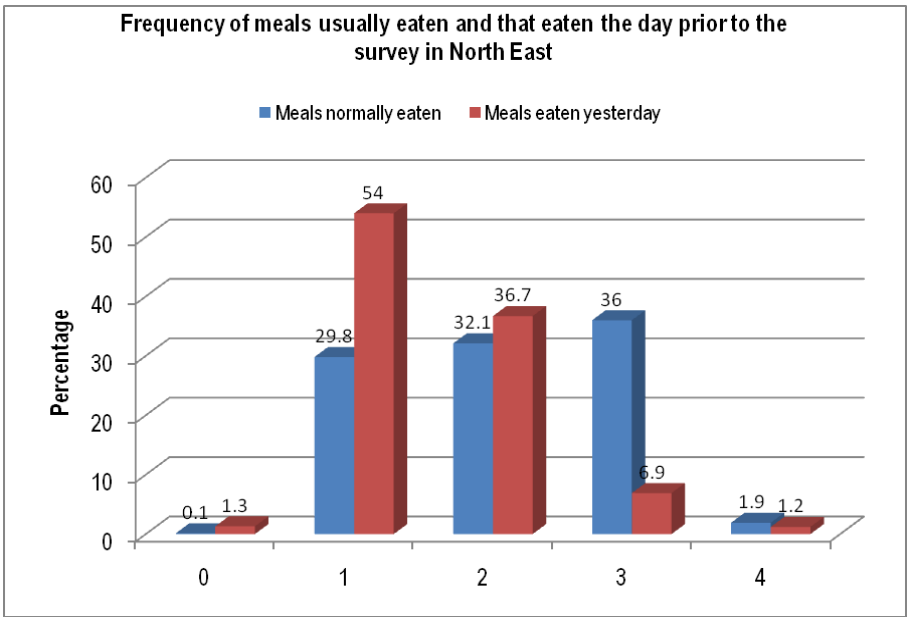


Figure 20: Frequency of meals usually eaten and that eaten the day prior to the survey in North East

Frequency of meal consumption by households in Turkana North West District

In North West, 32.7% of the households reported that they normally took one meal per day, 40.0% took two meals and 25.1% three meals per day (Figure 21). Those who normally ate four meals per day were 2.0% while those who took either no meal or six meals per day were 0.1%. On the day preceding the survey, the proportion of households that took one meal was 33.3%, those that took two meals was 41.7% and three meals 19.8% showing more or less a similar frequency of meal consumption normally and during the day preceding the survey (Figure 21). These findings indicate that the food security status of the households had not changed in recent times.

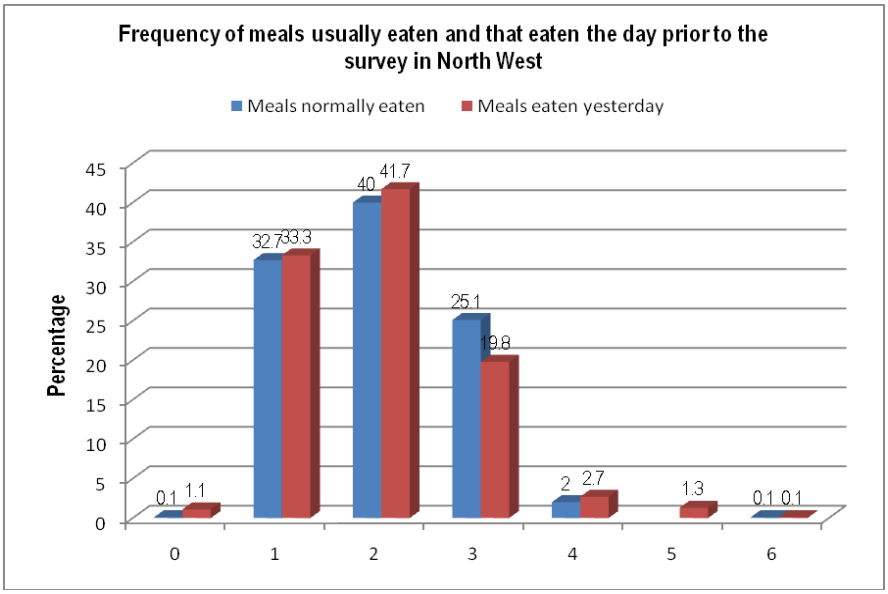


Figure 21: Frequency of meals usually eaten and that eaten the day prior to the survey in North West

4.15.4 Household members who missed meals the day prior to the survey and reasons for missing meals in all the districts

Table 47: Household members who missed meals the day prior to survey and reasons for missing meals

	Central N=666		South N=709		North East N=675		North West N=672	
	n	%	n	%	n	%	n	%
Households where some members missed meals	66	9.9	160	22.6	101	15.0	66	9.8
Members who missed meals:								
• Children under five years	9	13.4	44	26.5	10	10.4	14	20.6
• Children 5-12 years	5	7.5	21	12.7	10	10.4	4	5.9
• 13-19 years	10	14.9	10	6.0	10	10.4	2	2.9
• Mother	19	28.4	25	15.1	50	52.1	19	27.9
• Father	20	29.9	50	30.1	11	11.5	11	16.2
• Above 19 years	4	6.0	8	4.8	3	3.1	16	23.5
Reasons for missing meals:								
• Food not enough	27	42.2	66	46.2	76	79.2	40	71.4
• Sickness	4	6.3	8	5.6	4	4.2	5	8.9
• Away from home	25	39.1	37	25.9	6	6.3	5	8.9
• Other	7	10.9	26	18.2	10	10.4	6	10.7

Overall, South had the highest percentage (22.6%) of households where some members missed meals the day before the survey. This was followed by North East (15.0%), Central (9.9%) and lastly North West (9.8%) [Table 47]. In both Central and South, majority of those who missed meals were the fathers (29.9% and 30.1% respectively) while in the North East and North West majority of the households (52.1% and 27.9% respectively) indicated that the mother was the one who missed meals. Across the four districts, South recorded the highest percentage (26.5%) of children under five years who missed meals the day before the survey. This was followed by North West (20.6%), Central (13.4%) and lastly North East with 10.4%. In all the four districts, majority of the household members missed meals because food was not enough. The highest percentage was recorded in North East (79.2%), followed by North West (71.4%), South with 46.2% and lastly, Central at 42.2%. Some

household members missed meals because they were away from home. This was the case in 39.1% of households in Central, 25.9% in South, 8.9% in North West and 6.3% in North East. Household members who missed meals due to sickness were less than 10% in all the four districts surveyed (Table 47).

4.15.5 Household Dietary Diversity

Household Dietary Diversity

A 24-hour dietary diversity score was calculated to determine the households' economic capacity to consume various foods. On the whole, the 24-hour dietary diversity scores for all the survey sites were low. Central registered the highest score 4.8(sd 2.4) followed by North West with 4.2 (sd 2.1), South 3.8 (sd 2.0) and lastly North East 2.9 (sd 1.4) [Table 48]. These findings indicate that households from Central, South and North West consumed foods from just about one quarter of the 15 food groups, while those in North East consumed less than this, thus implying a limited diversity in their nutrient intake.

Table 48: Household dietary diversity score based on a 24-hour recall

	Central **N=688** Mean (sd)	**South** **N=753** Mean (sd)	**North East** **N=704** Mean (sd)	**North West** **N=721** Mean (sd)
24-hour diversity score	4.8 (2.4)	3.8 (2.0)	2.9 (1.4)	4.2 (2.1)

4.15.6 Variety of foods consumed

Based on 24-hour recall, as is expected, cereals and cereal products were consumed by the majority of the households across the four survey sites. The highest percentage of households consuming cereals and cereal products were from South (96.4%) followed by Central (92.9%), North West (92.6%) and lastly North East (90.4%) [Table 49]. Oils and fats were the second most commonly consumed foods in all the four districts with the highest percentage recorded in North West (74.2%), followed by Central with 70.4%, South (65.6%) and finally North East (56.5%) [Table 49]

Milk and milk products were consumed by more households in Central (58.4%) than in any of the other three districts. In North West, milk and milk products were consumed by 42.9% of the households while in South, 39.6% of the households. North East had the lowest percentage of households (33.7%) that had consumed milk the day prior to the survey (Table 49)

On the whole, consumption of dark green leafy vegetables was low and varied across the districts. In Central close to half of the households (48.7%), reported consumption of the vegetables while in North West 35.5% of the households consumed the vegetables. In South, dark green leafy vegetables were consumed by 25.4% of the households while only 5.7% indicated consumption in North East (Table 49). Organ meats and flesh meats were consumed by relatively low proportion of households despite the fact that pastoralism is the main livelihood for the majority of the people. Other food groups were consumed by less than 10% of the households (Table 49).

In summary, the most frequently consumed foods, with the exception of sugar, are those provided in the general food ration, implying that these foods form the diet for the majority of the households. The findings also reveal that most households ate foods from a limited variety of food groups. These findings concur with the findings showing a limited dietary diversity score. It is evident from these findings that the consumption of vitamin A-rich foods and animal proteins (eggs and organ meat), in particular, is limited. Flesh meat and milk and milk products were consumed by relatively low proportion of the households considering that pastoralism is the main livelihood of the people. The relatively low consumption of dark green vegetables may be partly explained by the fact that Turkana is drought-prone and because of poor infrastructure vegetables from *down country* cannot be easily transported to many areas. This could be the reason why North West recorded the least consumption of these vegetables.

Table 49: Foods consumed by households based on a 24-hour recall

Food groups	Central N=686		South N=750		North East N=685		North West N=718	
	n	%	n	%	n	%	n	%
Cereals and cereal products	639	92.9	726	96.4	633	90.4	666	92.6
Oils and fats	481	70.4	493	65.6	392	56.5	533	74.2
Milk and milk products	400	58.4	297	39.6	230	33.7	308	42.9
Dark green leafy vegetables	335	48.7	191	25.4	39	5.7	255	35.5
Sweets, sugar, honey, soda	313	46.0	329	43.8	161	23.6	342	47.8
Pulses and legumes	302	44.2	350	46.6	327	47.0	318	44.4
Vitamin A rich fruits	201	29.3	71	9.5	27	3.9	122	17.0
Other vegetables	152	22.4	132	17.6	17	2.5	135	18.9
Other fruits	123	18.1	108	14.4	9	1.3	27	3.8
Organ meats	120	17.5	34	4.5	35	5.1	80	11.1
Flesh meats and offal	102	14.9	37	4.9	67	9.8	99	13.8
White tubers and roots	47	6.9	25	3.3	21	3.1	21	2.9
Fish	40	5.9	24	3.2	67	9.8	41	5.7
Vitamin A rich vegetables and tubers	40	5.8	33	4.4	8	1.2	31	4.3
Eggs	15	2.2	12	1.6	10	1.5	21	2.9

4.16 Coping Strategies

Respondents were asked to state the coping strategies that their households had employed in the month prior to the survey. The findings showed that a number of strategies were used by the households (Table 50). Many households reported reduction in the number of meals consumed per day as a strategy commonly used; in Central, South and North East, over 90% of the households (98.1%, 96.9% and 91.1% respectively) indicated that they employed this strategy while 83.2% employed this strategy in North West (Table 50). Reducing the size of meals was another common strategy.. This was practiced by 98.1% of the households in Central, 96.0% in South and 91.1% in North East. Reducing the size of meals was the most common strategy employed by 83.6% of the households in North West. Another coping strategy used by the households was skipping meals for an entire day. The highest proportion of households that reported using this strategy was from South at 94.6% followed by Central with 82.4%, North East (82.2%) and North West 73.3%. Other households restricted consumption for adults to allow more for children as a strategy. This was employed by 78.8% of the households in North East, 78.2% in South, 77.4% in Central and 59.7% of the households in North West (Table 50).Being that the mainstay of the community is pastoralism, many of the households did not sell their livestock as a coping strategy. The sale of milk, meat and fish; and the consumption of decomposed fish were practiced by relatively fewer households in all the four districts (Table 50).

Table 50: Coping strategies employed during food shortage

Coping Strategies	Central District N=686		South District N=717		North East N=690		North West N=719	
	n	%	n	%	n	%	n	%
Reduction of no of meals per day	673	98.1	694	96.9	628	91.1	598	83.2
Reduce size of meals	652	95.0	707	98.6	585	84.8	601	83.6
Skip meals for an entire day	565	82.4	678	94.6	567	82.2	527	73.3
Restrict consumption for adults to allow more for children	527	77.4	561	78.2	544	78.8	429	59.7
Shift to less preferred food	524	76.4	528	73.7	359	52.1	467	65.1
Borrow Food	517	75.4	633	88.3	524	75.9	509	70.8
Consume wild foods	442	64.5	409	57.0	287	41.6	273	38.0
Purchase food on credit	430	62.6	341	47.6	345	50.0	206	28.7
Send child/children to school	323	47.4	513	71.6	465	67.5	346	48.1
Hunting and gathering	321	46.9	414	57.7	283	41.0	171	23.8
Send household members to eat elsewhere	307	44.8	285	39.8	340	49.3	287	39.0
Sale of charcoal/firewood	301	43.9	306	42.7	255	37.0	265	36.9
Sale of livestock	249	36.4	223	31.1	263	38.1	151	21.0
Donation	233	34.7	237	33.1	214	32.4	102	14.7
Part of family migrating with animals to look for pasture	159	23.3	164	22.9	228	33.0	123	17.2
Begging	156	22.8	106	14.8	256	37.1	175	24.3
Engaging in Casual labour	149	21.7	330	46.0	281	40.8	212	29.5
Sale of milk, meat, fish	60	8.3	72	10.1	169	24.5	31	4.3
Consumed decomposed fish	45	6.6	29	4.0	74	10.7	21	2.9

4.17 Mortality

Mortality measurements and indices

The *crude death rate* (CDR) is defined as the number of people in the total population who die over a specified period of time. It is calculated using the following formula:

$$\text{CDR} = \frac{\frac{\text{Number of deaths}}{\text{Total population}}}{10,000} \times \text{Time Interval} = \text{Deaths/10,000 people/day}$$

In the formula, total population is the population present at the midpoint of the time interval. The time interval is the length of time within which the respondents are asked to state if any deaths have occurred; this is usually referred to as the "recall period." The units for the formula are deaths per 10,000 per day when the "time interval" is expressed in days. In this survey the "recall period" was 90 days as recommended for use in developing countries.

The same formula was used for calculating the Under five Death Rate (U5DR).

Crude Death Rate

The crude death rates (CDR) for all the districts were within acceptable levels (<2 deaths/10,000 people/day) as per the SPHERE Standards 2004. The highest crude death rate was observed in North East at 1.08 (95%CI: 0.77-1.51) deaths/10,000/day and the lowest was in North West at 0.43 (95%CI: 0.15-1.25) [Table 51].

Underfive Death Rate

The underfive death rates (U5DR) for all the districts were within acceptable levels (<4 deaths/10,000 people/day) as per the SPHERE Standards 2004. The highest rate of U5DR was observed in North East 2.61(95%CI: 1.71-3.96) and the lowest in North West 2.61(95%CI: 1.71-3.96) (Table 51).

Table 51: Crude and Underfive Death Rates in all the four districts

	Central	**South**	**North East**	**North West**
Crude Death Rate (CDR)	0.88 (95%CI:0.61-1.26)	0.94 (95%CI: 0.67-1.32)	1.08 (95%CI: 0.77-1.51)	0.43 (95%CI:0.15-1.25)
Underfive Death Rate (U5DR)	1.62 (95%CI:0.91-2.89)	2.58 (95%CI: 1.66-4.00)	2.61(95%CI:1.71-3.96)	1.2 (95%CI:1.00-1.86)

5. DISCUSSION

The discussions are conducted for the whole of Turkana because of the similarities in the findings across the survey sites and where there are disparities these are pointed out appropriately. The findings of the FGDs have been used to complement the quantitative findings while highlighting disparities where they exist.

5.1 Nutrition Situation in Turkana

The nutrition situation in Turkana has improved significantly from 2009. All the districts recorded significant improvement in the GAM rates. The most significant improvement was realized in South and North East and the least in Central. Whereas Central recorded the lowest GAM in 2009 South had the lowest GAM in 2010. North East recorded the highest GAM in both 2009 and 2010. For the first time since 2007, the GAM rates for some districts (South and North West) were below the 15% emergency threshold (Figure 22).The relatively high rate of GAM in North East may be attributed to the vastness, remoteness, poor infrastructure and insecurity in the area. Consequently, the NGOs working there provide services on a mobile basis.

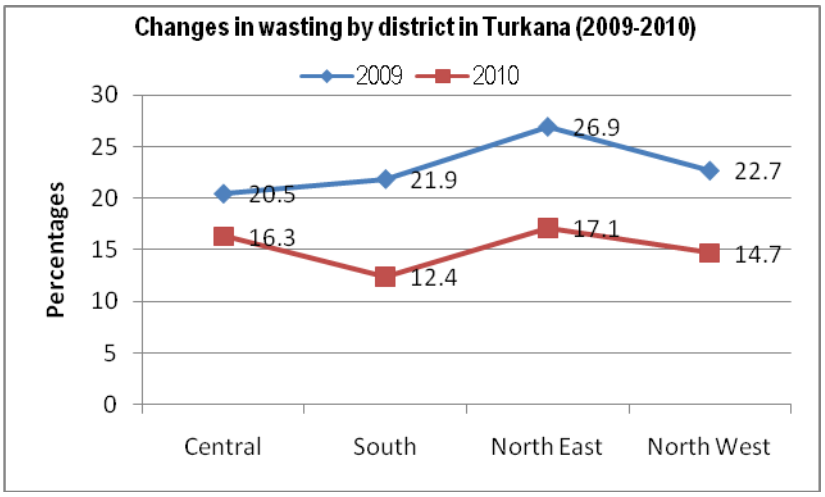


Figure 22: Changes in wasting by district in Turkana (2009-2010)

Chronic food insecurity has been reported to be the major cause of malnutrition making Turkana to be targeted under the EMOP with the rest of the ASAL districts in Kenya. For many years, the nutrition situation has not shown any significant improvement despite the government's efforts and those of other developing partners working in the region. The significant improvement in the nutrition situation in 2010 may be attributed first, to the heavy rains received in December 2009 to January 2010 and in April and May of the same year, in amounts that had not been received since in 2007. The drought-affected pastoral livelihood experienced a marked resurgence in environmental indicators which were slowly translating into improved household food security, through enhanced availability of milk and livestock products at the household and market levels, coupled with significant improvement in pastoral terms of trade.[16]

Secondly, there was improvement in the food security situation at the household level. In addition to the GFD, SFP and OTP, WFP and the agencies working in Turkana provided BSFP covering all children 6-59 months of age, pregnant and lactating women up to 6 months. This together with the improved milk and livestock products due to the improved rainfall greatly boosted the food security situation of the households.

As a whole, the community acknowledged the fact that the nutrition situation of the children had improved in the recent months before the survey according to findings of the FGDs. The reasons for the improvement were reported to be increased supply of food because of the BSFP. Some respondents reported that some of the households experienced higher purchasing power and could therefore afford to buy more and a wider variety of

[16] Food Security Steering Group KFSSG Turkana Short Rains Assessment Report, 2009-2010

foods for the family. It was reported that the food security situation could be better if it were not for: the persistent raids; poor infrastructure; prolonged drought; low job opportunities; low livestock prices; long distances to markets and high food prices.

5.2 Coverage of Selective Feeding Programmes

There was a significant improvement of SFP coverage rates in all the survey sites compared to 2009. All the sites achieved the SPHERE Standards 2004 (>50%) with the exception of North West which registered a rate of 44.2%. Nevertheless, this was a significant improvement from a rate of 13.0% in 2009. The OTP coverage rates were high with all the sites having a rate of 100%. In 2009, it was only North East and North West which did not register 100% coverage at 93.3% and 31.6% respectively. Both the SFP and OTP coverage in North West have significantly improved probably due to IRC's presence in the district unlike during the 2009 survey when no agency was implementing nutrition programmes in Kakuma division.

The interpretation of the coverage rates especially for OTP should be done cautiously given the limitations in the formula used to calculate these rates. The sample size for severely malnourished children was too small to estimate coverage with reasonable precision. The effective sample size was further reduced by the design effect introduced by cluster and proximity sampling which is likely to be considerable if coverage is spatially inhomogeneous (high in some communities and low in others). This formula includes children who may not be eligible for entry into the programme on the day of the survey (children who are in the recovery phase and whose weight-for-height is higher than that required for entry into the programme or who no longer exhibit nutritional oedema). These children, now in recovery, were recently undernourished. This formula is therefore an estimator of RECENT coverage in a given period (PERIOD PREVELENCE). The findings should therefore be interpreted as estimates, rather than actual coverage rates.

BSFP coverage for children 6-59 months of age was lower than what would be expected given that the concerned agencies provided the food in the whole of Turkana and that it was popular in the community. The BSFP coverage in Central and South districts was about two-thirds while in North East and North West about three-quarters of the children received BSFP. It is noteworthy that the programme ended just two weeks before the survey. There was a possibility of under reporting by respondents given that BSFP was very popular and that the mothers/caregivers had shown great interest in having the service continue. Given the dependency syndrome (evidenced during the FGDs on food security) it is likely that the respondents were of the opinion that a negative picture may probably elicit resumption of BSFP.

5.3 Immunization, de-worming and Vitamin A supplementation coverage

On the whole, immunization coverage for all the vaccines dropped slightly for all the districts compared to 2009. Coverage rates were within the SPHERE Standards 2004 acceptable levels for only some of the vaccinations and some of the districts. The decrease in the immunization was as a result of frequent shortages experienced in the supply of vaccines in 2010[17].

Vitamin A supplementation for children 6-59 months was low despite showing a marked improvement from 2009. Two districts; South and North East had coverage less than 50.0% of the children having received the supplementation in the 6 months before the survey whereas the rest of the districts had coverage of over 60%. On the whole, de-worming coverage was very low with three of the sites having less than 50.0%. North West registered the highest coverage at 65.0% and South the lowest at 24.0%. This finding is worrying considering the poor water availability and accessibility as well as poor sanitation in Turkana that predisposes the children to helminthes infestation, making de-worming a crucial exercise.

[17] Personal Communication, District Medical Officer of Health, Turkana Central District, May 2010

5.4 Child Morbidity and Maternal Health Seeking Behaviour

As a whole, there was a decrease in the level of morbidity among the children compared to 2009. As in the previous years, the most common illnesses were ARIs, diarrhoea and fever with chills like malaria in all the survey sites. About half of the caregivers from Central, South and North West and about two-thirds from North East sought assistance for their sick children from public health facilities. This practice needs to be improved so as to reduce the danger that children's lives are exposed to during illness. Of concern was the relatively high percentage of caregivers who sought no assistance for their sick children. Of equal concern is the practice of buying medicines for sick children from the shops or kiosks, a practice that needs to be discouraged because the self-diagnosis conducted by mothers/caregivers and then the decision on what medicines to purchase is likely to be a dangerous practice with adverse health consequences on the child. The importance of seeking medical attention from health professionals should be re-emphasized in the health education messages. It is noteworthy that for many people in Turkana, health services are not easily accessible because of the poor infrastructure and the few health facilities are, in many cases, poorly staffed and with limited medicines.

5.5 Infant and Young Child Feeding Practices (IYCF)

Breastfeeding Practices

Breastfeeding practices were adequate in terms of: initiation of breastfeeding which was universal as breastfeeding is the cultural norm; the giving of colostrum and duration of breastfeeding. It is recommended that all children be breastfed for two years or longer because of the immense health benefits of breastmilk. The majority of the children 0-23 months old in all the survey sites were still being breastfed. Over 80.0% of the children were given colostrum. Colostrum provides antibodies thus conferring immunity to the baby.

In contrast, optimal breastfeeding practices in terms of timely initiation of breastfeeding, not giving of pre-lacteal feeds, and exclusive breastfeeding for 6 months were inadequate. Timely initiation of breastfeeding leads to the establishment of successful lactation performance. Despite the overall improvement in the proportion of women who put their babies to the breast within the recommended 1 hour after birth, as per the WHO recommendation, there was a decrease in the practice in Turkana South. Again, there was an improvement in the practice of giving pre-lacteals from 2009 to 2010. The practice still needs to be discouraged.

There was significant improvement in exclusive breastfeeding rates from 35.7% to 53.1% in North East and from 33.8% to 68.6% in North West. The rates for Central and South remained more or less the same. Despite the fact that these rates are below the WHO goal, they are above the 32.0% national exclusive breastfeeding rate for infants below 6 months of age[18]. There is likelihood of over reporting because of the enhanced knowledge on the duration of exclusive breastfeeding and thus the respondents may be reporting knowledge rather than practice. While interpreting the prevalence of exclusive breastfeeding, it should be taken into account that the rates are based on a 24-hour recall cross-sectional data which tends to inflate the rates since mothers' infant feeding practices fluctuate from day to day. Cumulative rates of exclusive breastfeeding have been demonstrated to be lower than those from cross-sectional data[19],[20]. On the whole, the findings on the breastfeeding practices are in agreement with those of the nutrition surveys and in-depth qualitative assessments conducted in Turkana[21],[22].

[18] Kenya Demographic and Health Survey, 2008-09

[19] Bland RM, Little KE, Coovadia HM, Coutsoudis A, Rollins NC, Newel M. Intervention to promote exclusive breastfeeding for the first 6 months of life in a high HIV prevalence area. *AIDS* 2008; 22: 883-891.

[20] Engebretsen SMI, Wamani H, Karamangi C, Semiyanga N, Tumwine J, Tylleskar T. Low adherence to exclusive breastfeeding in Eastern Uganda: A community-based cross-sectional study comparing dietary recall since birth with 24 hour recall. *BMC Pediatrics* 2007; 7(10):1-12.

[21] World Vision Kenya, Assessment of Infant and Young Child Feeding Practices in Turkana District, Kenya; 2006

[22] MOH/UNICEF, Qualitative Assessment of the Infant and Young Child Feeding Practices in UNICEF-Kenya Focus Districts, 2007.

Complementary Feeding Practices

As a whole, the complementary feeding practices in all the survey sites were inadequate. Complementary feeding rate varied across the districts. In Central and North West about three-quarters of the children 6-23 months of age and about half of the children in South and North East had been introduced to complementary feeding. This means that many children were not getting adequate nutrients because of delayed introduction of complementary feeding.

It is important that complementary feeding be introduced at 6 months because breastmilk is not sufficient to provide all the required nutrients for the child's optimal growth and development from this age onwards. Dietary diversity was limited for those children receiving complementary feeding. The minimum dietary diversity (consumption of foods from ≥4 groups from a total of 7) was achieved by less than one-tenth of the children from all the survey sites with the exception of Central. The frequency of feeding was below the WHO recommendations. It is recommended that children 6-8 months be fed at least 2 times, and those 9-23 months old 3 times per day inclusive of snacks. Less than two-fifths of the children 6-8 months old were fed at least 2 times per day and the same proportion of children 9-23 months old were fed 3 times per day. The children were therefore most likely not getting a variety of nutrients in amounts to meet their requirements. Again, the findings on complementary feeding practices concur with those of in-depth assessments conducted in Turkana in the recent past[23],[24].

5.6 Maternal Nutritional Status

The rate of undernutrition was high among the pregnant and lactating women with about two-fifths wasted in all the four districts. In contrast, the level of wasting was much lower among the non-pregnant and non-lactating women. It is expected that the level of wasting among pregnant and lactating women would have been lower because of the BSFP targeting the mothers during the period end of January to end of May 2010. There is likelihood of leakage of the food through sharing as reported during the FGDs.

5.7 Availability and Utilization of mosquito bed nets

Bed net ownership was low in all the districts with only half or less of the households reported owning bed nets. Most of the bed nets were provided by MOPHS and partner agencies with fewer households reporting having purchased them. This is a commendable effort by MOPHS and partners which should be up scaled so that more households get bed nets. The utilization of the bed nets was by the most vulnerable groups; children underfive years of age and their mothers. This is a positive finding that should be encouraged because Turkana is malaria endemic.

5.8 Water and Sanitation and hygiene practices

There was no difference in the source of water for household use and that for drinking and the sources varied from one district to another. It would appear that households used the source of water that was most accessible to them because of the scarcity of water in the region. Even though the safety of the water was not established, it can be assumed, that on the whole, the households drank unsafe water as the majority, never boiled drinking water. The amount of water used by a household per day was low, on average about 50 litres and thus limiting adequate hygiene practices. The limited amount of water used by households may be explained by the long distances to water points. The minimum time taken to the water point and back was on average 45 minutes in all the districts.

Access to latrines was very low with less than 20.0% of the households in all the districts having toilets. The majority of the households disposed of adult and children's faeces in the bush. The practice of washing hands

[23] World Vision Kenya, Assessment of Infant and Young Child Feeding Practices in Turkana District, Kenya; 2006
[24] MOH/UNICEF, Qualitative Assessment of the Infant and Young Child Feeding Practices in UNICEF-Kenya Focus Districts, 2007.

after visiting the toilet was very low, by less than 20.0% of the respondents. This practice could be constrained in part, by the scarcity of water. The poor availability of safe water coupled with poor accessibility to latrines and poor personal hygiene practices, could probably explain the high prevalence of diarrhoeal diseases among children in Turkana.

5.9 Household Food Security

Overall, there was improvement in the food security status of the households in 2010 compared to 2009. According to the KFSSG Turkana Short Rains Assessment Report, 2009-2010, the food security situation was slowly improving based on environmental indicators[25]. A number of the community members expressed the same sentiments during the FGDs. The community members also acknowledged the provision of BSFP improved the food security status of the households. Nonetheless, the community members stated that despite the little improvement in food security, food was still not adequate due to accessibility problems caused by insecurity, raids and wild animals. The markets were also inaccessible and the prices of food commodities high.

Based on a number of proxy indicators used in the survey, it would seem that, despite the overall improvement in food security, for many households food was not adequate at the time of the survey. Food aid was received by less than half of the households with the exception of North East where 51.3% reported to have received food aid in the last three months. About one-quarter of the households from Central reported to have received food aid. The frequency of receiving the food aid varied from one district to another with the highest majority of those who received the food once in Central and North East. There is a possibility of under reporting to portray the need for increased targeting of perceived needy households by the community. This sentiment was expressed during the FGDs by community members who repeatedly reported that one way of dealing with food insecurity in Turkana is to provide food aid to more households. On the other hand, this finding could genuinely imply under targeting.

Analysis of the types of foods consumed at the household level also revealed dependence on food aid. The most consumed foods, with the exception of sugars, were those provided in the food basket; cereals, pulses and oils. Food aid was mentioned second to purchase, as the most common source of food. It should be noted that all the food items in the food basket were shared by many households thus further exacerbating the food insecurity situation. This finding was corroborated with that of the FGDs in which it was reported that sharing of food aid was very common, because of the many households perceived to be needy and not targeted. It can be assumed that among the items bought in exchange of the food aid sold was sugar, which was consumed by many households. The practice of sharing or selling food aid has the overall effect of diluting the food basket, in that the food consumed does not provide the 75.0% of the 2100 kilocalories per person per day as intended by WFP[26]. Furthermore, selling of food aid to purchase non-equivalent nutritional food commodities such as sugar, a food that offers *empty calories* further dilutes the food basket.

Another evidence of household food insecurity was the limited number of meals eaten per day. Many household members ate either one or two meals per day, with an increased number eating one or two meals and less eating three meals the day prior to the survey compared to usual times. This may have meant increased food insecurity at the time of the survey compared to other times. It was noted that most of the people who had planted sorghum had not harvested by the time of the survey, although consumption of milk and milk products had increased compared to 2009.

The household dietary diversity score was limited signifying low household economic capacity to consume foods that provide an adequate variety of nutrients. The consumption of vitamin A-rich vegetables and tubers, flesh meat, milk and milk products and eggs was particularly low. The limited dietary diversity is explained in part by the high level of poverty in Turkana and the unavailability and inaccessibility of a variety of foods. The same sentiments were expressed during the FGDs as community members stated that many of them have lost their livestock to drought, disease and raids.

[25] Kenya Food Steering Group (KFSSG) Turkana Short Rains Assessment Report, 2009-2010
[26] WFP Programme Assistant, Monitoring and Evaluation, Lodwar, 12th May 2009

5.10 Factors associated with malnutrition in Turkana

In discussing the probable causes/factors associated with the acute malnutrition in Turkana, it should be borne in mind that the results were generated from a cross-sectional survey and as such only reflects a "snap-shot" in time. The conceptual framework by UNICEF explaining the causality of malnutrition has been adapted, in discussing the probable causes of malnutrition in Turkana. The qualitative data from the FGDs have also been incorporated appropriately.

5.10.1 Immediate Causes

Dietary Intake

The findings of this survey revealed inadequate dietary intake by the households. Many households ate 1 or 2 meals per day instead of 3. The household dietary diversity was limited with the majority of households eating food from less than one-quarter of 15 food groups based on a 24-hour recall. Consumption of vitamin A-rich vegetables and tubers, and animal proteins in the form of eggs, flesh meat and milk and milk products was limited.

Disease

Between 12% to 18% of the children from all the survey sites suffered from diarrhoea, up to one quarter suffered from ARIs and up to 14% from fever with chills like malaria. These diseases have a profound negative effect on the nutritional status of children because to the synergism between infections and nutritional status.

5.10.2 Underlying causes of malnutrition

Inadequate Household Food Security

Food aid was a major source of food for many households, and the most commonly consumed foods, with the exception of sugar, were those from the food basket. Access to food was compromised to a large extent, by the high level sharing of the food ration with the households not targeted and to a lesser extent by the sale of the food to purchase other items.

Inadequate maternal and child care

IYCF practices were on the whole inadequate. Optimal breastfeeding practices; exclusive breastfeeding for infants less than 6 months of age and timely initiation of breastfeeding were inadequate. Additionally, giving of pre-lacteals was practiced by many mothers. Introduction of complementary feeding was delayed for many children and even for those on complementary feeding the diversity of the foods was limited and this was made worse by the low frequency of feeding of the children. In addition, dietary intake among pregnant and lactating women was inadequate as evidenced by the high level of malnutrition among them.

Inadequate health services and unhealthy environment

The health facilities are not easily accessible for the majority of the population and many public ones are understaffed. In some of the places, health services are offered on mobile basis. Consequently, immunization, vitamin A supplementation and de-worming coverage for children less than 5 years is below the WHO goal.

There was scarcity of water for the majority of the households and the water was also not easily accessible. Many households therefore, depended on water from unsafe sources such as the laga and the river. This was compounded by the fact that most of the households did not boil drinking water. The scarcity of water interfered with hygiene practices because about one-third of the respondents did not wash their hands after defaceation. Overall, sanitation was inadequate as less than one-fifth of the households had access to latrines.

5.10.3 Basic causes of malnutrition

Turkana is marginalized with low levels of development; there is poor infrastructure in terms of roads, health facilities and schools. There is high level of poverty caused by the chronic drought resulting in death of livestock, the main livelihood of the people. The constant cattle raids and animal diseases such as PPR have also contributed, to a large extent to loss of livestock. Consequently, many people have been rendered destitute and dependent on food aid.

6 CONCLUSIONS

- The nutritional status of the children has improved significantly in all the four districts in Turkana. For the first time since 2007, the GAM rate was below the 15% emergency threshold in two of the districts namely Turkana South and Turkana North West. This improvement can be attributed to the improved food security situation because of the rains experienced late 2009 and in 2010. Additionally, the BSFP provided for children 6-59 months of age, pregnant mothers and lactating mothers up to 6 months of age, in addition to SFP and OTP contributed greatly to the improved food security situation in Turkana. The prevalence of watery diarrhea, ARIs and fever with chills like malaria decreased in all the districts. Additionally, exclusive breastfeeding improved. The MOPHS and partner agencies are commended for the efforts in bringing down the level of malnutrition among the children. Nevertheless, more efforts are necessary to reduce acute malnutrition to the WHO acceptable rate of <5%;

- Despite the fact that the food security situation improved, it was constrained by high food prices, limited accessibility to markets, insecurity and raids and extensive sharing of food aid with households not targeted;

- The SFP and OTP coverage improved from 2009 and were within acceptable SPHERE Standards 2004;

- The BSFP coverage was lower than expected. This may be partly due to under reporting;

- As for IYCF practices, there was improvement in the rate of exclusive breastfeeding for infants less than 6 months though the WHO goal has yet to be realized. Complementary feeding practices were inadequate in terms of timely introduction, dietary diversity and the frequency of feeding of complementary foods;

- There was an improvement in the morbidity burden. The highest morbidity burden on the children was caused by fevers and ARIs and to a lesser extent watery diarrhoea;

- There was a slight drop in immunization coverage for all the antigens;

- The coverage of Vitamin A supplementation was far below acceptable levels with less than half of the children 6-59 months old from Turkana South and Turkana North East having received the supplement;

- Access to clean safe water and adequate sanitation was limited and probably constraining proper hygiene practices;
- Mosquito bed net ownership was low but utilization by the most vulnerable groups of people was high; and

- The crude and underfive mortality rates were within the SPHERE Standards 2004.

7. RECOMMENDATIONS

- An integrated approach, tackling both the immediate and underlying causes of malnutrition should be put into place and/or scaled up. Such approach is necessary because of the range of factors that interact with each other to contribute to malnutrition. Despite the fact that the addition of BSFP to the existing nutrition programmes contributed significantly to the overall reduction in malnutrition, more concerted efforts,

probably in terms of dealing with the underlying and basic causes of malnutrition need to be put into place to mitigate malnutrition in a sustainable manner. Most of the interventions in the region are humanitarian in nature, dealing with the immediate causes of malnutrition. Whereas these relief services are critical, they need to go hand in hand with developmental activities so as to provide sustainable solutions to the problem of malnutrition. Efforts to diversify livelihoods should be scaled up for greater impact. There is need for example, to think of or to scale up projects which will make food more available at the household level. More boreholes should be sunk to make water available for both human and animal use. The community members expressed a desire to have increased developmental activities in place. Suggestions of such activities included; capacity building in farming techniques, re-stocking livestock and involvement of the community in income generating activities;

- BSFP should continue to be used as a stop-gap measure in times of high food insecurity and vulnerability of the target population. It is suggested that beneficiaries be registered to allow for verification of those admitted in the programme;

- There is need for interventions that will improve the health status of children such as scaling up of mobile clinics, staffing of the health facilities and ensuring that the facilities are well equipped and drugs are available. Such interventions will also help to improve immunization and vitamin A coverage;

- Documentation of vaccination needs to improve. A significant proportion of the children did not have health cards and vaccination status was based on recall. Documentation of vaccination on cards is important to prevent unnecessary re-vaccination and monitoring of coverage. All vaccinations given during campaigns should be documented. Lost cards should be replaced as soon as possible;

- There is need for continued and more intensive health and nutrition education focusing on: the value of timely health seeking behaviour and the dangers of self-diagnosis and self prescription of medicine; importance of proper sanitation and hygiene especially using latrines, washing of hands after visiting the toilet; appropriate IYCF feeding practices with special focus on the value and duration of exclusive breastfeeding and the importance of timely introduction of complementary feeding, dietary diversity and appropriate frequency of feeding;

- It is recommended that all available channels such as SFP and OTP distribution points, MCH, ANC, SC and mobile clinics be used to provide health and nutrition education for wider coverage and reinforcement of the information; and

- Upscale the distribution of bed nets to help prevent malaria which is endemic in Turkana.

The following administrative recommendations are made to improve the quality of the data collected during the survey:

- Local calendars of events that are district specific should be developed at the local level, with the help of the District Nutrition Officers (DNOs) prior to the commencement of the survey. This is critical given that it is not feasible to develop such calendars centrally during the training session because of lack of information on the important events taking place in the different districts. The development of appropriate and applicable calendar of events is critical for age determination of children because many mothers do not know the birthdates of their children. This would go a long way in improving the quality of anthropometric data; and

- To improve the quality of data, it is suggested that data collection take place concurrently in two districts at a time and not the four at the same time as has been the practice. Training and data collection could start with, for example, Turkana Central and Turkana South before the team moves on to the North to train and undertake data collection in Turkana North East and Turkana North West. This will assist in improving the

quality of supervision of data collection which is a challenge because of the vastness, poor communication, transportation and insecurity in Turkana.

ANNEXES Annex 1: Terms of Reference (TOR)

TERMS OF REFERENCE FOR TURKANA NUTRITION SURVEY 2010 CONSULTANCY

Contact Person: Mary Karanja, Oxfam GB
Contact Info: mkaranja@oxfam.org.uk

March 2010

Background Information

The greater Turkana region lies in the Rift valley province of Kenya and is situated in the arid Northwestern region of the country sharing international borders with Ethiopia, Sudan and Uganda and locally with Baringo,

West Pokot and Samburu districts. The district has an estimated total population of 534, 441[27] persons and covers an area of 77,000km^2. The area has in the recent past been divided into four districts and comprises of seventeen administrative divisions. The larger Turkana district is the second poorest district in Kenya with poverty levels of approximately 20% above the national average. Turkana is constrained by the harsh environment, remoteness coupled with the poor infrastructure and low access to essential services in addition to other underlying causes of poverty that are experienced elsewhere in Kenya. It is classified among the arid and semi arid lands (ASAL).

Being an ASAL district, Turkana is a drought prone area that experiences frequent, successive and prolonged drought and cattle rustling which leads to heavy losses of lives and livestock. According to arid land resource management project (ALRMP), the district has four main livelihood zones. Nearly 60% of the population is considered pastoral, 20% agro pastoral, 12% fisher folks and 8% are in the urban/peri-urban formal and informal employments.

Due to failure of rainfall including the just ended short rains season, access to potable water is greatly reduced. This has negatively impacted on availability of pasture and in turn resulted in weakened animal body conditions thus affecting availability of milk at the household level. On the other hand, poverty, illiteracy and unfavourable government policies have ensured that access to essential services has remained minimal to the majority of the district inhabitants. Poverty, illiteracy and unfavorable government policies have ensured that access to essential services has remained minimal to the majority of the district inhabitants. Inadequate food and poor sanitary conditions at the household and community level as a result of cyclic drought conditions coupled with long-term degradation of livelihoods and traditional coping strategies have further weakened the Turkana community. The combined effect of the above factors has resulted in chronic levels of acute malnutrition indicating the enormity of both underlying and basic causes of malnutrition.[28]Following annual nutrition assessments that have been conducted in the district, various interventions based on the recommendations have been conducted in the district to address the high prevalence of malnutrition. However, despite the numerous interventions, the rates of malnutrition have on average maintained at above the emergency cut-off levels. A survey conducted by World Vision and partners in May 2009 indicated a GAM prevalence of >20% in all the districts which was above the WHO threshold to indicate emergency levels of child malnutrition.

Based on the above rates, partners have been implementing different nutrition response interventions in the areas. The assessment will aim at strengthening the on-going interventions in addition to new recommendations and determining the current, malnutrition rates in light of the just improved rain seasons and prevalence of cholera outbreak in the region.

Main Objective of the Consultancy

The main aim of the consultancy is to support the MoH and implementing partners in conducting 4 nutrition surveys in Turkana North (East and West), Turkana south and Turkana central.
The main purpose of the nutrition survey is to estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months of age.

1. Specific objectives of the Nutrition survey

Using the UNICEF/MOH nutritional survey guidelines, the following objectives will guide the implementation of the survey:

1. Estimate coverage of the current nutrition interventions in the district
2. Determine the Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age
3. Investigate household food security and food consumption practices.
4. To estimate crude and under-five mortality rates.
5. Estimate morbidity rates of children below five years

[27] Turkana District; Kenya National Bureau of Statistics, May 2009
[28] Conceptual framework of malnutrition: UNICEF 2000

6. Determine the proportion of households with access to safe water and sanitation

2. Survey methodology

The Kenya national guidelines on nutrition and mortality assessments and the MOH/UNICEF health and nutrition assessment tool will be used for data collection during the survey. The Nutrition survey will be conducted in accordance with the National Guidelines for Nutrition and Mortality assessments in Kenya and will employ ENA for SMART methodology to determine the sample size and the clusters at the village level.

The survey will use a cross-sectional study design with both quantitative and qualitative components. In addition to household interviews, which will provide quantitative information, focus group discussions (FGDs) will also be conducted with different groups at the community level.

Target population
Four independent surveys will be conducted in Central Turkana district, South Turkana district, North East and North West Turkana to assess the nutritional status of children 6-59 months of age. In addition, the survey will seek to establish infant and young child feeding practices among children 0 to 23 months as well the nutritional status of women in the reproduction age (18-45 years).

Design and Scope of Work
This consultant is to perform the major technical duties surrounding the nutrition survey:

The *key tasks* for this consultancy will be:

- Review the MOH questionnaires to make sure the minimum indicators and all other information required is captured in the questionnaires.
- Meet with the Ministry of Health and implementing partners in Nairobi and Turkana.
- Facilitate 2 trainings for the survey staff including for the focus group discussions.
- Ensure all questionnaires, survey tools and equipment are ready for the data collection.
- Supervise data collection for the 4 surveys
- Arrange for data entry and supervise data entry in Lodwar.
- Carry out data cleaning and data analysis. Quantitative data will be analyzed using Excel, SPSS and ENA for smart software while qualitative data will be analyzed manually.
- Present preliminary findings to the MOH and implementing partners two days after the data collection in Lodwar.
- Present first draft of report to implementing partners for comments 2 weeks after data collection
- Submit final report (one week later) to Implementing partner as stated in the consultancy contract.

Key Deliverables

a) Assessment supervisors and enumerators adequately trained to conduct the survey within the proposed timeframe.
b) A comprehensive food security and nutrition survey report in accordance with the approved TOR detailing:
    - Methodology used for data collection and analysis
    - Nutritional status of the targeted population
    - Coverage of nutrition interventions
    - Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age
    - Household food security and food consumption practices.
    - Crude and under-five mortality rates.
    - Morbidity rates of children below five years
    - Proportion of households with access to safe water and sanitation
    - Suggested recommendations that will inform future and current programming

The consultant will also be required to submit:

- Four (4) bound hard copies of the survey report
- Soft copy of the report in a CD
- Soft copies of all data sets both quantitative and qualitative (Cleaned data in both ENA for SMART)
- Copy of training package and materials used
- A table of data quality check duly filled
- All filled quantitative data collection tools and qualitative data recording materials.
- Any other non-consumable documents/items that will be used in the course of the planned consultancy

Duration of the Consultancy

The consultancy is expected to be for 42 days. The successful bidder must commit to accomplish and deliver the consultancy services and deliverables before or on 15th June 2010 by close of business.

Tentative schedule

Date	Activity	Location	Number of days
6th and 7th May	Questionnaires review and finalization	Nairobi	2
17th, 18th, 19th and 20th	Training of survey staff	Lodwar/Kakuma	5
21st	Photocopying of questionnaires Distribution of questionnaires to survey teams	Lodwar	1
22nd May to 2nd June	Supervision of data collection in 4 districts of Turkana	Larger Turkana	12
22nd May to 3rd June	Data entry and cleaning		1
4th June	Initial analysis for Nutrition status Presentation of preliminary results to MOH and partners	Lodwar	1
5th to 14th June	Data analysis	Nairobi	10
15th to 24th June	Report writing Draft report Final report	Nairobi	10
25th June	Presentation of final findings to MOH, UNICEF and other partners	Nairobi	1

Contractual Responsibilities

Required qualifications/ Complications

To successfully undertake this assignment, the Consultant should meet the following minimum requirements

a. Education: A professional with a post-graduate degree in Nutrition or public health.
b. Experience:
   - Documented experience in conducting Nutrition surveys
   - Experience in using a range of qualitative and quantitative data collection and analysis methods
   - Clearly proven strong quantitative skills and expertise in the use of standard data management software, statistical analysis and Nutritional data analysis packages
c. Skills:
   - Strong analytical and report writing skills
   - Proficiency in use of computers, especially latest Word Processing Packages and a MUST in the use of SPSS
d. Cost: The cost of the provision of services should be reasonable and feasible.
e. Independence: the consultant(s) should not have been directly involved in the design and execution of any of the ongoing Nutrition programs, and should not be a current employee of any of the implementing agencies.

3. Expression of interest

A consultant/Firm that meets the above requirements and is available within the time period indicated above should submit the following:

1. A capability statement of the firm and the specific consultant who will undertake this assignment, including a commitment to be available to undertake the entire assignment within the stated timelines. If two consultants are proposed, it should be clearly demonstrated on how their individual competencies shall complement each other in the context of this assignment and Budget
2. An elaborate methodology and detailed budgeted work plan indicating number of days per tasks and costs (in Kenya Shillings) per main task.
3. Detailed Curriculum vitae indicating their relevant qualifications, skills and experience should be clearly spelt out.
4. Full contact details for the person selected. The details should include current telephone contact, e-mail address, title of assignment undertaken by the consultant, dates when the assignment was undertaken and name of the contracting organization

Annex 2: Assignment of Clusters

Turkana Central District

Division	Location	Sub-location	Total population size	Assigned cluster
Central	Lodwar Town	Lodwar Town	13867	
		Nakwamekwi	7804	1
		Napetet	7196	2, 3, 4
	Kanamkemer	Kanamkemer	8433	5, 6
		Nawaitorong	6633	RC, 7, 8
Kerio	Kerio	Kerio	2991	
		Nakurio	5075	9
		Nadoto	2324	
	Kangirisae	Kangirisae	2461	10
		Nakoret	1932	
	Lorengelup	Lorengelup	1162	RC
		Kangegetei	1486	
		Kakimat	1420	11
Kalokol	Kalokol	Kalokol	12881	12
		Kapua	2896	13
		Namadak	4082	14, 15, 16, 17
	Namukuse	Namukuse	6488	RC
		Locher Akeny	3019	18
	Kangatotha	Eliye	2973	
		Naoros	1278	
		Lomopus	1531	
Turkwel	Lorugum	Lorugum	3529	19
		Turkwel	5801	20, 21
		Kalemunyang	5978	22
		Lobei	2344	
	Lomeyan	Lomeyan	11684	23, 24, 25, 26, 27, 28, 29
		Nachuro	5433	30
		Kapus	5269	RC, 31
	Nadapal	Kawalathe	1881	
		Tiya	2374	32
		Napeikar	2483	
		Nadapal	2422	33
		Kotaruk	6374	34, 35
		Lokipetot Areng	2840	
		Naipa	2606	36
Loima	Loima	Lochor Ekuyen	1321	
		Lochor Edome	1643	
		Puch	9724	RC
		Namuroputh	2291	37
	Lorengippi	Loya	262	
		Kaemanik	2482	38
		Nakurio	3242	39, 40
		Lodwat	1084	41
		Lorengippi	1040	
	Lokiriama	Lokiriama	1720	
		Atalamusio	2264	42
		Lochor Alomala	14493	43, 44, 45

(RC = Reserve Clusters, approx. 10% of the original clusters, all of the reserve clusters should be surveyed when it was not possible to collect some of the other clusters.)

Turkana South District

Division	Location	Sub-location	Total Population	Assigned clusters
Lokichar	Lokichar	Lokichar	4828	RC, 1, 2
	Kalapata	Loperot	3889.608	3, 4, 5, 6, 7, 8
		Kalapata	1527.36	9, 10
		Nakalalei	1357.08	11
	Longwaangamatak	Longwaangamatak	5942.256	RC, 12, 13
		Napusimoru	3719.328	14, 15, 16, 17
Lokori	Lokori	Lokori	2182.68	RC, RC, 18, 19, 20, 21
		Kangeitit	3957.72	RC, 22, 23
		Lotubae	2432.424	
	Kochodin	Lopii	1807.032	24, 25
		Kochodin	1189.896	26
	Katilia	Elelea	2749.248	27, 28
		Katilia	3595.488	29
		Parkati	2171.328	30
	Lochakula	Lochakula	705.888	31, 32
		Kakulit	576.888	33
		Lokwamusing	553.152	
Katilu	Katilu	Lokapel	2908.176	
		Kalemungorok	3455.136	34
		Kanaodon	2830.776	35, 36
Kainuk	Kaputir	Kalomae	2842.128	37, 38, 39, 40, 41
		Lorogon	668.736	
	Kainuk	Kainuk	3564.528	42, 43, 44, 45
		Kakong	840.048	

(RC = Reserve Clusters, approx. 10% of the original clusters, all of the reserve clusters should be surveyed when it was not possible to collect some of the other clusters.)

North East Turkana District

Division	Location	Sub-location	Total Population	Assigned clusters	
Kaaling	Kaikor	Loitanit	2630.568	1	
		Nalita	1155.84		
		Lokolio	1323.024	2, 3, 4	
	Yapakuno	Malimtatu	1110.432	5, 6, 7	
		Kalem	3806.016	8, 9, 10, 11	
		Kakelae	534.576		
	Loruth	Loruth/Esekon	6043.392	RC, 12, 13	
		Kotome	2316.84	14, 15	
		Karachii 2	3297.24	16, 17, 18	
	Kaeris	Kanakurudio	2332.32	19	
		Kaeris	2182.68		
		Nadunga	1025.808	RC	
		Kangapur	1520.136		
Lapur	Karebur	Karebur	2395.272	20, 21	
		Nabulukok	988.656		
	Meyan	Lewan	3276.6	RC, 22	
		Napeikar	2136.24		
	Kokuro	Kokuro	2296.2		
		Sasame	1446.864	RC, 23	
		Todonyang	3097.032	24, 25, 26	
Lokitaung'	Ngissinger	Lowarengak	4386	27, 28, 29	
		Kanamkonyi	1940.16	30, 31	
		Nachokui	2551.104		
	Kataboi	Kataboi	2437.584	32	
		Katiko	1698.672		
		Lomekui	1855.536	RC, 33, 34	
	Riokomori	Riokomori	2592.384		
		Kokisele	2736.864	35, 36, 37, 38, 39	
Kibish	Kibish	Naita	1195.056		
		Nayasa	316.824		
		Naita	879.264		
	Kibish	Lokamarinyang	1814.256	40	
		Kibish	748.2		
	Natapal	Natapal	534.576	41	
		Karachii 1	1828.704	42, 43, 44	
		Kaitede	1291.032	45	

(RC = Reserve Clusters, approx. 10% of the original clusters, all of the reserve clusters should be surveyed when it was not possible to collect some of the other clusters.)

Nutrition and Food Security Survey Questionnaire

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

HOUSEHOLD DATA **How many people live in this household together and share meals? (Household size)** ____

1.1 Age group	1.2 Person ID and Name (*Start with the youngest to the oldest member of the household Insert the names of the persons and ensure that numbering is continuous For the head of the household, indicate M for mother, F for father and C for child headed HH*)		1.3 Approx.* Age Enter months for children under 5 years and years for over 5's		1.4 Childs age verified by (1=Health card 2=Birth certificate/ notification 3=Baptism card 4=Recall)	1.5 Sex (1= Male 2= Female)	1.6 Main Occupation of the household head and the respondent or caregiver (enter code from list) *(Ask this question to the respondent/ caregiver. The responses can be more than one)* (1=Agricultural labour 2=Livestock herding 3=Own farm labour 4=Employed(salaried) 5=Waged labour (Casual) 6=Petty trade 7=Unemployed 8=Student 9=Merchant/trader 10=Mining 11=Housewife (Only those who completely stay home and have no other source of income) 12=Domestic help 13=Hunting, gathering 14=Firewood/charcoal selling 15= Brewing 16=Weaving/basketry 17=Fishing 18= Very old 19=Others (Specify)……..
	ID	NAME	Date of birth	Months			
Under 5 years							

over 5 years	ID	NAME		AGE		SEX	OCCUPATION

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

2. IMMUNIZATION COVERAGE: ASK FOR ALL CHILDREN LESS THAN 59 MONTHS

	Name of the child	**Sex of the** child M =1 F = 2	**AGE** IN MONTHS copy from page 1	Has the child received **vitamin A** supplement in **last 6 months?** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	Has the child received **deworming medicine** in **last 6 months?** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**BCG** 0=No **1=Yes (Card)** 2=Yes (by scar) 4=Do not know	**OPV1** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**OPV2** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**OPV3** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**DPT1/ HepB/ Hib1** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**DPT2/ HepB/ Hib2** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**DPT3/ HepB/ Hib1** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know	**Measles** 0=No **1=Yes (Card)** 2=Yes (Recall) 4=Do not know
1													
2													
3													
4													

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

3. MORBIDITY: ASK FOR ALL CHILDREN LESS THAN 59 MONTHS

	Name of the child	Sex 1=M 2=F	In the last 2 weeks including today, has [name] been sick? Yes--Ask the mother to describe illness No--continue with IYCF question	Watery Diarrhea An episode of 3 or more loose /watery stools in 24 hours	Bloody diarrhea An episode of 3 or more watery stools with blood in 24 hours	Cough with difficult breathing Any episode with difficult breathing,, rapid breathing or severe or persistent cough	Fever High temperature/Hot body-anything that is used to describe a high temperature	Fever with chills High body temperature with feelings of hot and cold spells	Other Specify Anything that does not fit other categories	When the child was sick, where did you first seek assistance? (enter code) 1=Traditional healer 2=Community health worker 3=Private clinic/ pharmacy 4=Shop/kiosk 5=Public health facility 6=Mobile clinic 7=Relative or friend 8=No assistance sought 9= Herbs/home remedy 10=Prayer 11= Others (specify)
1			Yes ☐ No☐	☐ Watery diarrhea ☐ Bloody diarrhea ☐ Cough with difficult breathing ☐ Fever ☐ Fever with chills ☐ Other (specify)_____						
2			Yes ☐ No☐	☐ Watery diarrhea ☐ Bloody diarrhea ☐ Cough with difficult breathing ☐ Fever ☐ Fever with chills ☐ Other (specify)_____						
3			Yes ☐ No☐	☐ Watery diarrhea ☐ Bloody diarrhea ☐ Cough with difficult breathing ☐ Fever ☐ Fever with chills ☐ Other (specify)_____						

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

INFANT AND YOUNG CHILD FEEDING PRACTICES (IYCF) FOR CHILDREN 0-23 MONTHS OF AGE

Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child. For every question use the child's name.

CH. No	Name of child	Background Information				Infant Feeding information					
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
		Child's date of Birth: dd/mm/yy	Source of birth date (Record the approp. code) 1 = CARD 2 = RECALL 3 = DNK	Age of child in months	Sex of child 1 = M 2 = F	Did you ever breastfeed [name]? 1= Yes 2= No 3=DNK If No, go to 4.6 If yes, go to 4.7	If No, why? See code below for the answers	If yes, How long after birth did you put [name] on the breast? See code below for the answers	During the first 3 days after delivery, did you give [Name] the fluid/liquid that came from your breasts? 1= Yes, 2= No, 3= DNK	In the first 3 days after delivery, was [Name] given anything to drink other than breast milk? Codes below	Are you still breastfeeding [Name]? 1= Yes 2= No

Question 4.6: 1= No milk; 2= Did not want to breast feed;3= Medical advice 4= Mother died 5=Other_____
Question 4.7: 1= Within I hr; 2= Within 24 hours; 3=After 24 hours; If mother does not know, record: **88** :
Question 4.9: 1= Plain water; 2= Sugar water or glucose water; 3= Powdered milk (Milki, Nido, Safariland), animal milk; 4 = Infant formula (Lactogen, Nan), 5= Gripe water; 6= Not given; 7 = Other (specify)

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

Now, I will ask you about what [Name] drank YESTERDAY during the day and the night. During the day and the night, did [Name] receive any of the following fluids? Refer to the name of the child for each question. Kindly probe the mother for responses and record the codes/responses as the mother names the fluids and liquids in their appropriate category

CH. No	Name of child	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18
		Breast milk Only one answer coded as below: 1. Yes 2. No 3. DNK	Infant formula (Mamex, Nan) 1. Yes 2. No 3. DNK	Other milks: animal milk, - reconstituted powdered milk, (Halwa, Milki, Nido, Safari land, Hayat, Coast) - Sour milk. 1. Yes 2. No 3. DNK	Sweetened flavored juices (Quencher, Juice for you, Zeitun, Altuza, Mushakil, vimto, afia, juice cola, Savannah,) Soda 1. Yes 2. No 3. DNK	ORS 1. Yes 2. No 3. DNK	Tea/Coffee 1. Yes 2. No 3. DNK	Plain water 1. Yes 2. No 3. DNK	Porridge 1. Yes 2. No 3. DNK

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

Now, I will ask you about what solid/ semi solid foods [Name] ate YESTERDAY during the day and the night. YESTERDAY during the day and the night, what food items did [Name] receive? (Ask the mother /caregiver to mention all foods given to the child and record as mentioned in the appropriate category)

Note: Please wait for the mothers response after asking the questions other than reading out the various foods

ChNo	Child Name	4.19	4.20	4.21	4.22	4.23	4.24	4.25	4.26	4.27	4.28
		Eggs 1. Yes 2. No 3. DNK	Porridge made from CSB/ Unimix/ millet/ sorghum/ maize flour Use the correct code. Only one answer. 1. Yes 2. No 3. DNK	Flesh Meats (Chicken, beef, Goat,Kidney,Liver, Mutton, Camel, Donkey, Fish, blood, wild meat) 1. Yes 2. No 3. DNK	Legumes and Nuts (Beans, Groundnuts, Cowpeas, Lentils, Green Grams, Edapal, Eedung) 1. Yes 2. No 3. DNK	Dairy Products (Milk, cheese, Ghee, fermented milk) 1. Yes 2. No 3. DNK	Grains, Roots &Tubers (Pasta, rice, bread, potatoes, biscuits, mandazi, chapatti, anjera, ugali, cassava, sorghum, millet) 1. Yes 2. No 3. DNK	Vitamin A Rich fruits & Vegetables (pawpaw, melon, Sukuma wiki, carrots, cowpea leaves, spinach, Avocado,) 1. Yes 2. No 3. DNK	Other Fruits and Vegetables (onions, tomatoes, cabbage, Oranges, bananas Okra, wild fruits) 1. Yes 2. No 3. DNK	Oil (Salad oil), fats, Zeitzun, simsim, (camel fat, goat's fat) 1= Yes 2= No 3= DNK	Yesterday (During the day and at night), how many times did you feed [Name] solid and semi-solid foods? No. of times child was given food to make it full.

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

5. HOUSEHOLD WATER CONSUMPTION

5.1. What is your main current water source for household use? *(Probe for the Main source)* 1=River 2=Lake 3=Water tap 4=Borehole 5=Unprotected well 6=Protected well 7=Public pan 8=Water tanks 9=Dam 10=Laga 11=Springs 12=Other _____	**5.2 How long does it take to go to the main source of water and come back (in minutes)** (In case you approximate in hours kindly note (Hrs))	**5.3 On average, how many LITRES (20 litre jerricans) of water does the household use per day?**	**5.4. How much do you pay for a 20lt jerrican (enter zero if water is free). Enter in Kenya shillings**	**5.5. What is your main source of drinking water?** *(Probe for the Main source of drinking water)* 1=River 2=Lake 3=Water tap 4=Borehole 5=Unprotected well 6=Protected well 7=Public pan 8=Tanker 9=Dam 10=Laga 11=Other _____	**5.6. Do you do anything to the water before drinking it?** 1=Boiling 2=Use traditional herbs 3=Use chemicals 4=Filters/Sieves 5=Decant 6=Nothing
			1.Per 20lt jerrycan _____ 2. Per month_____ 3. Free_____		

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

6. SANITATION

6.1. Does your household have access to a toilet/ latrine facility? 1=Yes 2=No **IF NO, GO TO QUESTION 6.3**	**6.2. If yes, what type of toilet facility do you have?** 1=Bucket 2=Traditional pit latrines 3=Ventilated improved pit latrine 4=Flush toilet 5=Other Specify _____	**6.3. If No, where do you go/use? (probe further)** 1= Bush 2=Open field 3.=Near the river 4.=Behind the house 5.=Other (specify)_____	**6.4. How is children's faeces disposed (Probe and OBSERVE)** 1= Disposed of immediately and hygienically 2= Disposed of immediately in the nearby bushes 3= Not disposed (scattered in the compound) 4= Use of dogs 5=Other (specify) 6= Not applicable (for houses with no children)	**6.5.** On what occasion (s) do you wash your hands**?** **Record ALL that applies** **See codes for 6.5 below**

6.5 1= After using the toilet; 2= After attending to a child who has defecated, 3= Before feeding a child (including before breastfeeding a child), 4=Before eating or preparing a meal; 5=After handling animals, 6=others specify

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

7. FOOD CONSUMPTION AND DIET DIVERSITY

Twenty four hour recall food consumption in the households. The interviewers should establish whether the previous day and night was usual or normal for the households.

7.1 Food group consumed	7.2. Did a member of your household consume food from any of these groups in the last 24 hours (from this time yesterday to now)? Include any snacks consumed 1= Yes 0= No	7.3 What is the main source of the dominant food item consumed (*Please insert the appropriate code)* 1=Own production 2= purchases 3=gifts from friends/ family 4= food aid 5= traded or bartered 6=borrowed 7=Gathering /wild 8= Others specify
Type of food		
1. Cereals and cereal products (e.g. sorghum, maize, spaghetti, pasta, *anjera*, rice, bulga wheat, bread)		
2. Vitamin A rich vegetables and tubers: Pumpkin, carrots, yellow fleshed sweet potatoes		
3. White tubers and roots: Ppotatoes, white yams , cassava or foods from roots, white sweet potatoes, *egilae*		
4. Dark green leafy vegetables: Dark green leafy vegetables including wild ones + locally available vitamin A rich leaves such as, pumpkin leaves, kunde leaves, lokilton, lorakimak, erosin akeny, sukuma wiki, spinach, *Ekamongo Eleero*, *akapurait*		
5. Other vegetables (e.g. tomatoes, biringanya, onions, cabbages)		
6. Vitamin A rich fruits: Ripe mangoes , papayas + others locally available like watermelon, *edome, ngakalaleo, ebei, ngalam, engomo, etoikira*		
7. Other fruits like *esekon, engo*		
8. Organ meat (Iron rich): Liver, kidney, heart or other organ meats or blood based foods , spleen		
9. Flesh meat and offal's(matumbo): Meat, poultry, (goat, camel)		

10. Eggs		
7.1 Food group consumed	**7.2. Did a member of your household consume food from any of these groups in the last 24 hours (from this time yesterday to now)? Include any snacks consumed** 1= Yes 0= No	**7.3 What is the main source of the dominant food item consumed** **(*Please insert the appropriate code)*** 1=Own production 2= purchases 3=gifts from friends/ family 4= food aid 5= traded or bartered 6=borrowed 7=Gathering /wild 8= Others specify
11. Fish: Fresh or dried fish or shell fish or smoked , salted, fried		
12. Pulses legumes or nuts (e.g. beans , lentils, green grams, cowpeas, dried peas, *edapal, eduung, eruit, nimae*)		
13. Milk and milk products (e.g. goat , camel, fermented milk , cow's milk, donkey's meat, powdered milk)		
14. Oils/ fats (e.g. cooking fat or oil, butter , ghee, margarine, goat's fat, sheep's fat)		
15. Sweets: Sugar, honey, sweetened juice, soda/sugary foods such as sweets, ekaamit, glucose		

Please probe and accurately indicate the number of meals consumed per day and the previous day. Information on household members who ate the previous day, those who did not eat as well as reasons for not eating should be probed and recorded appropriately

7.4. Including food eaten in the morning, how many meals does your family normally eat per day? *(Please indicate the number of meals consumed e.g.* 1, 2, 3, 4, 5 ,6)	**7.5. Including food eaten in the morning, how many meals did your family eat <u>YESTERDAY</u>?** *(Please indicate the number of meals consumed e.g.* 0, 1, 2, 3, 4, 5,6)	**7.6. Did all the members of your family eat yesterday?** (*Please record all responses*) 1.Yes***(If Yes, Go to question 8 Food Aid)*** 2.No ***(If No, Go to 7.7)***	**7.7. If some household members did not eat, Who did not eat yesterday?** *(Please record all the responses)* 1=Child under 5 2= 5-12 years old 3=13-19 years old 4= Mother 5= Father 6= Above 19 years	**7.8. Why did the person/s not eat?** *(Please record all the responses***)** 1= Food not enough 2= Sickness 3= Away from home 4=Other (specify)

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

8. FOOD AID (GENERAL FOOD DISTRIBUTION)

8.1. Have you received **FOOD AID** (general food distribution) in the last **three (3)** months? (Please circle) **1 = Yes 2 = No (If no go to section 9 on coping strategies)**

8.2 If, YES, how many times in the last 3 months? **1= Once 2= Two times 3= Three times**

Please indicate the food commodities received in the last distribution, duration each food item lasted and how it was utilized. Tick the appropriate spaces.

Of the food aid received please indicate how it was used					
8.3 FOOD AID COMMODITY	**8.4 Resold in the market**	**8.5 Bartered for other item**	**8.6 Shared with kin**	**8.7 Consumed by household members**	**8.8 How many days did each food commodity last? Write number of days**

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

9. COPING STRATEGIES

	In the previous month, has the household done any of the following? Tick as appropriate	1=Yes 2=No 88 = Do not know
9.1	Reduction in the number of meals per day	
9.2	Skip food consumption for an entire day	
9.3	Reduction in size of meals	
9.4	Restrict consumption of adults to allow more for children	
9.5	Swapped consumption to less preferred or cheaper foods	
9.6	Hunting and gathering	
9.7	Engaging in casual labour	
9.8	Borrow food from a friend or relative	
9.9	Purchase food on credit	
9.10	Consume wild foods (normal wild food)	
9.11	Consume decomposed fish	
9.12	Send household members to eat elsewhere	
9.13	Send child(ren) to School	
9.14	Begging	
9.15	Sale of livestock	
9.16	Sell of charcoal and/or fire wood/small scale business	
9.17	Part of family migrating with animals to look for grazing	
9.18	Sale of milk and/or meat, and/or fish	
9.19	Donation	
9.20	Others (Specify)	

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

10. MOSQUITO AND BEDNET USE

10.1. Does this household have a mosquito net? 1 = Yes 2 = No (IF NO, GO TO 11)	10.2. Where did you get it from: 1 = A Shop 2 = An agency/Church 3 = Ministry of Health 4= Others (specify)_____	10.3. Who slept under the mosquito net last night? (Probe - enter all responses mentioned) 1. Children less than 5 years 2. Children over 5 years 3. Pregnant woman 4. Mother 5. Father 6. Nobody uses

11. LIVESTOCK OWNERSHIP

11.1	Do you own livestock? (Chicken not included) 1=Yes; 2=NO	
11.2	Has the size of your livestock herd changed in the last 6 months? (1=increased, 2=reduced, 3=remained the same)	
11.3	If increased what are the reasons? ***(Multiple responses are acceptable)*** (1=animals gave birth, 2=bought, 3=given, 4=raid, 5= Dowry; 6=restocking; 7=donation; 8=Other (specify)	
11.4	If decreased, What are the reasons? ***(Multiple responses are acceptable)*** (1=sold, 2=death because of drought, 5=death because diseases, 6=sold, 7=raid, 8= Dowry; 9=Other (specify)	

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

12. ADULTS NUTRITIONAL STATUS

QUESTIONS TO BE ANSWERED IF CARE GIVER IS A FEMALE: • Measure MUAC of caregiver only if a child from her household was measured in SECTION 13 • Caregiver must be female between 15 and 49 years of age • If there are multiple caregivers, interview only the one who is a primary caregiver		
11.1. How old are you? _____ years	**11.2. What is the woman's current physiological status? (Ask carefully and Circle)** 1. = Currently pregnant 2. = Breastfeeding (<6months infant) 3. = Breastfeeding (6-24months) 4. = Pregnant and breastfeeding *5.* = Not pregnant/not breastfeeding	**11.3. MUAC (mm), left arm (To the nearest 0.1 mm), do not round up** _____.____mm

Name of District	Name of Division	Name of sub location	Cluster Number	Team number	Household Number	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
						____/____/____		

13. ANTHROPOMETRY AND SELECTIVE FEEDING PROGRAMMES FOR ALL CHILDREN 6-59 MONTHS

	Name of children 6-59 months	Sex 1=M 2=F	Birth date dd/mm/yyyy	Age in months	Weight (to the nearest 0.1kg)	Height (to the nearest 0.1cm)	Oedema Yes=Y No=N	MUAC cm	Is the child currently in any feeding programme? 0=No 1=SFP 2=OTP 3=SC 4= Not sure/Do not know	Was child admitted in BSFP? 0=No 1=Yes 88= Not sure/Do not know
1										
2										
3										
4										
5										

QUESTIONNAIRE FOR MORTALITY RATE CALCULATION

District: _____ Division _____Sub-location----------Cluster number: _____ Team number: _____

Date of Interview_____ Name of Interviewer_____ Name of Team Leader_____

Name of Coordinator_____

HH No.	Total no in household	Total under 5 in House-hold	Total Join House-hold since 24th February	Total Under 5 join Household since 24th February	Total Leave Household since 24th February	Total under 5 leave Household since 24th February	No. of births since 24th February 2010	Total deaths since 24th February	Total No. under 5 deaths since 24th February
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

LOCAL EVENTS CALENDAR
2010

		2005		2006		2007		2008		2009		**2010**
January (LOKWANG)		New year **Discussion of Bomas draft**		New year	**48**	New year	**36**	New year **Post election violence, rise of IDP'S, Opening of sesame gold mine**	**24**	New year/ **Maka mpya, A woman kills a merille at kokuro**	**12**	New year ECLIPSE OF THE SUN, MARICH BRIDGE SWEPT BY FLOOD
February (LODUNGE)			**59**		**47**	**Polio campaign**	**35**	**Koffi Annan signs Kenya peace accord**	**23**		**11**	
March(LOMARUK)	**Long rains**		**58**		**46**	**Polio campaign**	**34**		**22**	**Polio kanipen**	**10**	
April (LOCHOTO)			**57**	**Floods in Lomil,1st Turkana to be appointed minister**	**45**	**PPR - disease for small livestock**	**33**	**Resurgence of Lommo(PPR)**	**21**	**Counsellor Aule's arrest; dry grass relief**	**9**	
May (TITIMA)			**56**	**Measles outbreak**	**44**	**Lokwamusing Massacre**	**32**	**Napena, yellow maize flour**	**20**		**8**	
June (EEL EEL)			**55**		**43**	**Registration of voters, bridge**	**31**	**Kenya oil comes to Lodwar for extraction**	**19**	**Polio kanipen**	**7**	

						collapses in Kainuk , Wathog bites child in Kanamkemer						
July (LORARA)		**Death of Natubwa (seer)**	**54**		**42**	**Nominations**	**30**	**Demonstration about the district HQ in Lokori**	**18**		**6**	
August (LOSUBAN)		**Mission plane crashes, Death of Dr. Garang**	**53**	**Elephant swept away by R.Turkwel, Flush floods , SFP/TFP**	**41**	**Death of Ashraf**	**29**	**Napeiton massacre**	**17**	census		
September (LOTIAK)			**52**		**40**	**Power connection in Kainuk**	**28**	**Accident of Kangitit girls high school**	**16**	CHOLERA OUTBREAK		
October (LOOPO)	**Short rains**	**Eclipse of the sun(ARIBOKIN)**	**51**		**39**		**27**		**15**	NADAPAL(LOKI) BORDER CONFLICT		

November (LOMUK)		**Referendum (Orange and Banana campaigns)**	**50**		**38**		**26**	**Obama wins the USA elections**	**14**	COUNCELLORS DIE IN NAKURU ROAD ACCIDENT		
December (LOLONGUK)		Christmas	**49**	Christmas	**37**	Elections Christmas **gold discovered**	**25**	Christmas **Lorengippi massacre**	**13**	Christmas		

CHART FOR CALCULATING AGE IN MONTHS

(Accurate at May 2010)
Please cross - check against data of birth of child and date of survey to establish actual age

DATE OF BIRTH	AGE IN MONTHS	DATE OF BIRTH	AGE IN MONTHS
		August -2008	21
		September - 2008	20
June- 2005	59	October – 2008	19
July – 2005	58	November – 2008	18
August – 2005	57	December – 2008	17
September - 2005	56	January – 2009	16
October – 2005	55	February– 2009	15
November - 2005	54	March - 2009	14
December- 2005	53	April – 2009	13
January - 2006	52	May – 2009	12
February - 2006	51	June – 2009	11
March - 2006	50	July – 2009	10
April - 2006	49	August – 2009	9
May - 2006	48	September – 2009	8
June - 2006	47	October - 2009	7
July - 2006	46	November – 2009	6
August - 2006	45	December - 2009	5
September - 2006	44	January - 2010	4
October-2006	43	February - 2010	3
November - 2006	42	March- 2010	2
December - 2006	41	April - 2010	1
January - 2007	40		
February - 2007	39		
March - 2007	38		
April - 2007	37		
May - 2007	36		
June - 2007	35		
July - 2007	34		
August - 2007	33		
September - 2007	32		
October - 2007	31		
November - 2007	30		
December - 2007	29		
January- 2008	28		
February - 2008	27		
March - 2008	26		
April - 2008	25		
May - 2008	24		
June - 2008	23		
July - 2008	22		