Report of a Multiple Indicator Cluster Survey (MICS)

22nd-26th December 2014

Kutum town, Kassab and Fata Borno camps of Kutum Locality

Sudan

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List of Abbreviations

ARI	Acute respiratory infection
ANC	Ante-natal care
BCG	Bacillus Chalmette Guerin strain
BSFP	Blanket supplementary feeding programme
CHF	Common Humanitarian Fund
CHP	Community Health Promoter
CI	Confidence interval (at 95% throughout report)
cm	Centimetre
COOPI	Cooperazione Internazionale (Italy)
CMR	Crude Mortality Rate
DPT	Diphtheria, pertussis, tetanus
ECHO	European Commission's Humanitarian Aid and Civil Protection department
ENA	Emergency nutrition assessment
EPI	Expanded programme of immunisation
FAO	Food and Agricultural Organization
FEWS NET	Famine Early Warnings System Network
GAM	Global acute malnutrition
GFD	General food distribution
HAC	Humanitarian Aid Commission
HAZ	Height for age z-score
HFA	Height for age
HIV (+)	Human Immunodeficiency Virus (positive)
HH	Household
IDP	Internally displaced person
IGA	Income generating activity
IMCI	Integrated management of childhood illness
INGO	International non-governmental organisation
KAEDS	Kutum agriculture extension and development society
KAPB	Knowledge, Attitudes, Practices and Behaviour
kg	Kilogram
LLITN	Long life insecticide treated net
MICS	Multiple Indicator Cluster Survey
mm	Millimetre
MoH	Ministry of Health
MtCT	Mother to Child transmission
MUAC	Mid Upper Arm Circumference
N	Total number
n	Number in sub group
NCHS	National Centre For Health Statistics
NFIs	Non-food items
NGO	Non-governmental organization
NIPP	Nutrition impact positive practice
Nov	November
OFDA	Office of U.S. Foreign Disaster Assistance

ORS	Oral rehydration solution
OTP	Outpatient therapeutic programme
Penta	Pentavelant
PHC	Primary Health Care
PNC	Post-natal care
REFLECT	Regenerated Freirean Literacy through Empowering Community Techniques
SAF	Sudanese Armed Forces
SAM	Severe acute malnutrition
SC	Stabilisation Centre
SD	Standard deviation
SDG	Sudanese pound
SFP	Supplementary feeding programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
STI	Sexually transmitted infection
TBA	Traditional birth attendant
TSFP	Targeted supplementary feeding programme
TT1	Tetanus toxoid, 1 dose
TT2	Tetanus toxoid, 2 doses
WASH	Water and sanitation/hygiene
WAZ	Weight for age z-score
WES	Water, environment and sanitation (sector)
WFH	Weight for height
WFP	World Food Programme
WHZ	Weight for height z-score
WHO	World Health Organization
U5MR	Under 5 years mortality rate
UNAMID	United Nations African Union Mission in Darfur
UNFPA	United Nations Fund for Population Activities
UNHCR	United nation high commissioner for Refugees
UN	United Nations
UNICEF	United Nation Children Fund

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Executive Summary

Methodology

A 26*30 cluster sample approach was adopted for the survey using SMART[1] methodology, covering Kutum town, Kassab and Fata Borno camps of Kutum Locality. The survey took place from the 22nd – 26th December 2014, using Ministry of Health (MoH) and GOAL survey guidelines.

Across the 30 clusters: 746 children aged between six and 59 months were randomly selected for the collection of anthropometric data; health data was analyzed for 798 children between 0-59 months; infant feeding data was analyzed for 294 infants between 0-23 months. Household data was analyzed for 779 households including information covering general health, food security, livelihoods and HIV. Mortality data was analyzed for 4,820 people to estimate the retrospective mortality rates. The plausibility report generated by SMART scored the overall survey at 6% which means that the quality of the data is good.

Overall objective

To identify the current situation in GOAL catchment areas in terms of health, water, sanitation and hygiene (WASH), HIV, nutrition, food security and livelihoods.

Key findings

Anthropometric indices (WHO standards 2006)

Acute malnutrition

Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All N = 743	**Boys** N = 371	**Girls** N = 372
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(81) 10.9 % (8.1 - 14.5 95% C.I.)	(42) 11.3 % (7.4 - 17.0 95% C.I.)	(39) 10.5 % (7.2 - 15.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(67) 9.0 % (6.6 - 12.2 95% C.I.)	(34) 9.2 % (5.9 - 14.1 95% C.I.)	(33) 8.9 % (5.9 - 13.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(14) 1.9 % (1.1 - 3.2 95% C.I.)	(8) 2.2 % (1.0 - 4.5 95% C.I.)	(6) 1.6 % (0.7 - 3.5 95% C.I.)

The prevalence of oedema is 0.0%

[1] Standardized Monitoring and Assessment of Relief and Transitions, October 2007, M. Golden et al

Mortality

GOAL Kutum MICS by year	CMR: Total deaths/10,000 people/day	U5MR: Deaths 0-5 years/10,000 children 0-5 years/day
Kutum MICS 2014 (95% CI)	0.39 (0.20-0.74)	1.70 (0.86-3.34)
Kutum KAPB 2013 (95% CI)	0.3 (0.08-1.10)	0.8 (0.19-3.31)
Kutum MICS 2012 (95% CI)	0.46 (0.25-0.85)	1.14 (0.51-2.52)
Kutum MICS 2011 (95% CI)	0.35 (0.20-0.63)	0.81 (0.31-2.11)
Kutum MICS 2010 (95% CI)	0.22 (0.05-0.39)	0.26 (0.06-0.58)
Kutum MICS 2009 (95% CI)	0.45 (0.29-0.70)	0.41 (0.16-1.06)
Sphere Emergency Threshold	0.8	2.1
Sphere Average baseline for Sub Saharan Africa	0.41	1.07

Morbidity

Prevalence of reported illness in children in the two weeks prior to survey 0-59 months (N=798):

Prevalence of reported illness	32.7**%** (n=261, 95% CI 29.54-36.04)

Indicators

All the surveys were conducted in Kutum urban, Kassab and Fata Borno camps, however the difference in seasonal timings of the 2007 and 2014 survey makes it unsuitable for direct comparison with the other surveys any comparisons with these two surveys need to take seasonality into account. Results for 2009 include the key nutrition, child health and mortality statistics only. No MICS was conducted in 2008 due to insecurity in the area.

INDICATOR		Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
General Population Demographics								
Average HH size		6.1	-	6.2	5.5	5.5	6.4	6.3
Average number <5years per HH		1.5	-	1.4	0.79	1.6	0.9	1.0
% Permanent residents		31.6	-	42.3	26.0	40.1	33.2	32.0
% Returnees (in last 12 months)		0.5	-	0.6	0.3	0.4	0	0.6
% IDPs (in last 12 months)		66.3	-	5.5	0	0.7	3.1	0.6
% IDPs (1-5Yrs)			-	10.3	0.06	1.8	2.8	1.2
% IDPs (5Yrs +)			-	41	73.1	56.6	60.6	65.4
% Refugees (in last 12 months)		-	-	0.3	0	0	0	0.1
% Female headed HHs		2.3	-	16.7	22.1	11.0	29.1	23.0
Mortality								
Crude mortality rate (/10,000/day)		0.28	0.45	0.22	0.35	0.50	0.3	0.39
Under 5 death rate (/10,000/day)		1.13	0.41	0.26	0.81	1.14	0.8	1.70
Leading cause of death in family members >5		-	-	Aging	Old age	Old age/ Unknown	None	None
Leading cause of death in family members <5		-	-	Malaria	Neonatal	Neonatal	None	Neonatal/ unknown
Nutrition								
% 6-59 months MUAC <11.5cm		0.5	-	0.7	2.3	1.0	-[2]	0.3
% 6-59 months MUAC 11.5-12.5cm		3.5	-	9.3	3.1	5.0	-	4.2
% GAM: Global acute malnutrition	(WHO)	-	-	16.2	13.3	17.6	-	10.9
% GAM: Global acute malnutrition	(NCHS)	16.4	19.6	14.2	12.6	18.0	-	10.5
% SAM: Severe acute malnutrition	(WHO)	-	-	2.6	2.9	2.6	-	1.9
% SAM: Severe acute malnutrition	(NCHS)	0.9	1.5	1.6	1.4	1.3	-	0.8

[2] The authorities were not asked for permission for these nutrition indicators to be collected during the 2013 KAPB Survey due to a National Survey which was conducted in May 2013 by UNICEF/MoH.

INDICATOR		Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
% Global underweight	(WHO)	-	-	20.1	21.5	24.8	-	21.9
% Global underweight	(NCHS)	-	-	28.0	29.5	32.5	-	29.2
% Severe underweight	(WHO)	-	-	3.9	2.9	3.4	-	3.4
% Severe underweight	(NCHS)	-	-	4.4	3.1	3.4	-	4.7
% Global chronic malnutrition; stunting	(WHO)	-	-	18.9	21.7	18.1	-	27.1
% Global chronic malnutrition; stunting	(NCHS)	21.5	16.3	15.1	16.6	12.6	-	19.9
Vaccination Status[3]								
% 6-59months Vitamin A in the past 6 months, recall or card		98.2	94.7	93.1	98.1	93.0	91.6	84.2
% 9-59 months Measles with card		54.8	75.6	56.6	82.2	87.2	88.5	90.3
% 9-59months Measles, recall and card		92.2	97.4	95.9	91.8	92.2	96.1	92.8
% 12-23 months measles, recall and card		-	-	-	-	100	96.0	92.9
% 6-59 months with BCG scar		83.5	92.4	88.6	82.7	-	-	-
% 6-59months3 doses DPT with card		58.8	74.3	58	-	-	-	-
% 6-59months 3 doses DPT, recall and card		97.2	98.3	98.3	-	-	-	-
% 6-59months 3 doses Pentavalent with card		-	76.5	57.8	89.4	93.2	89.6	94.2
% 6-59months 3 doses Pentavalent, recall and card		-	98.2	98.1	100	99.2	97.2	97.2
% under 12 months 3 doses Pentavalent, recall and card		-	-	-		95.6	91.4	79.9
Childhood Illness								
% 0-59months ill in 2 weeks prior to survey[4]		53.1	29.5	30.5	30.7	32.0	30.0	32.7
Main cause of illness in children <5 years		ARI (82.5%)	Cough / difficult	(36.6%) Other[5]	Fever/ malaria (29.5%)	Fever/ malaria (20.8%)	Fever/Malaria (11.9%)	Fever/Malaria (25.3%)

[3] Previous to the 2011 MICS Measles for children 9-59 months and Penta3 for children 6-59 months

[4] For this indicator the age group for analysis was 6-59 months for the surveys preceding the 2013 survey.

[5] The majority of 'other' diseases found were flu. It is about 60.4% (87) of the total 'other' diseases (144)

INDICATOR	Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
		breathing (50.4%)					
% children <5 with diarrhoeal disease in the last 2 weeks (mothers recall)	-	-	-		19.2	0.4	6.6
% of children ill with fever 2 weeks before the survey who were brought to a health facility by their carer[6]	27.6	-	68.6	-	40.0	40.6	59.1
% of mothers of children <5 who would refer their child to a health facility if they had a cough with difficult breathing	40	-	74.0	73.3	-	-	-
Infant and Young Child Feeding							
% of children <24 months ever breastfed	94	-	99.7	100	95.6	99.0	98.6
% of children <24 months put to the breast within the first hour of life	88	-	91.8	89.9	87.3	76.5	94.6
% of infants <6 months exclusively breastfed, 24 hours before survey	2.0		65.3	65.9	52.8	52.4	40.4
% of children 12-15 months receiving breast milk, 24 hours prior to survey	-	-	90.6	81.0	64.5	68.0	98.4
% of children 20-23 months receiving breast milk, 24 hours prior to survey	-	-	47.4	60.0	37.0	25.0	82.9
% of infants 6-8 months receiving complementary foods, 24 hours prior to survey	37.5	-	76.9	87.0	76.0	84.6	97.9
% of children 6-23 months receiving food from 4 or more food groups, 24 hours prior to survey	-	-	1.1	0	0.8	20.9	6.8
% of children 6-23 months who received the minimum acceptable diet during the last 24 hours (including minimum diet diversity & meal frequency)	-	-	-	-	0.8	18.5	6.7
% of mothers who provide increased fluids and continued feeding during diarrhoeal disease	-	-	35.0[7]	45.3[8]	32.0	24.1	29.2
% of mothers who provide ORS/salt sugar solution to a child with diarrhoea	-	-	40.2	45.8	-	-	-
Reproductive Health[9]							

[6] Prior to 2012, this was analyzed for any illness, not specifically fever
[7] This result relates to positive caring practices when their child had diarrhoea, by giving more fluids, more food or more breast feeding
[8] This result relates to positive caring practices when their child had diarrhoea, by giving more fluids, more food or more breast feeding
[9] From 2011, all mothers with a child under the age of 5 were asked to respond based on the birth of their youngest child; all other years the question was only asked to women who had given birth in the last year

INDICATOR	Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
(asked to mothers with children under five, in relation to their youngest child)							
% of women who gave birth in the past five years who attended a health facility for delivery	17	-	10.9	6.9	10.4	12.0	13.5
% of women who gave birth in the past five years who had a skilled attendant at delivery	63	-	67.6	48.9	74.3	67.4	63.7
% of mothers who gave birth in the past five years who attended 2 or more ANC visits	92	-	98.4	96.2	94.3	90.5	95.4
% of mothers who gave birth in the past five years who attended 4 or more ANC visits	-	-	-	-	81.9	74.6	84.9
%TT1 coverage, women who gave birth in last five years, recall	-	-	9.3	29.0	1.1	5.4	0.6
%TT1 coverage, women who gave birth in last five years, recall and card	32	-	18.6	81.9	35.1	74.8	88.3
%TT2 coverage, women who gave birth in last five years, recall	36.4	-	47.8	21.9	1.9	4.8	0.8
%TT2 coverage, women who gave birth in last five years, recall and card	56.4	-	70.5	58.7	42.6	40.7	60.6
% mothers who received post natal check-up	61	-	57.5	68.5	71.1	65.3	79.7
% of newborns who received a post natal check-up	7	-	2.8	56.7	71.1	72.2	68.2
HIV							
% HHs who know at least one way to prevent HIV	44.4	-	75.1	60.0	82.0	73.4	71.8
% HHs who know 2 or more ways to prevent HIV	0	-	34.9	26.7	81.6	49.1	48.4
% of population who received an HIV test in the previous 12 months and know their results	-	-	-	-	5.5	0.7	1.0
% HHs who would support / accept community member living with HIV	-	-	34	30.0	45.6	39.4	52.0
General Health							
% HHs who perceive an improvement in their health status since the same time last year	-	-	26.4	36.6	26.5	38.1	21.1
Main factor contributing to an improvement (% HHs)	-	-	46.3% (improved health services)	65.4% (improved health services)	61.1% (improved health services)	38.2% (both improved health	39.5% (improved health services)

INDICATOR	Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
						services and more access to food)	
% HHs who perceive a deterioration in their health status since the same time last year	-	-	47.4	30.9	44.9	39.8	34.9
Perceived main factor contributing to a deterioration (% HHs)	-	-	47.8 (Less access to food)	36.3 (less access to food)	45.1 (less access to food)	47.0 (less access to food)	42.5 cost of health services too expensive
Malaria[10]							
% HHs reporting ownership of at least one mosquito net	73.2	-	82.5	LLITN 74.4	87.1	82.7	85.9
Average number of nets owned per HH	2.4	-	2.2	LLITN 1.7	2.4	2.6	2.5
% of children <5 years who slept under net on the night before survey	23	-	32.6	56.9	41.8	44.1	72.9
% of pregnant women who slept under net on night before survey	-	-	36.5	37.5	63.6	26.1	67.5
% of survey population who slept under net on the night before survey	18	-	15.3	17.5	14.7	13.5	37.5
% HHs who can correctly identify how malaria is transmitted	73.4	-	74.3	82.4	79.8	85.1	86.1
Livelihoods							
Main HH expenditure	-	-	89.9 (food)	97.3 (food)	96.7 (food)	95.2% (food)	86.8% (food)
Main source of food for households in the community	46.9	-	80.4 (food aid)	81.0[11] (food aid)	54.0 (food aid)	65.4% (bought in the market)	67.5% (bought in the market)
% of HH with two or more sources of food	-	-	74.4	59.1	31.6	64.7	58.6

[10] The malaria results for 2011 are based on ownership of LLITNs and not mosquito nets generally.
[11] Includes first and second response

INDICATOR	Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
% HHs reporting own production of food	-	-	-	-	30.5	20.1	29.4
Most frequent duration of food reserves from previous harvest (months)	5.6 months	-	< 3 months (56.7)	<3 months (48.0)	<3months (24.3)	3-6 months (59.2%)	<3 months (42.7%)
% of households who can indicate that there are at least three food groups in stock in the home (on day of survey)					1.8	0.7	3.1
% HHs reporting increased harvest yields from the last harvest	-	-	-	-	2.6	57.7	37.8
% HHs indicating 2 or more sources of cash income	8.3	-	7.1	0	14.7	25.9	17.5
% HHs reporting increased income in the past 12 months	-	-	-	-	74.3	22.1	19.4
% of targeted HHs having two or more income sources AND report income has increased, in the last 12 months	-	-	-	-	11.4	10.4	4.6
% women with children <5 years accessing IGA	-	-	-	-	25.7	34.3	24.9[12]
Water, Sanitation and Hygiene (WASH)							
% HHs reporting washing their hands at least 3 appropriate times (After defecation/after handling child faeces, before cooking, before eating)	-	-	-	26.7	47.0	42.3	19.0
% HHs reporting washing their hands before cooking AND before eating AND after defecation	-	-	-		32.0	32.9	7.8
% HHs with soap at the place for hand washing	-	-	87	90.1	68.6	77.2	75.3
% of HH with a designated hand washing area with soap or other locally available material for hand washing available in the home					62.5	73.4	75.3
% HHs using protected water source, dry season	75.7	-	84.4	75.6	78.3	75.8	82.9
% HHs using protected water source, wet season	76.5	-	84.4	75.9	77.9	75.7	85.1
% HHs taking <1hour to collect water, round trip	53.6	-	48.3	56.6	37.9	-	-
% HHs taking <30 minutes to walk to the nearest improved water source	-	-	-	-	-	33.7	41.2

[12] Includes HHs without children

INDICATOR	Nov 2007	May 2009	June 2010	May 2011	May 2012	June 2013	Dec 2014
Average daily consumption of water (litres/person/day)	19 litres	-	10.9 litres	8.5 litres	10.2 litres	9.9 litres	11.8 litres
% HHs using less than 10 litres per person per day	-	-	48.1	63.4	56.6	64.4	50.6
% HHs using more than 15 litres per person per day	-	-	26.2	16.7	15.4	14.2	12.6
% HHs reporting correct water transportation and storage (including clean container)	-	-	-	-	11.9	25.3	20.8
% HHs with appropriate water storage container (clean container, covered and narrow neck)	-	-	-	-	11.8	18.0	24.9
% HH using undesignated open area for defecation	1.5	-	0.5	0.6	0.4	3.1	3.0[13]
% HH using a latrine for defecation	54.8	-	56.6	98.1	99.3	96.2[14]	96.7[15]
% HHs who indicate that they wash their hands after defecation	29.7	-	52.3	61.0	65.4	61.6	25.2

[13] Includes both designated open area and undesignated open area.
[14] Total of HHs using their own latrine, a communal latrine and those using a neighbour's latrine.
[15] Ibid

Recommendations:

The recommendations below are to be introduced in the next 12 months.

1. GOAL to review NIPP coverage to ensure it is in line with increased GAM and adequately fills the gap left by SFP.

2. Appropriate infant feeding practices to be emphasized through Care group, NIPP, general health education and thematic discussion; specifically exclusive breast feeding.

3. Barrier analyses to be conducted to understand complimentary feeding and design appropriate response.

4. Food security to be improved through home production interventions, increasing access to micronutrient-rich foods such as moringa in collaboration with KEADS who are carrying out livelihood activities in Darfur.

4. GOAL to investigate current income generating activities among women in order to understand barriers and opportunities and then design a plan to support improved access to IGA for vulnerable women.

5. A barrier analysis should be conducted to investigate water storage.

6. Focus group discussions should be held on how hand washing instruction should be carried out within different intervention groups and different groups within the urban community.

6. In 2015, GOAL will work through partners to improve HIV awareness including ways of transmission and prevention of HIV, continue mainstreaming and programmes aimed at reducing stigma.

7. GOAL partners to provide condom distribution only in conjunction with treatment for sexually transmitted infections.

1.0 Background

The survey covered the same geographical areas sampled in the previous MICS from 2007 and 2009-2013. This includes: Kutum Town, Kassab and Fata Borno Internally Displaced People (IDP) Camps (see Appendix 5 for a map of the area). Although GOAL continues to support health facilities in rural areas outside Kutum town to provide PHC services, they are excluded from the survey sample because GOAL is generally unable to access these areas due to the precarious security environment.

Darfur region consists of five states (previously three prior to 2011). The five states of North, Central, West, East and South Darfur cover a vast area of 510,000 km (one-fifth of Sudan), stretching from the Sahara Desert in the north to the equatorial forest in the south. Darfur shares borders with the Sudanese states of North and West Kordofan and Bahr el Ghazal and with the neighbouring countries of Egypt, Libya, Chad and the Central African Republic[16].

Darfur's population of about 7.5 million is scattered over an area the size of France and the region lacks basic infrastructure and social services. The land used to belong to tribes and there are 36 main tribes in the region. Traditionally, conflicts were settled with little or no violence by respected local councils, but these were abolished in 1989 and no mechanisms for resolving disputes peacefully replaced them[17].

The conflict in Darfur flared in 2003 when rebels took up arms. Civilians came under attack from a number of groups, Arab militias fought one another and there were frequent clashes between tribes. Levels of violence fell after 2005; in 2009, the outgoing commander of the UN Peacekeepers stated that the conflict was effectively over and isolated attacks and banditry were the region's main problems. However, in 2010, fighting escalated again for a period. Currently, since 2013, violence is on the rise again. Since February 2014, the Sudan Armed Forces (SAF) have intensified military operations against Darfur rebel groups in North and South Darfur.

Many villages were destroyed and hundreds of thousands of people fled the violence into camps or sought refuge with host communities; there are still an estimated 2 million people displaced, who fled their homes at the height of the conflict between 2003 and 2005[18]. In the first half of 2014 alone, continuing conflict has resulted in further burning of villages and looting of assets (including livestock) and displacing roughly 400,000 people – the largest wave of displacement since conflict erupted there 12 years ago.

Although 30-35% of new IDPs returned to their home villages by early July 2014, widespread loss of assets and reduced access to land for planting due to this insecurity has compromised households' access to food and livelihoods.
Despite negotiated and signed peace deals since 2006, Darfur is no closer to peace.

[16] Fenstein International Famine Centre: Darfur, Livelihoods under siege. June 2005
[17] http://www.trust.org/spotlight/Darfur-conflict accessed 29/01/2015
[18] Ibid

Darfur, as a whole, has been extremely vulnerable to food insecurity for many years, largely due to a combination of poor rains and infertile soils[19]. The conflict accelerated the deterioration in the situation by causing many families to flee rural areas in favour of urban towns and villages in order to seek security and assistance. As a result of abandoning their land and traditional coping strategies the majority of people now depend upon food aid as a means of survival. Continuing insecurity limits people's access to key natural resources and land areas vital for livestock and crop production and reduces the opportunities for the durable restoration of livelihoods throughout Darfur.[20]

According to WFP's food security monitoring, in May 2014 the proportion of food insecure households had increased slightly compared to the same period last year. However, given the exceptionally low crop production in the 2013/14 season, very high food prices and increased conflict the food situation was better than expected possibly due to increased food assistance. At that time, more than half the households in resident and IDP locations could not afford the cost of the local food basket which was at 4.3 SDG per person per day, the highest on record: 41% above the May 2013 level, almost 150% above the May 2012 level, and 250% above the May 2011 level. Wage labour continues to be the main income source for IDPs and households in mixed communities[21].

In December 2014, the main harvests continued, but harvests will be below average in parts of Darfur where ongoing conflict limited agricultural activities. However, despite a 20-30% reduction in area planted in western El fasher, Kutum and El Serief localities as a result of conflict and displacement, prospects are much better in North Darfur compared to average. Overall cereal production is likely to be 120% above the five-year average due to favourable weather conditions. Staple food prices continued to decline in most markets in November 2014. The projected outlook for food security through to March 2015 is that, despite good harvests, displaced households in areas of Darfur where conflict persists will not benefit from improved food security conditions as much as other poor households. Most IDPs did not have access to cultivation and income generating opportunities and, as a result, despite declining food prices, IDP households will remain unable to meet the minimum food requirements and many will remain reliant on host community households for food. Therefore, a large proportion of the IDP population in Darfur will remain in a 'stressed' acute food security situation through the first quarter of 2015[22].

In 2009, several NGOs were expelled from the Darfur region by the Government of Sudan, which resulted in a reduction of operational NGOs in Kutum and affecting the provision and support to all essential basic services. Between 2011 and 2013, a further four or five NGOs have left the Darfur region due to different reasons such as access issues and funding issues, and no new NGOs have come to the area.

[19] Darfur Joint Assessment Mission (D-JAM): Status of Natural Resources and the Environment. August 2006
[20] FAO Factsheet, October 2010. http://www.fao.org/fileadmin/templates/tc/tce/pdf/SudanNorth_FACTSHEET_FSLcluster_Oct2010.pdf
[21] http://reliefweb.int/report/sudan/north-darfur-sudan-food-security-monitoring-may-2014, accessed 29/01/2015
[22] http://www.fews.net/east-africa/sudan/food-security-outlook-update/december-2015, accessed 29/01/2015

Kutum locality is situated north-west of the North Darfur State capital, El Fasher, with an estimated urban population of 79,631[23], Kutum town is approximately 200km by sand road from El Fasher.

Traditionally, the main livelihoods in Kutum locality are pastoralism and farming (dry river bed – *wadi* - farmers), which are both highly dependent on annual rainfall. However, repeated periods of drought, the recent war, and sporadic conflict have resulted in the destruction of cultivated and grazing lands. In some areas, agricultural production has virtually ground to a halt as displaced populations are unable to access their fields. Now, 10 years on from the original conflict, the main source of livelihood for the households in the Kutum locality is small scale farming of fruits, vegetables, cereals, and small-scale keeping of livestock (i.e., sheep, goats and cattle)[24].

Displaced people are no longer allowed to settle in new camps so they merge into existing camps or towns where UNAMID have bases. Conducting population verification assessments in these areas remains a challenge.

Kutum town
The current residents of Kutum include those displaced from the rural areas around Kutum. The estimated population of Kutum town is 45,035[25].

Kassab IDP camp
Kassab Camp is an IDP camp situated 3 km outside Kutum Town, with approximately 26,509 resident IDPs. Kassab Camp was established in March 2004 to provide shelter for IDPs who at that time were living in the *wadi* (dry river beds) of Kutum Town. WFP provides food through local partners. Sudan's Ministry of Water, Environment and Sanitation (WES) provides water and sanitation. GOAL provides health care as well as distributing shelter materials and non-food–items (NFIs).

Fata Borno IDP camp
Fata Borno camp, which is approximately 12 km from Kutum town, houses 4,416 IDPs. The camp serves IDPs from areas around Fata Borno and from Fata Borno Town itself. The areas around Fata Borno are insecure, with residents and NGOs continuing to report high incidences of abuse including robberies and abductions. GOAL is supporting a MoH health clinic in Fata Borno Town, which operates six days per week.

GOAL Darfur Programme Activities

The GOAL Darfur programme is an integrated programme combining activities of primary health care (curative and reproductive health), health promotion, WASH, livelihoods, nutrition, and emergency response and relief distribution. This programme has been operational since February 2004.

[23] This population figure only includes Kutum town and the two IDP camps, Kassab and Fata Borno, and was last updated in May 2014 from WFP population data and community leaders.
[24] Darfur Development and Reconstruction Agency Trade and Market Bulletin North Darfur-April 2011
[25] Population dat taken from WFP's estimation, 2008

Table 1: Other Agencies operating in Kutum Locality

Agency	Activities
UN agencies	
WFP	Feeding programmes including food for work, SFP, Blanket under 5 and GFD.
UNICEF	Visit to monitor: education, nutrition, WASH Support to IMCI programme
UNFPA	Visit to monitor: RH issues including GBV
FAO	Visit to monitor: food and agriculture
WHO	Visit to monitor: health care delivery, maternal and child morbidity and mortality reduction
UNHCR	Visit to monitor: NFI distributions
International NGOs	
German Agro Action (WHH/GAA)	Food Security, livelihoods, education, food/NFIs
Save the Children – Sweden (SCS)	Child protection, education
COOPI	Water
National NGOs	
Darfur Peace Development (DPDO)	Adult literacy and IGA, women's wealth
Sudanese Red Crescent (SRC)	First aid training, training centre
Kutum Agricultural Extension and Development Society (KEADS)	Agriculture and food distributions, capacity building, nutrition program (TSFP and BSFP) with WFP

2.0 Objectives of the survey

2.1 Overall objective of the survey

To identify the current situation in Kutum Locality in terms of health, WASH, HIV, nutrition, food security and livelihoods.

2.2 Specific objectives

- To assess the overall prevalence of malnutrition in all GOAL operation areas.
- To estimate the immunization coverage of measles, DPT3/Pentavalent 3 and vitamin A supplementation of children under five years of age in the survey areas.
- To estimate retrospective under-five and crude mortality rates over the three months prior to the survey time.
- To assess the morbidity of children under five years during the two weeks prior to the survey time.
- To assess infant and young child feeding practices among children less than 24 months of age.
- To assess household conditions of health, water and sanitation, and livelihood issues in the survey areas.
- To compare the situation to the previous year at the survey areas.
- To propose necessary recommendations for future interventions.

3.0 Methodology

3.1 First stage of sampling: sampling procedure and sample size for

anthropometric and mortality data

A two-stage cluster survey was conducted covering urban Kutum Locality (Kutum town, Kassab camp and Fata Borno camp) using the SMART[26] methodology (26x30) with probability proportional to size at the first stage of sampling. A total population of 79,631[27] was used, with the under-five year old population estimated at 17%[28]. A total of 118 villages were included for possible selection and there was no reason to exclude any of them. Therefore, the sampling frame was N=118 (Appendix 1).

Clusters were selected using the ENA software (March 2011 version). The villages included in the sample frame were entered into the software with their population numbers. The ENA software then randomly assigned clusters, with the chance of each village being chosen being proportional to its population size. Using this technique allows every child the same probability of being selected. In order for a survey to be truly representative, every member of the population must have an equal chance of being chosen. Thirty clusters were selected at this stage (Appendix 1).

Calculating sample size for anthropometric data

Sample size was calculated using ENA software, with an expected 37.6% prevalence of malnutrition which was the prevalence of malnutrition found in the last national nutrition survey conducted in Kutum in June 2013. A precision of 5% was used, with a design effect of 1.5 to compensate for differences within clusters. The average household size was five people, taken from the MoH. The proportion of under five year olds was taken as 17%[29]. A 3% contingency was included in case of non-response or invalid data. This gave a sample size of 589 children and 793 households.

Calculating sample size for mortality data

Two-stage cluster sampling was also used to estimate mortality rates. The same clusters were used for mortality as were used to estimate malnutrition. Sample size was calculated using ENA software, with a total population of 79,631, an estimated death rate of 2[30], a precision of ±1/10,000/day[31], a design effect of 1.5; average household size of five, asused by the MoH, and a 3% margin for non-response. The recall period was a total of 90 days from 23 September until 21 December 2014 (the Sunday before the MICS started); 23 September was the Muslim festival of Eid Al Fitr and is a widely remembered event. This gave a sample size of 1394 people and 287 households to be included.
The sample size, in relation to households, was found to be larger with the anthropometric sample calculation, therefore this figure (793) was taken as the

[26] Standardized Monitoring and Assessment of Relief and Transitions, October 2007, M. Golden et al
[27] This population figure only includes Kutum town and the two IDP camps, Kassab and Fata Borno, and was last updated in May 2014 from WFP population data and community leaders.
[28] MoH national nutrition guidelines
[29] Ibid
[30] Ibid
[31] Ibid

sample size for mortality and anthropometry. This resulted in 26 households being surveyed in each cluster (793/30), giving a total of 780 households over all.

3.2 Second stage of sampling: selection of households and children

Selection of households

Upon reaching the randomly selected village, the village chief was found and introductions made and the purpose of the survey explained. The chief provided a Community Guide to accompany the team. The Guide began by showing the team to the center of the village. At the center of the village a pen was spun and the teams walked to the edge of the village in the direction shown by the pen, counting the houses along this line. The first house to be surveyed was selected randomly by drawing a number, from 1 to the total houses counted, blindly; the number picked became the first household to be surveyed and thereafter every household with the nearest door on the right until all 26 households were surveyed. If a household was not at home when the survey team passed, they noted the household name and number and returned later.

Selection of children

For the child questionnaires, the mother or the child's care-taker was interviewed. The child morbidity and vaccination questions were asked regarding all children in the household between 0 and 59 months. In the same households, the young child and infant feeding questions were conducted for all infants aged 0-23 months. Additionally, anthropometric measurements were taken for all children from 6-59 months. If a child was missing, s/he was sent for and the survey team returned to the household. If a child was not at home when the survey team passed, they noted the household name and number and returned later.

Changes to SMART clusters

Three reserve clusters were identified by the ENA software, but none were required. All clusters that were originally identified were surveyed.

3.3 Data collected

Data was collected from 22nd to 26th December 2014[32] through anthropometric measurements and child and household questionnaires (see Appendix 4). Most children in the area have a birth certificate or vaccination card with their date of birth noted on it, so these were used to determine the age of a child. If neither of these documents were available and the mother was unsure of her child's birth date, the age was determined using a detailed local events calendar (see Appendix 2) to avoid rounding to whole year numbers. Height cut-offs were not used to estimate age, in order to allow an estimation of chronic malnutrition.

Mortality questionnaire

- Total number of people in the household

[32] Note that this survey should have taken place in June 2014 but due to the security situation and lack of access during this time the survey was delayed until safe access was restored.

- Number of children under five years
- Number of people who left the household within the recall period (total and under five years)
- Number of people who joined the household within the recall period (total and under five years)
- Number of births in the household within the recall period
- Number of deaths in the household within the recall period (total and under five years)
- Cause of deaths

Child questionnaire

- Sex and age (determined using an events calendar if no birth record available)
- Weight (in kilograms) measured to a precision of 0.1 kg using electronic Seca scales
- Height (in centimeters) measured to the nearest 0.1 cm using Short height boards. Children <=87 cm were measured lying down; children >87 cm were measured standing
- Presence of bilateral pitting oedema on both feet after three seconds of pressure
- Mid upper arm circumference (MUAC) (in centimeters) measured to the nearest 0.1 cm
- Inclusion in a feeding programme (SFP, OTP, SC and/or nutrition circle)
- Morbidity status over the previous two weeks and type of illness
- Treatment seeking behavior for fever
- Overall immunization status - Penta3; measles and vitamin A received within the last six months (all based on documentation on the child's health card or confirmation by mother/caretaker if a card was not available)
- Feeding practices if the child has diarrhoea
- Breastfeeding
- 24 hour dietary recall and frequency of eating

Household Questionnaire

- Demographics
- Education and decision making
- Water, sanitation and hygiene
- Food Security and livelihoods (sources of income, spends, main sources of food, cultivation, food reserves)
- Malaria (knowledge, net ownership and use)
- General health status of household
- Reproductive health (ANC visits, tetanus toxoid, place of delivery, delivery attendant, PNC)
- HIV (knowledge, stigma, testing)

3.4 Training and Supervision

Training

Before data collection began, 27 enumerators were trained, some who had participated in the survey before: 18 were GOAL staff (11 from Nutrition, one from REFLECT, two from WASH, one from CHPs, one from school Health Club, one from care group, and an additional one individual from REFLECT trained as a "reserve" enumerator). The remaining were two from KEADS, three from the El Fasher MoH, and four from the locality MOH.

Training lasted three days and covered the essentials of a survey, the correct way for interviewers to ask questions and how to translate the questions into local language with back translation, the development and use of the local events calendar and the survey methodology. All team members were trained on how to take correct anthropometric measurements and completed a practical session of weighing and measuring children. The teams practiced conducting the questionnaires beforehand to ensure their comprehension, to bring out any translation difficulties in the training and to tailor the closed-end questionnaire choices to the local context. The teams also conducted a pilot survey that was carried out in Kassab Camp, in areas that were not included in the clusters chosen for the survey. Each team practiced selecting their first household as described above, measuring children and conducting the questionnaires. On return from the pilot test, difficulties encountered were discussed and necessary changes were made to the questionnaires to make them more locally applicable and any difficulties encountered discussed and resolved. Roles within the team were allocated based on competence during the pilot survey, previous experience and language proficiency. Only responsible senior staffs were chosen as supervisors; team leaders were selected from among local staff because of local language ability.

Supervision

There were two overall supervisors, including a representative from the MoH who was responsible to visit and support the teams in the field during data collection. The Nutrition Coordinator who has successfully run a number of GOAL MICS was responsible for the overall leadership of the training and data collection. She was supported by the Community Processes Manager from GOAL and one person from the MOH. The GOAL Health Support Officer was responsible for the data entry. These overall supervisors also conducted the training and led the pilot survey. There were six teams of four members each, which included a team supervisor, two measurers and a team leader. Each team supervisor provided daily feedback and reviewed the data collected with their overall supervisor at the end of each day.

3.5 Steps taken to minimize bias

The reduction of any potential bias during the implementation of the survey is vital to ensure that the data is of good quality, the following were included in the survey to help reduce the incidence of bias:

- Each team was led by a responsible and well-trained member of senior staff;
- Use of a local events calendar to determine the age in months of the children when birth records were not available;
- Calibrating balances with test weights and continual zeroing of balances;

- Ensuring height boards in working order and MUAC tapes in good condition;
- Refreshments provided in the field to motivate the team members and increase energy so that fatigue and hunger did not influence taking short-cuts;
- Verification of extreme values (re-weighing/measuring, or returning to households to verify data);
- Returning to the households if children were missed and/or households were not at home;
- Slightly changing the selection of households to reflect the reality on the ground so as not to compromise the random element of the survey;
- No changes to the survey were allowed and/or made without the approval of the Survey Coordinator;
- Thorough time dedicated to interviewing techniques and translation difficulties in training;
- All questionnaires were written and recorded in Arabic; a translator fluent in local language was at hand in each team at all times;
- Field supervision conducted by GOAL and MoH together in order to ensure high quality data collection.

3.6 Data analysis

Across the 30 clusters, 746 children aged between six and 59 months were randomly selected for the collection of anthropometric data. This data was checked for outliers (values that lie +/-3 SD from the observed mean). Outliers were flagged by the ENA software as not being plausible values of either weight, height or age therefore the SMART flags were excluded from the analysis as seen in Table 2 below (also see Appendix 3 for the NCHS reference flags). Therefore, weight-for-height data was analyzed for 743 children, weight-for-age for 741 children, and height-for-age for 735 children aged 6-59 months using ENA software (version August 2014). The number of children analyzed is more than the number required when calculating the sample size. The total sample size required was 589 including a 3% contingency. This means the precision of the results will be tighter than indicated when calculating the sample.

Table 2: Mean z-scores, Design Effects and excluded subjects (WHO Standards, 2006)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available	z-scores out of range
Weight-for-Height	743	-0.85±0.96	1.82	1	2
Weight-for-Age	741	-1.30±0.90	1.82	1	4
Height-for-Age	735	-1.31±1.09	3.11	0	11

Health data was analyzed for 798 children between 0-59 months and infant feeding data was analyzed for 294 infants between 0-23 months using Microsoft Excel. Household data was analyzed for 779 households using Microsoft Excel. Mortality data was analyzed for 4,820 people using ENA software, version August 2014, to estimate the retrospective mortality rates, significantly more than the 1,394 people predicted when the sample size was calculated. The plausibility report generated by ENA (Appendix 6) scored the overall survey at 6% which means that the quality of the data is good.

Interpreting the data

The MICS is a cross-sectional study that generates descriptive data such as the prevalence of malnutrition by taking a 'snapshot' at one point in time for one location, in this case for Kutum Locality in December 2014. When prevalence is presented, the denominator is also presented in this report as "N". Cross-sectional studies are helpful for looking at relationships among different variables (by using different statistical tests) for example the difference in the level of malnutrition in female versus male-headed households. The statistical tests determine whether the difference in figures for the variable under investigation between the two groups being compared is great enough to really be a 'significant' difference where one can see a trend developing. Simply, this significant difference is shown throughout this report by the p-value, which if less than 0.05 means that there is a significant difference and 95% confidence intervals (CI) are used to judge the statistical precision of point estimates, whereby the more precise the estimate, the tighter the CI. Where means are presented throughout the report, a standard deviation (SD) will be presented which is the measure of spread around the mean.

Cross-sectional studies are also helpful by making generalizations about the characteristics of the population as a whole by collecting data from a random representative sample with a big enough sample size. To be able to generalize about the population in the survey area, 95% CI's are also produced, which tell the reader the range of values in which the real value for the survey area would lie 95 out of 100 times if one were to repeat the same survey 100 times. The actual prevalence that is presented is the value that the sample generated, which falls within the confidence interval, but the real population value is always unknown other than the range produced by the confidence interval.

Cross-sectional studies, however do not provide causal information or insight into temporal relationships, i.e. whether the exposure preceded or followed the outcome, as both are measured at the same time, such as if one were measuring wasting and illness, did the illness occur before the wasting started or after? These are the limitations of cross-sectional studies and so one should read the report with caution when looking at variables that are significantly associated and not assign causality.

3.7 Classifying malnutrition

Weight-for-height

Weight-for-height z-scores (WHZ) were calculated to give the prevalence of acute malnutrition or wasting. Wasting can be assessed by comparing a child's weight with the weight that would be expected from a healthy child of the same height. For the purposes of this report, the WHO growth standards, (2006) are used as the healthy comparison group.

A z-score is a measure of how far the child deviates from the mean WHO or NCHS record for his age or height, and therefore a measure of how well he is growing compared to the 'norm.' Prevalence of malnutrition according to the NCHS 1977 reference were also analyzed and presented in Appendix 3. As seen below, wasting

is defined as <-2 z-scores (global acute malnutrition), whereas severe wasting is defined as <-3 z-scores (severe acute malnutrition).[33]

Table 3: Wasting as defined by WHO

Global Acute Malnutrition (GAM) Moderate & Severe wasting	<-2 z-scores / <80% median weight-for-height (WFH) and/or oedema
Severe Acute Malnutrition (SAM) Severe wasting	<-3 z-scores / <70% median weight-for-height (WFH) and/or oedema

Mid-upper arm circumference (MUAC)

The MUAC increases in size during the first year of a child's life quite significantly, but relatively little between the ages of 1-5 years. At birth an infant's upper arm circumference is about 105 mm. By the age of one year, it will have grown on average to about 165 mm. Over the next four years until the child is five years old, the circumference only grows about 10 mm to 175 mm at the most[34]. Any child aged between 1-5 years whose arm circumference is less than 125 mm may be acutely malnourished and less than 115 mm severely malnourished. MUAC is a simple and important tool because it is the best predictor of those cases most at risk of dying once the MUAC falls below 115 mm; however, it is not a sensitive early predictor of malnutrition[35]. In recent years MUAC has been increasingly used for children from six to 59 months of age.

Height-for-age

Height-for-age z-scores were calculated to give the prevalence of chronic malnutrition or stunting. Stunting can be assessed by comparing a child's height with the height of a healthy child of the same age. Stunting is an index of long-term nutritional deprivation where growth is being compromised to conserve nutrients and energy for the maintenance of the body. It is also necessary to know the exact age of the child to accurately determine stunting. As seen in the Table 4 below, stunting is defined as <-2 z-scores, whereas severe stunting is defined as <-3 z-scores.

Table 4: Stunting as defined by WHO

Global Chronic Malnutrition Global Stunting	<-2 z-scores / <90% median height-for-age (HFA)
Severe Chronic Malnutrition Severe Stunting	<-3 z-scores / <80% median height-for-age (HFA)

Weight-for-age

Weight-for-age z-scores were calculated to give the prevalence of under nutrition or underweight. Underweight can be assessed by comparing a child's weight with

[33] Z-score criteria always yield a greater prevalence of malnutrition than use of the percent of median criteria. This is because the former takes into account variation in the standard deviation of weight at different heights, making it more statistically valid. For this reason WHO recommends use of z-scores for the presentation of malnutrition prevalence.

[34] Health link Worldwide. Growth monitoring Health Basics. Diarrhoea Dialogue online. March 1986: 24

[35] WHO/UNICEF. WHO child growth standards and the identification of severe acute malnutrition in infants and children: A joint statement. 2009.

the weight of a healthy child of the same age. It is also necessary to know the exact age of the child to accurately determine underweight. Underweight is defined as <-2 z-scores, whereas severe underweight is defined as <-3 z-scores.

Population cut-offs for malnutrition

The table below defines the population cut-offs for determining the severity of the malnutrition when the prevalence of acute and chronic malnutrition is known. These levels are internationally agreed upon and provide an objective basis for developing responses to increased levels of acute and chronic malnutrition[36]. To interpret proportions at a population level with meaning, absolute numbers are also necessary (i.e. 8% of a large population will be many more than 15% of a small population).

Table 5: WHO population cut-offs for chronic and acute malnutrition

Index	Normal/ Low	Poor/ Medium	Serious/ High	Critical/ Very high
Global Underweight	<10%	10-19.9%	20-29.9%	>30%
Global Chronic Malnutrition	<20%	20-29%	30-39%	≥40
Global Acute Malnutrition	<5%	5-9%	10-14%	≥15
Mean weight for height z-score (GAM)	>-0.40	-0.40 to –0.69	-0.70 to –0.99	≤-1.00

[36] Physical Status: The use and interpretation of Anthropometry. Report of a WHO expert committee, 1995. Chapter 5, p208 & 212

4.0 Results

4.1. Descriptive Statistics

Anthropometric data was collected for 746 children aged 6-59 months and, having removed outliers, was analysed using the WHO Standard, 2006 for 743 children for weight-for-height, 741 children for weight-for-age and 735 children for height-for-age.

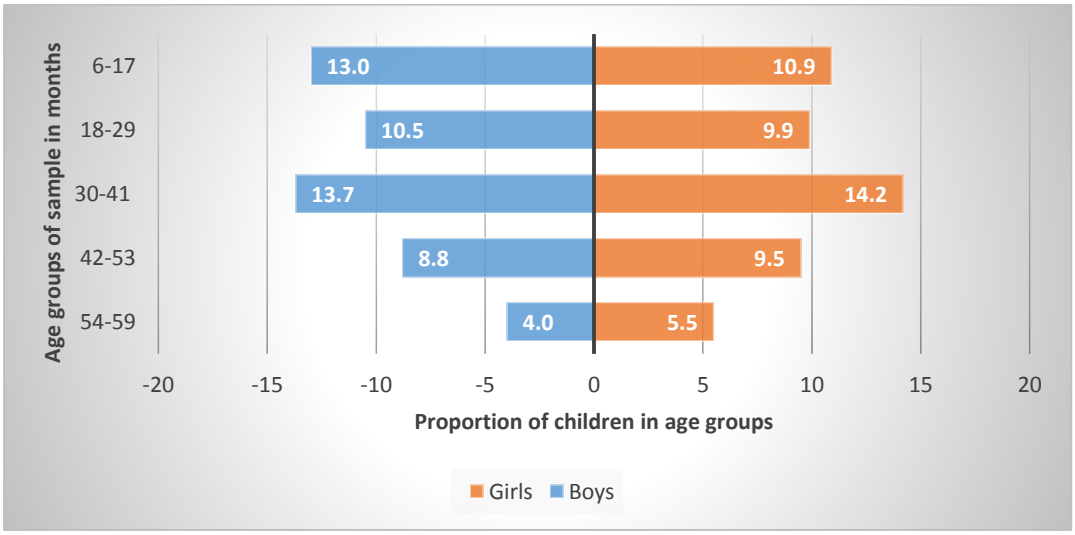
Table 6: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (months)	no.	%	no.	%	no.	%	Boy: girl
6-17	97	54.5	81	45.5	178	23.9	1.2
18-29	78	51.3	74	48.7	152	20.4	1.1
30-41	102	49.0	106	51.0	208	27.9	1.0
42-53	66	48.2	71	51.8	137	18.4	0.9
54-59	30	42.3	41	57.7	71	9.5	0.7
Total	373	50.0	373	50.0	746	100.0	1.0

Table 6 above shows the distribution of age and sex of the surveyed children.

The distribution of the sample by sex shows no significant difference found in the number of boys and girls, p-value = 1.000 showing that boys and girls are equally represented. The over-all age distribution showed a significant difference, p-value = 0.001 as compared to data compiled by Michael Golden based on extensive age distribution research[37]. This was due to the age distribution of both the boys and the girls which was significantly different than expected (p-value = 0.019 and p-value = 0.041). Therefore the overall sex/age distribution is showing a significant difference to what should be expected in the sample population (p-value = 0.000).

Figure 1: Population age and sex pyramid for the 6-59 month sample (N=746)



[37] SMART Training Tools: Survey Manager Training Module 7, Annex 7.4: Group 1 = 6-17 months = 23.2%; Group 2 = 18-29 months = 22.6%; Group 3 = 30-41 months = 21.9%; Group 4 = 42-53 months = 21.6%; Group 5 = 54-59 months = 10.7%.

4.2 Anthropometric indices (WHO standards 2006)

4.2.1 Acute malnutrition (Weight-for-height)

The prevalence of GAM and SAM weight-for-height index values were calculated for the prevalence of acute malnutrition, or wasting, as seen below in Table 7. There was no significant difference in the prevalence of GAM and SAM between boys and girls (p-value = 0.7850, p-value = 0.6847 respectively).

There is no significant difference between the prevalence of SAM found in this survey and that found in the 2012 survey[38] (p-value = 0.4501); however a significant difference was found between the prevalence of GAM found in this survey and that found in 2012 (p-value = 0.0036).

The results analysed using the NCHS Reference population data, 1977 are presented in Appendix 3.

Table 7: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (WHO, 2006)

	All N = 743	**Boys** N = 371	**Girls** N = 372
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(81) 10.9 % (8.1 - 14.5 95% C.I.)	(42) 11.3 % (7.4 - 17.0 95% C.I.)	(39) 10.5 % (7.2 - 15.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(67) 9.0 % (6.6 - 12.2 95% C.I.)	(34) 9.2 % (5.9 - 14.1 95% C.I.)	(33) 8.9 % (5.9 - 13.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(14) 1.9 % (1.1 - 3.2 95% C.I.)	(8) 2.2 % (1.0 - 4.5 95% C.I.)	(6) 1.6 % (0.7 - 3.5 95% C.I.)

The prevalence of oedema is 0.0 %

Table 8: Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores (WHO, 2006)

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 15 (2.0 %)	Not severely malnourished No. 7300 (98.0 %)

[38] Anthropometric data was not collected during the 2013 survey therefore no comparisons can be made with this survey.

Figure 2: Frequency distribution of weight for height z-scores (WHO, 2006)

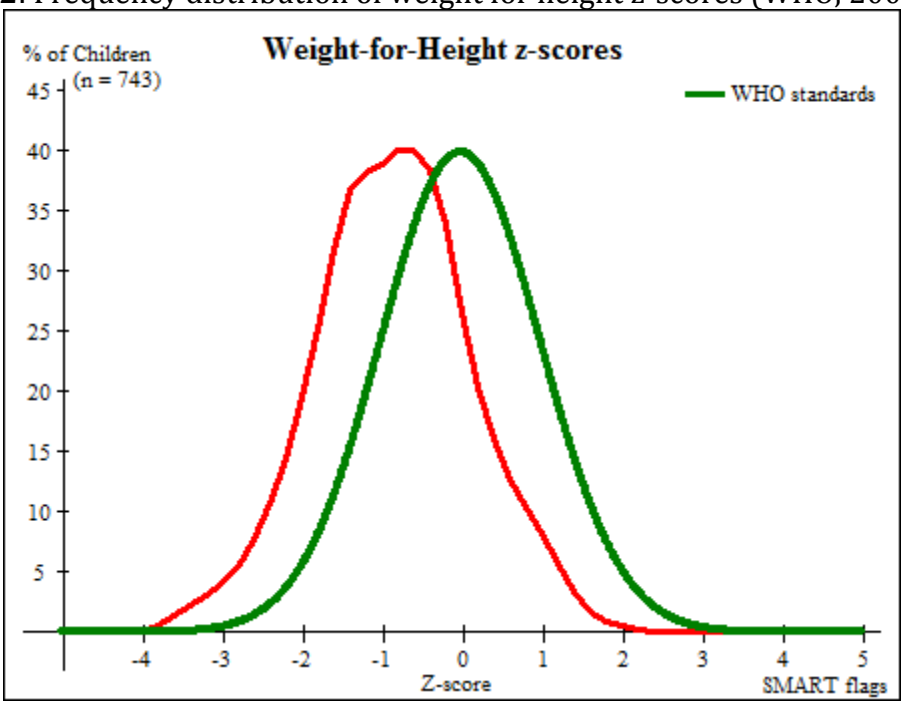


Figure 2 above shows the distribution curve of WHZ of the 743 sampled children is shifted to the left of the reference population with a mean W/H Z-score -0.85±0.96 SD below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population. The standard deviation of the curve (±0.96) lies within accepted benchmarks (0.8 – 1.2)[39], showing an acceptable accuracy of the measurements taken.

The skewness (-0.03) of the WHZ distribution is within accepted limits of -0.2 and +0.2 showing that the distribution can be considered as symmetrical, and the kurtosis at -0.01 is less than an absolute value of 0.2 so the distribution can be considered as normal.

Acute malnutrition by age group

Table 9: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema (WHO, 2006)

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	177	4	2.3	22	12.4	151	85.3	0	0.0
18-29	152	5	3.3	12	7.9	135	88.8	0	0.0
30-41	207	1	0.5	15	7.2	191	92.3	0	0.0
42-53	137	4	2.9	11	8.0	122	89.1	0	0.0
54-59	70	0	0.0	7	10.0	63	90.0	0	0.0
Total	743	14	1.9	67	9.0	662	89.1	0	0.0

[39] M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food Security in Crisis Situations: SMART Methodology

Table 10: Prevalence of wasting by major age group based on weight-for-height z-scores (WHO, 2006)

	Prevalence of global acute malnutrition (WHZ<-2 z-score and/or oedema)	Prevalence of severe acute malnutrition (WHZ<-3 z-score and/or oedema)
6-29 months (N=329)	13.1% (n= 43) 95% CI 8.6-19.3	2.7% (n= 9) 95% CI 1.4-5.2
30-59 months (N=414)	9.2% (n= 38) 95% CI 6.8-12.3	1.2% (n= 5) 95% CI 0.5-2.9

The results of GAM and SAM for the two major age groups (6-29 months and 30-59 months) show no significant difference between the two age groups (p-value = 0.2225 and p-value = 0.2722 respectively).

Mid-Upper Arm Circumference (MUAC)

Table 11: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex (WHO, 2006)

	All N = 745	Boys N = 372	Girls N = 373
Prevalence of global malnutrition (< 125 mm and/or oedema)	(33) 4.4 % (2.8 - 6.9 95% C.I.)	(12) 3.2 % (1.7 - 6.2 95% C.I.)	(21) 5.6 % (3.1 - 9.9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(31) 4.2 % (2.6 - 6.5 95% C.I.)	(11) 3.0 % (1.4 - 6.0 95% C.I.)	(20) 5.4 % (2.9 - 9.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(2) 0.3 % (0.0 - 2.0 95% C.I.)	(1) 0.3 % (0.0 - 2.0 95% C.I.)	(1) 0.3 % (0.0 - 2.0 95% C.I.)

A mean MUAC of 142.4 mm ±10.7mm was found amongst the 746 children measured.

Table 12: Prevalence of acute malnutrition by age, based on MUAC cut off and/or oedema (WHO, 2006)

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	178	2	1.1	17	9.6	159	89.3	0	0.0
18-29	152	0	0.0	11	7.2	141	92.8	0	0.0
30-41	207	0	0.0	3	1.4	204	98.6	0	0.0
42-53	137	0	0.0	0	0.0	137	100.0	0	0.0
54-59	71	0	0.0	0	0.0	71	100.0	0	0.0
Total	745	2	0.3	31	4.2	712	95.6	0	0.0

MUAC measurements were taken for children 6-59 months. A MUAC of less than 115mm signifies severe wasting, when the child has a higher risk of death[40].

4.2.2 Underweight (Weight-for-age)

Table 13: Prevalence of underweight based on weight-for-age by sex (WHO, 2006)

	All N = 741	**Boys** N = 370	**Girls** N = 371
Prevalence of underweight (<-2 z-score)	(162) 21.9 % (18.0 - 26.3 95% C.I.)	(86) 23.2 % (17.9 - 29.6 95% C.I.)	(76) 20.5 % (16.2 - 25.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(137) 18.5 % (14.7 - 23.0 95% C.I.)	(68) 18.4 % (14.2 - 23.4 95% C.I.)	(69) 18.6 % (14.0 - 24.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(25) 3.4 % (1.8 - 6.1 95% C.I.)	(18) 4.9 % (2.2 - 10.6 95% C.I.)	(7) 1.9 % (0.8 - 4.2 95% C.I.)

Figure 3: Frequency distribution of weight for age z-scores (WHO, 2006)

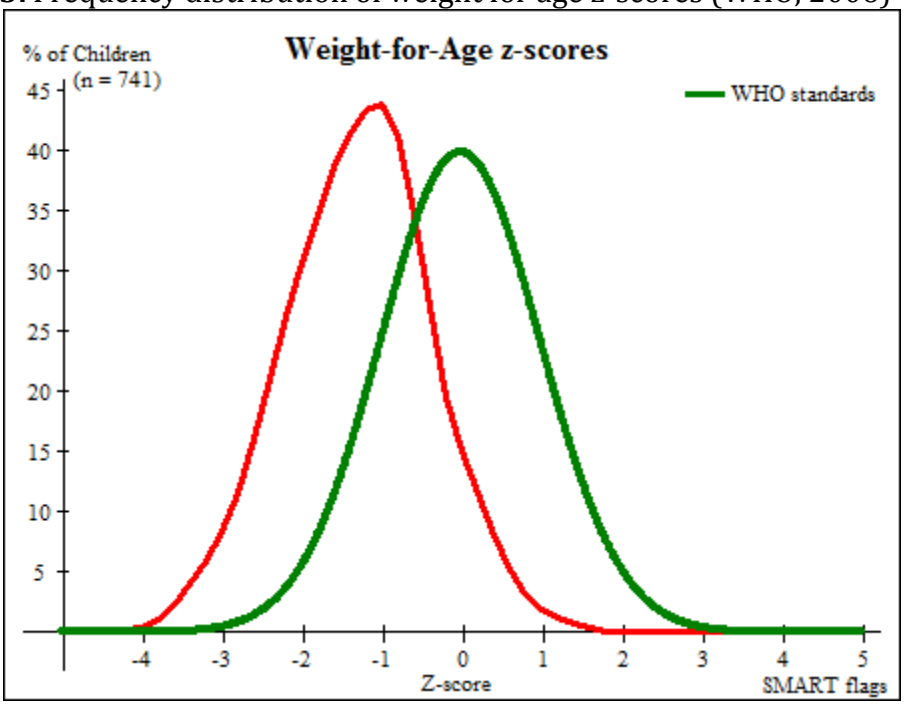


Figure 3 above shows the distribution curve of WAZ of the 741 sampled children is shifted to the left of the reference population with a mean WAZ of -1.30 ± 1.09SD below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population. The standard deviation of the curve (±1.09) lies within accepted benchmarks (0.8 – 1.2)[41], showing accuracy of the measurements taken.

40 WHO/UNICEF Joint Statement. WHO Child Growth Standards and the identification of severe acute malnutrition in infants and children. Geneva, 2009.

41 M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food Security in Crisis Situations: SMART Methodology

The skewness (-0.04) of the WAZ distribution is within accepted limits of -0.2 and +0.2 showing that the distribution can be considered as symmetrical, and the kurtosis at -0.04 is less than an absolute value of 0.2 so the distribution can be considered as normal.

Table 14: Prevalence of underweight by age, based on weight-for-age z-scores and oedema (WHO, 2006)

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	175	10	5.7	30	17.1	135	77.1	0	0.0
18-29	152	7	4.6	37	24.3	108	71.1	0	0.0
30-41	208	6	2.9	32	15.4	170	81.7	0	0.0
42-53	136	1	0.7	28	20.6	107	78.7	0	0.0
54-59	70	1	1.4	10	14.3	59	84.3	0	0.0
Total	741	25	3.4	137	18.5	579	78.1	0	0.0

4.2.3 Stunting (Height-for-age)

The prevalence of stunting is calculated based on height-for-age z-scores (HAZ). Calculation of height-for-age index values from the data revealed a prevalence of chronic malnutrition, or stunting at 27.1% compared to 18.1% in the 2012 survey, which is a significant increase (p-value = 0.0036). In 2012, the prevalence had decreased to a level classified as normal/low according to the WHO population cut-offs for chronic malnutrition as shown in Table 5 rather than 'poor' in the 2011 survey; however, this result is showing that the prevalence has again increased and is now in the 'poor' category. For severe stunting, 2014 figures found 6.0% compared to 3.9% in 2012, which is not a significant increase (p-value = 0.2035).

Table 15: Prevalence of stunting based on height-for-age z-scores and by sex (WHO, 2006)

	All N = 735	**Boys** N = 367	**Girls** N = 368
Prevalence of stunting (<-2 z-score)	(199) 27.1 % (21.6 - 33.4 95% C.I.)	(112) 30.5 % (23.8 - 38.2 95% C.I.)	(87) 23.6 % (18.2 - 30.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(155) 21.1 % (16.6 - 26.4 95% C.I.)	(84) 22.9 % (17.5 - 29.3 95% C.I.)	(71) 19.3 % (14.5 - 25.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(44) 6.0 % (4.0 - 8.9 95% C.I.)	(28) 7.6 % (4.8 - 11.9 95% C.I.)	(16) 4.3 % (2.5 - 7.5 95% C.I.)

Figure 4: Distribution of height -for- age z-scores for children 6-59 months (WHO, 2006)

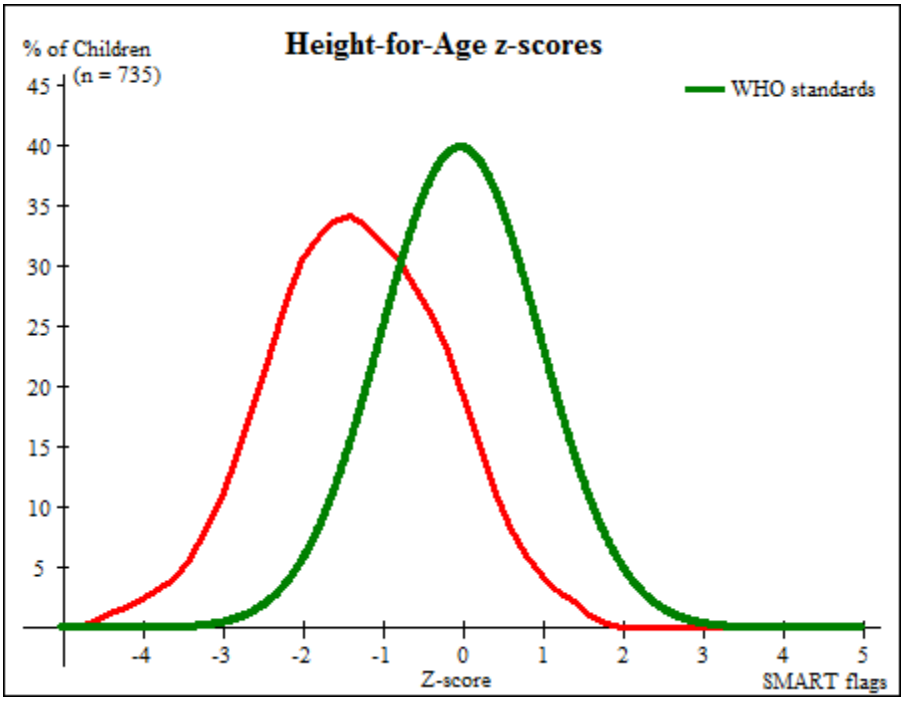


Figure 4 above shows the distribution curve of HAZ of the 735 sampled children is shifted to the left of the reference population with a mean HAZ -1.31±1.09 SD below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population. The standard deviation of the curve (±1.09) lies within accepted benchmarks (0.8 – 1.2)[42], showing that the data is acceptable for the measurements taken.

The skewness (-0.05) of the HAZ distribution is within accepted limits of -0.2 and +0.2 showing that the distribution can be considered as symmetrical, and the kurtosis at -0.23 is less than an absolute value of 0.2 so the distribution can be considered as normal.

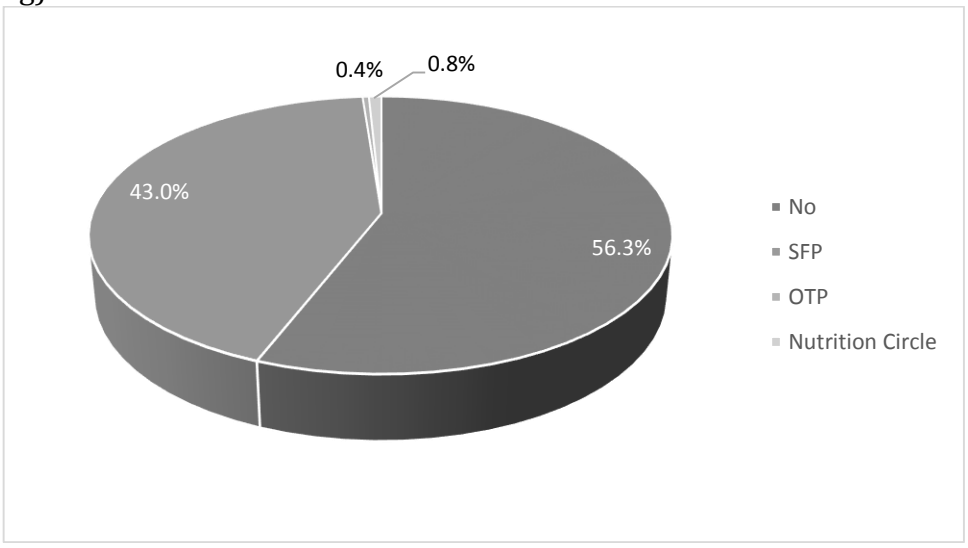
Table 16: Prevalence of stunting by age based on height-for-age z-scores (WHO, 2006)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	12	6.9	31	17.8	131	75.3
18-29	149	15	10.1	52	34.9	82	55.0
30-41	205	10	4.9	43	21.0	152	74.1
42-53	136	4	2.9	23	16.9	109	80.1
54-59	71	3	4.2	6	8.5	62	87.3
Total	735	44	6.0	155	21.1	536	72.9

[42] M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food Security in Crisis Situations: SMART Methodology

4.2.4 Nutrition Programme Coverage

Figure 5: Children (6-59 months) found to be in feeding programme (N=741, 5 missing)



Four children were registered in both the SFP and the Nutrition Circle.

Using WFH as the criteria for admission into a nutrition programme the level of nutrition programme coverage found in this survey is 397.5%. 319 children were registered in the SFP and three children in OTP. The result of programme coverage was calculated using the following method:

$$\frac{\text{Number of beneficiaries found to be attending SFP or OTP by the survey teams (322)}}{\text{Number of children <-2 z-scores WFH or oedema found by survey teams that should be attending the programme (81)}} \times 100$$

GOAL uses MUAC to screen for admission to OTP using cut-off of 11.5cm to justify admission. Using this method OTP coverage is 150% (3/2).

Of the 81 children aged 6-59 months with WHZ of <-2 only 38.3% (n=31) are registered in some form of feeding programme (including Nutrition Circles) according to the survey data.

Of the 33 children aged 6-59 months with MUAC <125 mm only 51.5% (n=17) are registered in some form of feeding programme (including Nutrition Circles) according to the survey data.

4.3 Mortality

Mortality data was collected from 780 households. The Crude Mortality Rate (CMR) was below Sphere emergency thresholds and the average baseline for Sub-

Saharan Africa, however the U5MR is bordering on the emergency threshold but above the Sub-Saharan Africa average baseline[43].

Table 17: Mortality rates

GOAL Kutum MICS by year	CMR: Total deaths/10,000 people/day	U5MR: Deaths 0-5 years/10,000 children 0-5 years/day
Kutum MICS 2014 (95% CI)	0.39 (0.20-0.74)	1.70 (0.86-3.34)
Kutum KAPB 2013 (95% CI)	0.3 (0.08-1.10)	0.8 (0.19-3.31)
Kutum MICS 2012 (95% CI)	0.46 (0.25-0.85)	1.14 (0.51-2.52)
Kutum MICS 2011 (95% CI)	0.35 (0.20-0.63)	0.81 (0.31-2.11)
Kutum MICS 2010 (95% CI)	0.22 (0.05-0.39)	0.26 (0.06-0.58)
Kutum MICS 2009 (95% CI)	0.45 (0.29-0.70)	0.41 (0.16-1.06)
Sphere Emergency Threshold	0.8	2.1
Sphere Average baseline for Sub Saharan Africa	0.41	1.07

Table 18: Details for mortality calculations (780 Households interviewed; recall period=90 days)

HH information: TOTAL		HH information: 0-5 years	
Total number HH residents	4,820	number 0-5 years	851
Total number people joined HH in recall period	174	number 0-5yrs joined HH during recall period	30
Total number people left HH in recall period	252	number 0-5 years left HH during recall period	32
Total number births during recall period	21		
Total number deaths during recall period	17	number 0-5 years deaths during recall period	13
Design effect	1.67	Design effect	1.44

The Table below illustrates the cause of death as reported by respondents. There were a total of 17 deaths; 13 were children under five years, and four were in the over five year old population.

The causes of death were reported by the survey respondents and not medically trained persons, nor were they confirmed by medical records and as such have

[43] Humanitarian Charter and Minimum Standards in Disaster Response, The Sphere Project, Third Edition, 2011, page 311, Mortality - baseline reference data by region

limitations. Cause of death should be interpreted with caution as possibly the secondary symptom or illness was reported as the cause of death.

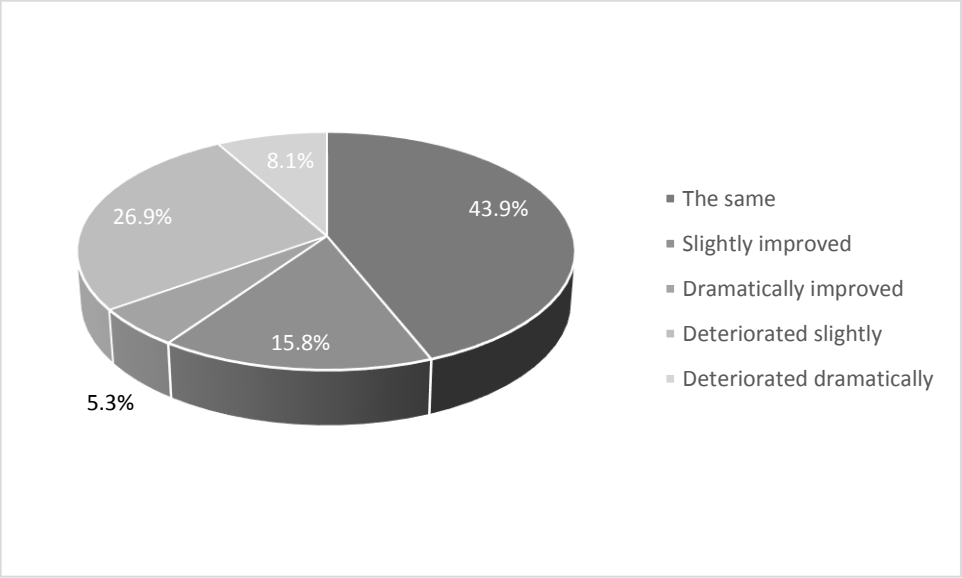
Table 19: Causes of death

Deaths >5 years		Deaths < 5 years	
Cause	**No.**	**Cause**	**No.**
Maternal Mortality	1	Neonatal Mortality	4
No cause recorded	2	Diarrhoea	2
Others - Diabetes	1	Diarrhoea and Measles	1
		Moderate diarrhoea and vomiting	1
		Moderate diarrhoea	1
		Unknown	4
Total	**4**		**13**

4.4 Perception of general health status

Respondents were asked about their perception of their family's general health status compared to last year, and what they attribute the difference to.

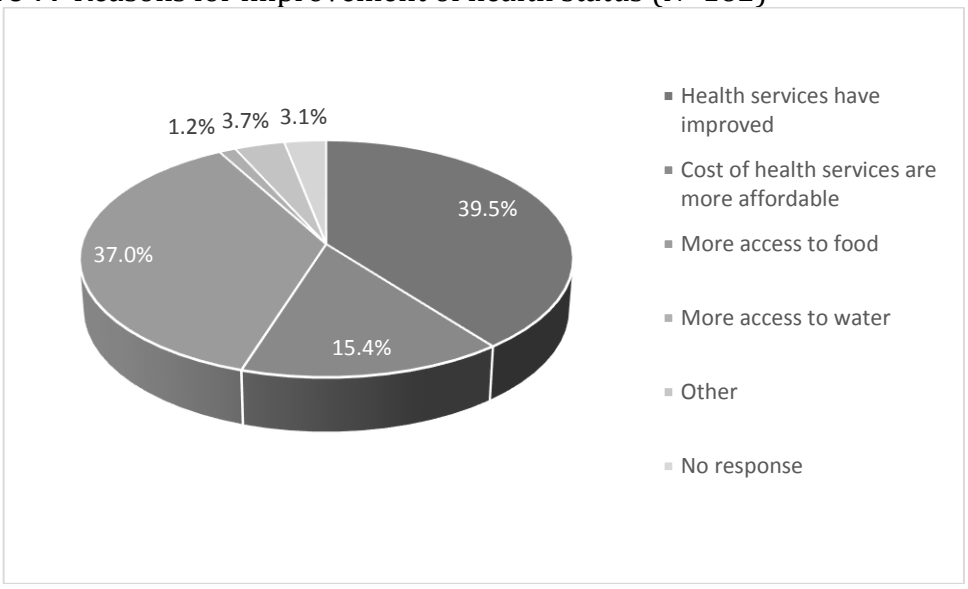
Figure 6*:* Proportion of households who perceive that their family's health status has changed in the last 12 months (N=767)



21.1% (n=162, 95% CI 18.38-24.15) of the households surveyed thought there was an improvement in their health status, while 34.9% (n=268, 95% CI 31.65-38.38) thought that their health status had deteriorated, and 43.9% (n=337, 95% CI 40.46-47.47) said it was the same health situation as last year.

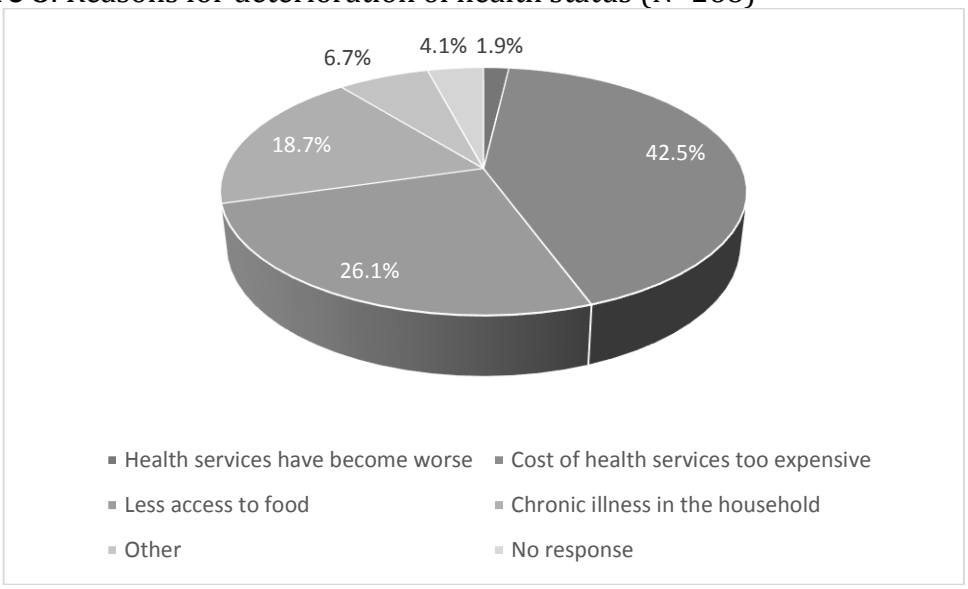
The main reasons cited for the changes in health status are shown in the figures below. Of those who thought there was an improvement in their family's health status compared to last year 39.5% (n=64, 95% CI 32.30-47.19) attributed this to improvement in health services. Those who think that their health deteriorated compared to last year cited that the main reason was as a result of the cost of health services being too expensive 42.5%, (n=114, 95% CI 36.76-48.52).

Figure 7: Reasons for improvement of health status (N=162)



'Other' responses included: found good job (n=1), not sick (n=1), same things (n=1), don't know (n=2) and unspecified (n=1).

Figure 8: Reasons for deterioration of health status (N=268)



'Others' responses include: no drugs (n=2), don't know (n=7) and disease (n=9).

Compared to the 2013 survey results (38.1%) the households who considered that the families' health had improved has shown a significant decline (p-value = 0). Those who noted a decline in the families' health status compared to the 2013 survey results (39.8%) is not a significant decline (p-value = 0.1443) but the reason for the decline has changed to the cost of the health services being too expensive, whereas since the 2010 survey to the 2013 survey the reason stated was always less access to food.

4.5 Child morbidity

Table 20: Prevalence of reported illness in children in the two weeks prior to survey 0-59 months (N=798)

Prevalence of reported illness	32.7**%** (n=261, 95% CI 29.54-36.04)

Table 21: Morbidities as reported in the last two weeks for children 0-59 months (N=261)

Illness	n	% of children ill (N=261)	% of total children (N=798)
Fever/Malaria	66	25.3%	8.3%
Cough/difficulty breathing	49	18.8%	6.1%
Diarrhoea	53	20.3%	6.6%
Measles	2	0.8%	0.3%
Eye infections	14	5.4%	1.8%
Other	61	23.4%	7.6%
Missing data	26	9.9%	3.3%

'Other' illnesses reported were: common cold (36), cough (20), allergy (2), vomiting (4) – multi diagnosis for one child

The causes of morbidity were reported by the survey respondents and not medically trained persons, nor were they confirmed by medical records and as such have limitations. Cause of morbidity should be interpreted with caution.

Rates of child morbidity have remain fairly constant at around 30-32% every year since the 2009 survey. The rate of morbidity found in this survey is slightly higher compared to the 2013 survey findings (32.7% compared to 30.0%) but this is not a significant difference (p-value = 0.41222). The main illness that the children had was malaria/fever and this has remained the same over the last five years.

The rate of children <5 years with diarrhoea has significantly increased from the 2013 survey to this survey (0.4% to 6.6%; p-value = 0).

Treatment seeking behaviour

Among respondents who indicated that their child had fever in the previous two weeks, (N=66) 59.1% reported that they brought the child to a clinic (see figure below); either a private, Government or a mobile/outreach clinic (n=39, 95% CI 47.05-70.13).

In the 2013 survey findings the proportion of children take to the health facility when they had fever was 40.6%; compared to this year's survey findings there was no significant difference in the results (p-value = 0.08544).

Of the 39 who reported that they sought treatment from a clinic/hospital 30.8% (n=12, 95% CI 18.57-46.42) sought the treatment within the first 24 hours. 66.7%

sought treatment the next day (more than 24 hours after the fever began) (n=26, 95% CI 50.98-79.37) and 2.6% did not seek treatment (n=1, 95% CI 0.45-13.18).

Table 22: Treatment seeking for fever

Treatment	n	%	95% CI
Go to a clinic/ hospital (private)	23	34.8%	24.48-46.89
Go to a clinic/ hospital (Government)	12	18.2%	10.72-29.15
Use traditional medicine	6	9.1%	4.23-18.45
Do nothing	5	7.6%	3.28-16.54
Buy drug from a pharmacy	5	7.6%	3.28-16.54
Buy drugs from a market	4	6.1%	2.38-14.57
Go to a mobile/outreach clinic	4	6.1%	2.38-14.57
Don't know	1	1.5%	0.27-8.10
Other	1	1.5%	0.27-8.10
Missing data	5	7.6%	3.28-16.54
Total	**66**	**100%**	**-**

4.6 Vaccination

Vaccination data was collected and verified by vaccination card where possible.

Table 23: Percentage of children vaccinated as reported by Kutum MICS

Children 6-59 months (N=746)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	650	87.1%	84.54-89.35
Measles, recall	22	2.9%	1.96-4.42
Measles, TOTAL	**672**	**90.1%**	**87.73-92.02**
Penta3/DPT3, Verified with card	703	94.2%	92.33-95.69
Penta3/DPT3, recall	22	2.9%	1.96-4.42
DPT3, TOTAL	**725**	**97.2%**	**95.73-98.15**
Vitamin A, card and recall	682	84.2%	89.19-93.22
Children 9-23 months (N=195)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	176	90.3%	85.28-93.67
Measles, recall	5	2.6%	1.10-5.86
Measles, TOTAL	**181**	**92.8%**	**88.31-95.68**
Children 12-23 months (N=155)			
Antigen	**n**	**%**	**95% CI**
Measles, card and recall	144	92.9%	87.74-95.99
Children under 12 months (N=149)			
Penta3/DPT3, card and recall	119	79.9%	72.71-85.52

Vaccination rates remain high and within the levels which provide the population with herd immunity. This is a continuing trend seen since 2011.

4.7 Infant and young child feeding practices

4.7.1 Feeding practices (0-23 months)

Of the children from age 0-23 months, data on infant feeding practices were analysed for 294 children. The survey found that 98.6% of children had been breastfed at some point in their lives (n=290, 95% CI 96.55-99.47). Nearly all were put to the breast within the first hour of life (94.6%, n=273, 95% CI 91.34-96.62).

Table 24: Breastfeeding practices and introduction of complementary feeding (N=294)

Indicator	Age group	Number in age group	n	%	95% CI
Children ever breast fed	0 - 23 months	294	290	98.6	96.55-99.47
Initiation of breast feeding in first hour	0 - 23 months	294	278	94.6	91.34-96.62
Exclusive breast feeding	<6 months	57	23	40.4	28.62-53.30
Eating complementary foods	6-8 months	47	46	97.9	88.89-99.62
Continued breastfeeding at 1 year	12 - 15 months	62	61	98.4	91.41-99.71
Continued breastfeeding at 2 years	20 - 23 months	35	29	82.9	67.32-91.90
Continued breastfeeding over 1 year	12-23 months	150	136	90.7	84.94-94.36

The proportion of children ever breastfed and those that were put to the breast within the first hour after birth has always shown relatively high results in all the surveys since 2011. However, the proportion of children <6 months old who have been exclusively breast fed has shown a steady decline since 2010. This decline was found to not be significant between the 2013 survey finding (52.4%) and this survey's finding (p-value = 0.34212); however, when comparing the 2011 survey result (65.9%) with this survey's result the difference was found to be significant (p-value = 0.01078) indicating a significant decline in the number of children <6 months being exclusively breast fed.

On the other side of the coin, the rate of children who are receiving complimentary foods at the correct time has shown a steady significant rise since 2012 (p-value = 0.00288).

Table 25: Fluids taken by children the day before the survey by age group:

Type of drink	0-5 months (N=57)		6-23 months (N=237)	
	n	%	n	%
Nothing at all	6	10.5	1	0.4
Vitamin drops or medicine as drops	1	1.8	18	7.6
ORS	-	-	5	2.1
Plain water	2	3.5	4	1.7
Infant formula	-	-	8	3.4
Milk (tinned, powdered or fresh)	3	5.3	80	33.8
Juice or juice drinks	3	5.3	93	39.2
Clear broth	4	7.0	15	6.3
Other water based liquids	1	1.8	36	15.2
Thin porridge	6	10.5	121	51.1
Breast milk	47	82.5	215	90.7
Other	2	3.5	4	1.7

Table 26: Food eaten by children day before the survey by age group:

Type of food	0-5 months (N=57)		6-23 months (N=237)	
	n	%	n	%
Nothing	25	43.9	2	0.8
Grains/roots/tubers	23	40.4	212	89.5
Legumes/nuts	1	1.8	131	55.3
Dairy Products	-	-	17	7.2
Flesh Foods	2	3.5	33	13.9
Eggs	-	-	26	11.0
Vitamin A rich Vegetables/Fruits	-	-	71	30.0
Other Vegetables/Fruits	-	-	19	8.0
Other – not specified	3	5.3	6	2.5
Missing records	4	7.0	-	-

4.7.2 Diet Diversity

WHO defines minimum dietary diversity as eating from at least four food groups per day, in the survey area only 6.8% (n=16, 95% CI 4.20-10.68) of children age 6-23 months were fed from four or more food groups.

Table 27: Dietary diversity, children 6-23 months, the 24 hours before the survey (N=237)

Number of food groups eaten	n	%	95% CI
None	2	0.8	0.23-3.02
One group	53	22.4	17.52-28.08
Two groups	107	45.2	38.94-51.51
Three groups	59	24.9	19.82-30.77
Four or more groups	16	6.8	4.20-10.68
Total	**237**	**100**	**-**

Table 28: Number of meals taken, the 24 hours before the survey, children aged 6-23 months (N=237)

No. of meals	Children currently breastfed				Children currently not breastfed	
	6-8 months (N=47)		9-23 months (N=182)		6-23 months (N=8)	
	n	%	n	%	n	%
None	1	2.1	1	0.6	0	-
1	3	6.4	5	2.8	0	-
2	13	27.7	23	12.6	0	-
3	6	12.8	58	31.9	2	25.0
4 or more	21	44.7	87	47.8	5	62.5
Missing data	3	6.4	8	4.4	1	12.5

WHO considers minimum meal frequency as:

- two or more meals per day for breastfed children age 6-8 months
- three or more meals per day for breastfed children age 9-23 months
- Four or more meals per day for non-breastfed children[44].

Using this classification, 84.4% of children (N=225, 12 missing records, n=190; 95% CI 79.13-88.60) are eating frequently enough[45].

Minimum acceptable diet is defined for children from 6-23 months as meeting minimum meal frequency and minimum meal diversity. This is achieved for 6.7% of children (N=225, n=15, 95% CI 4.08-10.71).

The level of children receiving the acceptable minimum diet remains at a very low level.

[44] Indicators For Assessing Infant And Young Child Feeding Practices. Conclusions of a consensus meeting held 6-8 November 2007 in Washington D.C., USA. http://www.fantaproject.org/publications/iycf_definitions2008.shtml

[45] The way this question is analyzed changed in 2012 as a result of new GOAL guidelines, which would affect the comparability of this indicator to previous years

4.7.3 Feeding during diarrhoea

A total of 737 mothers of children 6-59 months responded to both of the questions relating to how much fluid and food they offered the child when inflicted with diarrhoea; 28.5% (n=210, 95% CI 25.35-31.86) indicated that they offered their child more fluids and food than usual whilst 29.2% (n=215, 95% CI 26.01-32.56) indicated that they offered more fluids and either the same or more food than usual. Compared to the 2013 survey results (24.1%) and the 2012 survey results (32.0%) this is not a significant change (p-value = 0.10096 and p-value = 0.07346 respectively).

4.8 Household demography

Based on the findings of the Household questionnaire the following household demographics were found (N=779).

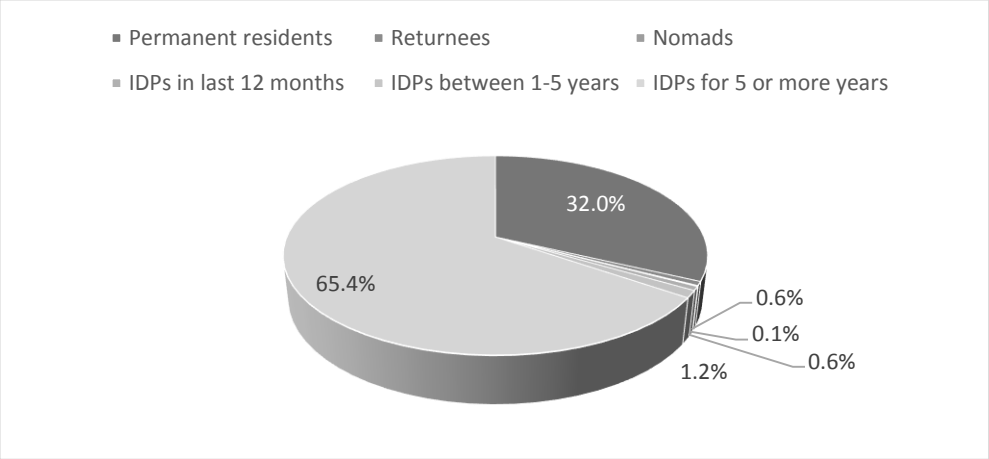
Table 33: Household demographics taken from the household questionnaire findings (N=779):

Category	n	%
Females	2468	49.99%
Males	2469	50.01%
Total Population in HHs	**4937**	**100%**
Average HH size	**6.3**	**-**
Females, under 5 years	390	48.3%
Males, under 5 years	418	51.7%
Total under 5 years in population	**808**	**16.4%**
Average under 5 per HH	**1.0**	**-**
Pregnant women in HHs	**123**	**2.5%**
Female Headed Households	**179**	**23.0%**

Out of the total respondents to the household questionnaires 92.8% (n=723) were female and the remaining 7.2% (n=55) were male.

4.8.1 Resident status

Figure 9: Resident status as reported by the survey respondents (N=778)



4.8.2 Education and decision making

Table 29: Education level of the respondents as captured in the household survey (N=778)

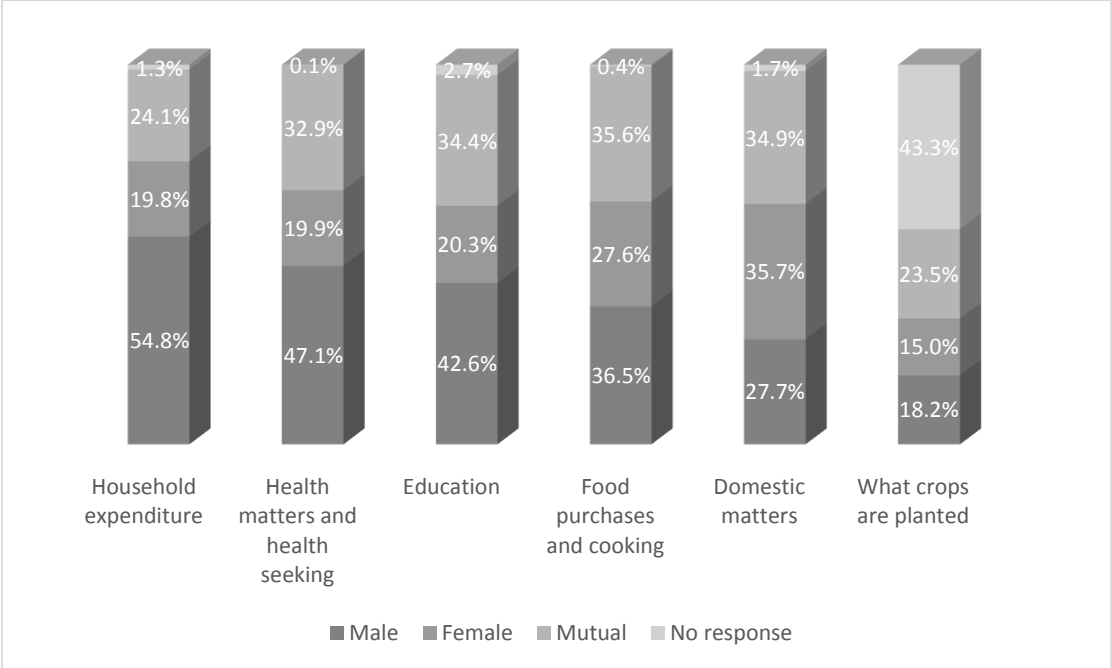
Education level	n	%	95% CI
No education	220	28.3%	25.23-31.54
Primary Level	248	31.9%	28.70-35.23
Secondary Level	34	4.4%	3.14-6.04
Secondary High	152	19.5%	16.90-22.47
University or higher	85	10.9%	8.92-13.31
Other	39	5.0%	3.69-6.78

'Other' responses include khlawa (29), REFLECT (3) and not specified (7)

The survey (N=779 HHs) found that in 95 households, a man made all of the decisions (in all categories) (12.2%; 95% CI 10.08-14.68), in 80 households a woman made all of the decisions (10.3%; 95% CI 8.33-12.60) but 72 (90%) of those HHs were female headed households, and in 118 households, all decisions were mutual (15.1%; 95% CI 12.80-17.84). Sixty of the female headed households (75%) mentioned a male in some category of decision making; of these nine of the households had a male making all the decisions and in 22 households all the decisions were mutual. This could indicate that although a household might be female headed it may still mean that men are considered in the household decisions.

In 212 households, a woman was involved in all decisions (27.2%; 95% CI 24.21-30.45).

Figure 10: Decision making in the household



4.8.3 Livelihoods

Income and expenses

Table 30: Source of income (N=779)

	Source one		Source two		Combined	
	n	%	n	%	n	%
None	35	4.5	268	34.4	268[46]	34.4
Paid employment	135	17.3	7	0.9	142	18.2
Petty trading	105	13.5	31	4.0	136	17.5
Cash crops	37	4.8	23	3.0	60	7.7
Food crops for selling	23	3.0	18	2.3	41	5.3
Skilled worker	333	42.8	37	4.8	370	47.5
Daily labour	104	13.4	14	1.8	118	15.2
Gift	4	0.5	0	0.0	4	0.5
Food Aid	2	0.3	6	0.8	8	1.0

The table above displays the main sources of cash income for the surveyed households in the preceding 30 days. The results show that the major source of income for the surveyed household was skilled labour 47.5% (n= 370, 95% CI 44.01-51.01), followed by paid employment 18.2% (n=142, 95% CI 15.68-21.09).

4.5% (n=35, 95% CI 3.25-6.18) of respondents reported that they didn't have any source of income and 17.5% of respondents reported two sources of income (n=136, 95% CI 14.95-20.28). This result shows a significant decrease since the 2013 survey (25.9%; p-value = 0.00194) but an increase since the 2012 survey result (14.7%); however this increase was not a significant increase (p-value = 0.29372).

19.4% of households reported that their overall income had increased in the past 12 months (N=777, n=151, 95% CI 16.80-22.36); 58.7% (n=456, 95% CI 55.19-62.10) reported that their income had not increased and 21.9% (n=170, 95% CI 19.11-24.92) did not know if their income had increased or not in the past 12 months. Households with an increase in their income has seen a significantly steady decline since the 2012 survey (74.3%; p-value = 0).

Households having two or more income sources and reporting an increased income in last 12 months was found to be 4.6% (N=779, n=36, 95% CI 3.36-6.33). Significantly fewer households were found to have two sources of income and their income increasing than was found in the 2013 survey (10.4%; p-value = 0.00052).

[46] Only the second source of HHs with no income is recorded in the combined column because those stating none for the first source also stated none for the second source.

Table 31: Major household expenses per month (N=775)

	n	%	95% CI
Food	673	86.8	84.28-89.04
Education	80	10.3	8.37-12.66
Health care	8	1.0	0.52-2.02
Family needs	9	1.2	0.61-2.19
Other	5	0.6	0.28-1.50
Total	**775**	**100.0%**	**-**

'Other' responses include water (n=1), gifts (n=1), not wanting to respond (n=1) and no response (n=2).

From the table above, it is clear that the priority expenditure for the majority of households is food and this has been the case each year since the survey in 2010.

Table 32: The households' current main food sources

	Food source one		Food source two		Combined	
	n	%	n	%	n	%
Private production	109	14.0	120	15.5	229	29.4
Bought in market	430	55.3	95	12.2	525	67.5
Food aid	232	29.8	226	29.1	458	58.9
Gift	7	0.9	11	1.4	18	2.3
Wild food	-	-	4	0.5	4	0.5
Total	778	100.0%	456	58.6%	-	-

Households were asked where they sourced their food items from. Data was collected from 778 households and 58.6% of households (n=456, 95% CI 55.12-62.02) reported a second source of food, which was not a significant decrease from the 2013 survey (64.7%; p-value = 0.0703), but a significant increase from the 2012 survey (31.6%; p-value = 0). Over the years, there has generally been a decline in the number of households with two or more sources of food.

The main source of food for households at the time of the survey was food purchased in the market (67.5%, n=525, 95% CI 64.11-70.68); this figure includes reported first and second food source and this was the case in the 2013 survey, however, food aid was the main source of food for the three years prior to that, which in this survey was the second most popular main source of food (58.9%, n=458, 95% CI 55.38-62.27). Although households having a second source of food should make them less vulnerable to shock, in this case both sources of food are reliant on external factors be it cash and/or other people to provide food.

Only 29.4% (n=229, 95% CI 26.34-32.73) of households surveyed reported that some of their food came from private production. This is a significant increase from the 2013 survey results (20.1%; p-value = 0.00214) and also a slight change from the 2012 survey (30.5%).

Figure 11: First and second sources of food by number of households

Figure 12: Food groups in stock on the day of the survey (N= 778)

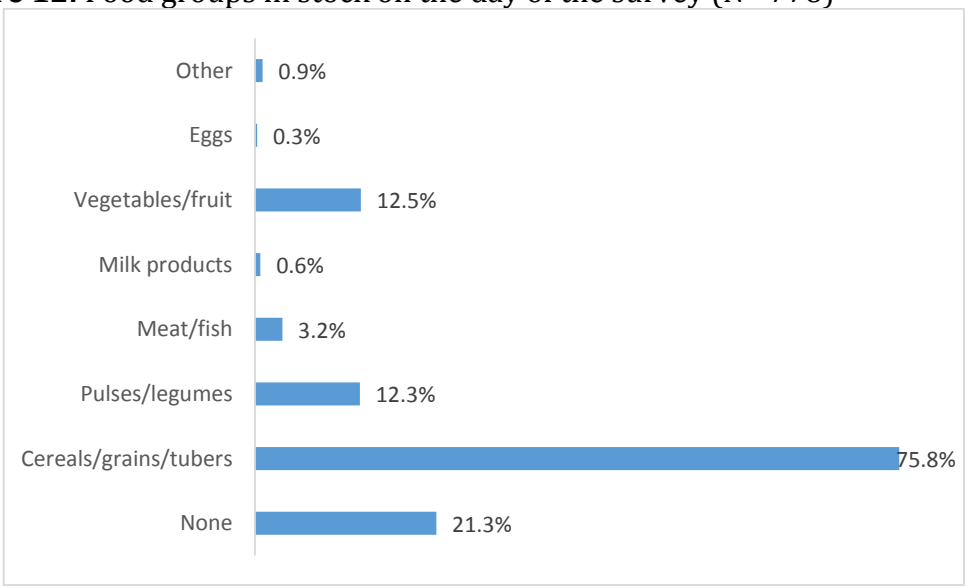


Table 33: Number of food groups in stock in households on day of survey

Food groups	n	%	95% CI
None	166	21.3	18.60-24.35
One group	447	57.5	53.95-60.88
Two groups	141	18.1	15.58-20.98
Three groups	24	3.1	2.08-4.55
Total	**778**	**100.0%**	**-**

3.1% (n=24) household reported that they had at least three food groups in stock in the home on the day of survey. This is a significant increase from the 2013

survey (0.7%; p-value = 0.02444) but not a significant increase from the 2012 survey results (1.8%; p-value = 0.28014).

Access to land

Table 34: Household access to land (N=758)

	n	%	95% CI
None	531	70.1	66.70-73.21
Owned	89	11.7	9.64-14.23
Rented	109	14.4	12.06-17.06
Borrowed	23	3.0	2.03-4.51
Shared	5	0.7	0.28-1.53
Other	1	0.1	0.02-0.74
Total	**758**	**100.0%**	**-**

29.9% (n=227, 95% CI 26.79-33.30) of households have access to land and 70.1% (n=531, 95% CI 66.70-73.21) have no access to land.

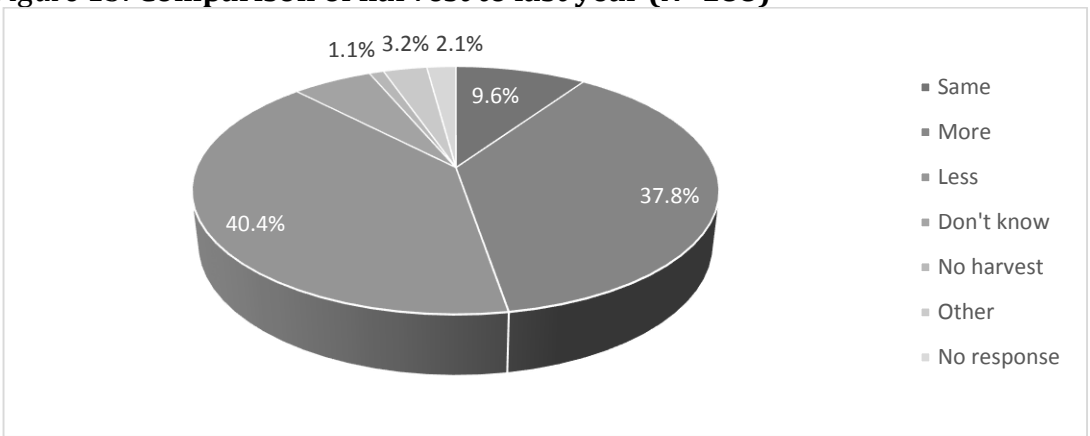
Cultivation and Harvest

Of the 227 households who had access to land, 82.8% of respondents indicated that their household cultivated in the most recent growing season (n=188, 95% CI 77.38-87.17). This is equivalent to 24.2% of the total households surveyed (N=778).

Households that cultivated (N=188) were then asked to compare their harvest to the previous season.

As seen in the figure below, 37.8% (n=71, 95% CI 31.15-44.88) of respondents' harvests yielded more than they did the previous year, 40.4% (n=76, 95% CI 33.67-47.56) of respondents' harvests yielded less than they did the previous year.

Figure 13: **Comparison of harvest to last year (N=188)**

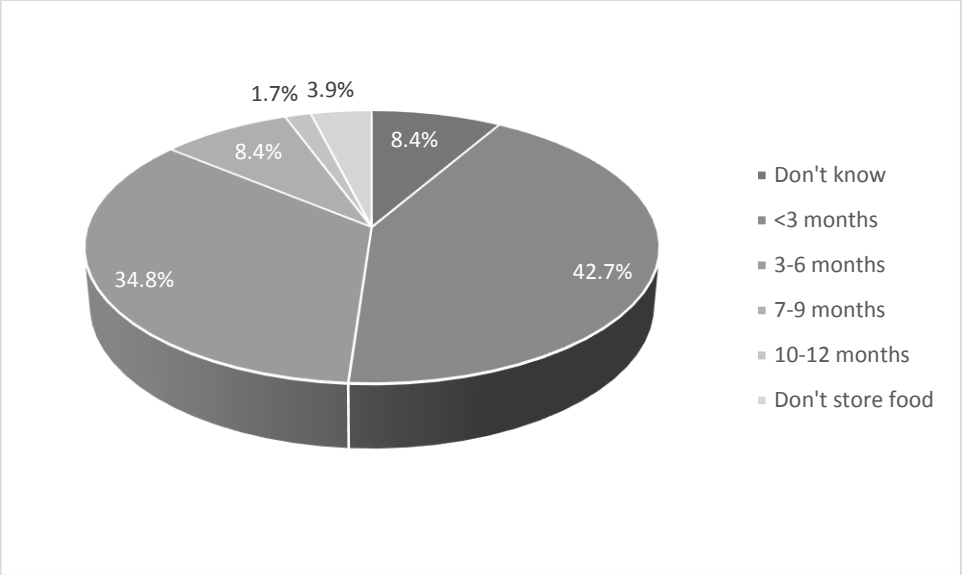


'Other' responses include: did not cultivate last year (n=4) and not specified (n=2).

Table 35: Main type of crops grown

Food Groups	n	%	95% CI
Cereals/grains/tubers	137	73.7	66.89-79.46
Legumes/nuts	19	10.2	6.64-15.40
Vitamin A rich fruits/Veg	18	9.7	6.21-14.78
Other fruits/Veg	10	5.4	2.95-9.61
Other	2	1.1	0.30-3.84
Total	**186**	**100%**	**-**

Figure 14: Duration that harvested stocks are reported to last (N=178)



From Figure 14 above we see that for 77.5% of those who cultivated (n=138, 95% CI 70.85-83.04) their harvest lasted for six months or less. The most frequent duration that food was stored was less than three months for 42.7% of households (n=76, 95% CI 35.66-50.04).

Income generation activities

24.9% (N=760, n=189, 95% CI 21.93-28.06) of households reported that at least one women in the household has had access to an IGA in the last three months, 74.9% (n=569, 95% CI 71.66-77.82) had no access to IGA in last three months and the remaining 0.2% (n=2, 95% CI 0.07-0.95) did not know if the women had had access to an IGA in the last three months.

8.2% of households owned more than one type of animal (n=61, 95% CI 6.42-10.36)

Table 36: Household ownership of animals (N=746)

Animal group (multiple response)	**Combined**		
	n	%	95% CI
None	332	44.5	40.97-48.09
Chickens	131	17.6	15.00-20.45
Goats	176	23.6	20.69-26.77
Sheep	1	0.1	0.02-0.76
Cows	1	0.1	0.02-0.76
Donkeys	166	22.3	19.41-25.37

4.8.4 Water, sanitation and hygiene

Water

Most respondents reported that they sourced their drinking water from a protected source. There was very little difference between the dry season and wet season (82.9% vs 85.1%).

Table 37: Source of drinking water, by season

Source	**Dry season (N=767)**		**Wet season (N=778)**		**Same water source used both seasons (N=767)**	
	n	**%**	**n**	**%**	**n**	**%**
Protected source (borehole, capped well)	605	78.9	631	81.1	601	78.4
Unprotected well	47	6.1	108	13.9	37	4.8
Unprotected surface water (rainwater, pond)	81	10.6	5	0.6	5	0.6
Water seller-protected source	30	3.91	30	3.85	27	3.5
Water seller – unprotected source/source unknown	3	0.39	3	0.38	3	0.3
Other – not specified	1	0.13	1	0.12	1	0.1
Total HHs using the same water source for both seasons					674	87.9

Since the 2010 survey there has not been a great variation in the proportion of households using protected water sources. On average 79.4% of households use a protected water source in the dry season and 79.8% of households use a protected water source in the wet season.

Over the years since 2010 there has been a drop in the proportion of households using a protected source but this years result shows an upward turn. When comparing the 2014 survey result for the dry and the wet season with those of the 2013 (75.8% and 75.7% respectively) the increase is significant for both seasons (p-value=0.00494 and p-value=0 respectively).

Figure 15: Source of protected and unprotected water, by season

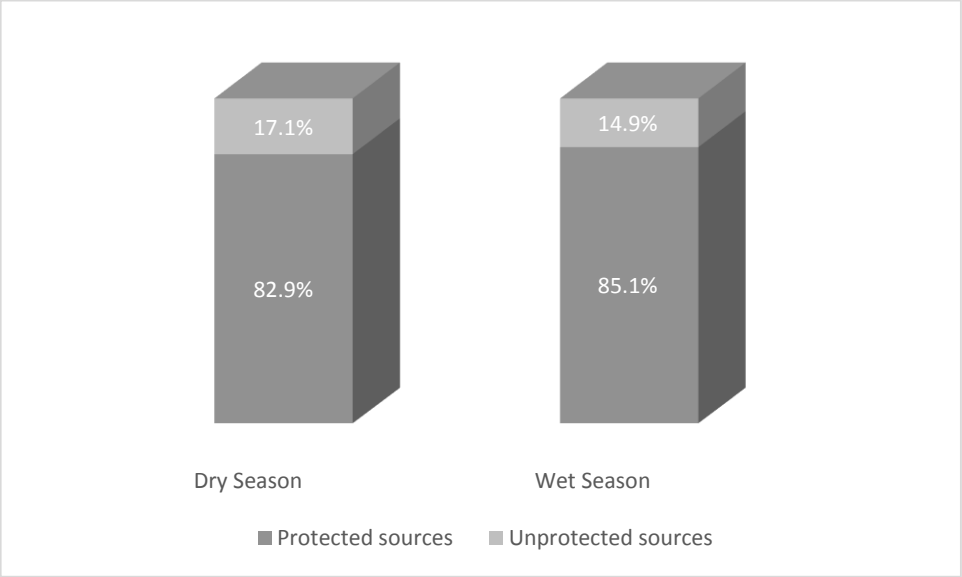


Table 38: Time taken by households to walk to the nearest improved water source (N=747)

Time taken to collect water	n	%	95% CI
< 30 minutes	321	41.2	37.80-44.79
30 minutes – <1hour	267	34.3	31.03-37.68
1 hour or more	191	24.5	21.63-27.66
Total	**779**	**100.0%**	**-**

This result is a significant increase on the 2013 survey (33.7%; p-value = 0.02642).

Table 39: Water transportation (N= 778)

Method	n	%	95% CI
Using open container	56	7.2	5.58-9.23
Covered containers	275	35.3	32.07-38.77
Jerry cans with lids	288	37.0	33.70-40.47
Jerry cans without lids	52	6.7	5.13-8.66
Other containers (not specified)	3	0.4	0.13-1.13
Delivered by water seller in covered containers	100	12.9	10.68-15.39
Delivered by water seller in uncovered containers	4	0.5	0.20-1.31
Total	**778**	**100%**	**-**

85.2% (N=663, n=249, 95% CI 82.55-87.54) of households were found to be using appropriate water transportation (using a covered container ie jerry can with lid, covered containers and delivered by water seller in covered containers).

Of the total households (N=778) 93 (12.0%, 95% CI 9.86-14.42) were noted to be collecting water from a protected source using covered containers for both the dry and wet seasons.

From the household who collected household water themselves in covered containers (N=563) 77.8% (n=438, 95% CI 74.18-81.04) collected water from a protected source.

Of the households surveyed (N=775), 98.5% (n=763, 95% CI 97.31-99.11) of households reported storing drinking water in containers. Of these, 24.9% (n=190, 95% CI 21.96-28.09) of households were found to be using appropriate drinking water storage, including a clean container, covered (all) with a narrow mouth. This result has shown a significantly steady increase since data was first collected in the 2012 survey (11.8%; p-value = 0).

Of the households who transported water to their household (N=778), 20.8% (n=162, 95% CI 18.12-23.82) transported the water in an appropriate container (a covered container: i.e., jerry can with lid, covered containers and delivered by water seller in covered containers) AND stored their water appropriately in the home (in narrow mouthed containers which were all covered and clean).

The average amount of water used per household was 69.1 litres on the day prior to the survey (53301 Litres/771 households). For this survey, a 20 litre jerry can was used to determine household consumption; this is based on the standard size jerry can used in the area.

The survey findings show that the average litres of water used per person per day is 11.8 litres/person/day, the day before the survey; this result is below the Sphere standard of 15 litres/person/day[47]. This result has wavered around 10 litres over the last five years with the highest result being this survey and the lowest being the 2011 survey (8.8 litres). The rate of households using more than 15 litres per person per day has shown a steady decline since the 2010 survey (26.2%).

Table 40: Litres of water used per person, per day

Category of litres used	n	%	95% CI
<=10 litres/person/day	390	50.6	47.06-54.10
10.1-15 litres/person/day	247	32.0	28.84-35.41
15.1-20 litres/person/day	97	12.6	10.42-15.11
>20 litres/person/day	37	4.8	3.50-6.54
Total	**771**	**100%**	**-**

Sanitation and hygiene: Latrines

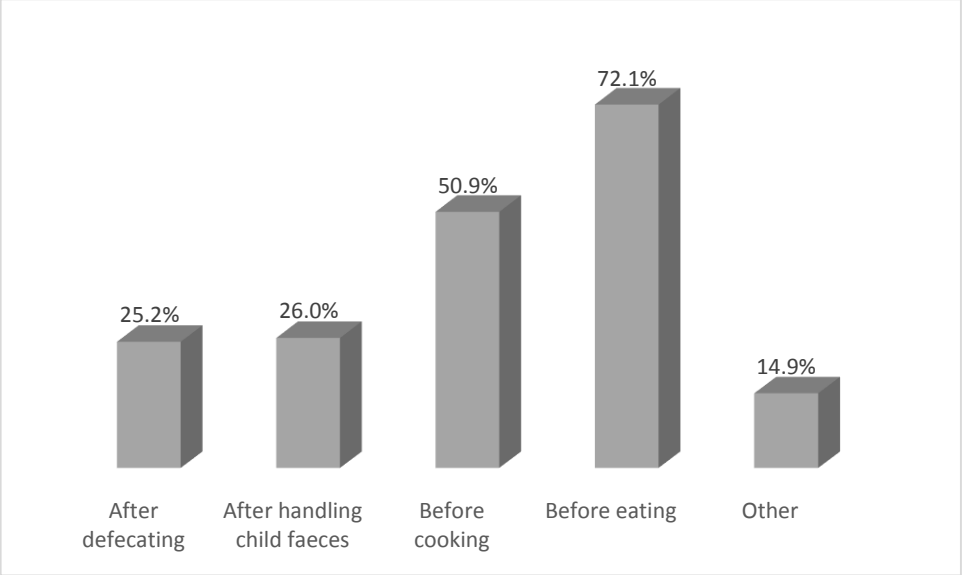
96.7% of households reported using a latrine for defecation (N=777; n=751, 95% CI 95.14-97.71). This result has remained constantly high since the 2011 survey.

[47] Humanitarian Charter and Minimum Standards in Disaster Response, The Sphere Project, Third Edition, 2011, page 97

87.3% (n=678, 95% CI 84.73-89.42) of all households reported using a household latrine, while a further 9.1% (n=71, 95% CI 7.31-11.37) reported using a communal latrine and 0.3% (n=2, 95% CI 0.07-0.93) said they used a neighbour's latrine. Those who use an open area for defecation are 3.0% (n=23, 95% CI 1.98-4.40) and those who reported 'other' unspecified means for defecation is 0.4% (n=3, 95% CI 0.13-1.13).

Sanitation and hygiene: Hand washing

Figure 16: Reported critical hand washing times (N=778)



'Other' responses included: after eating (n=66), any time (n=11), before praying (n=18), after cooking (n=1), during breast feeding (n=1), meal time (n=1) and unspecified (n=18)

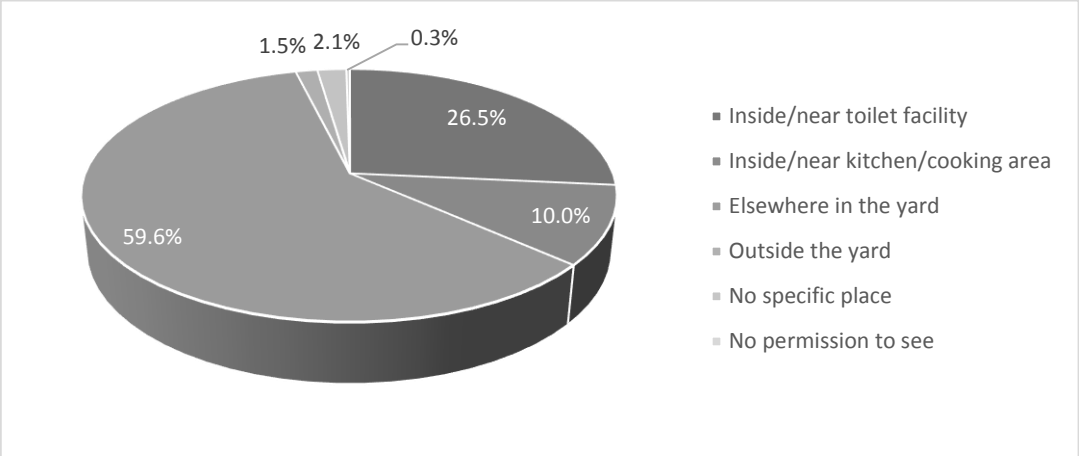
Table 41: Washing hands at critical times (N=778)

Critical time	n	%	95% CI
None	14	1.8	1.07-3.00
One critical time	347	44.6	41.14-48.11
Two critical times	269	34.6	31.32-37.99
Three critical times	122	15.7	13.30-18.40
Four critical times	26	3.3	2.29-4.85
Total	**778**	**100.0%**	**-**

7.8% (n=61, 95% CI 6.15-9.94) of households reported washing their hands before cooking, before eating and after defecation.

Overall, 19.0% (n=148, 95% CI 16.42-21.93) of people reported washing their hands at least three critical times. This result has shown a significantly steady decline since the 2012 survey (47.0%; p-value = 0).

Figure 17: Designated area for washing hands (N= 778)



96.1% (n=748, 95% CI 94.55-97.29) of households had a designated area for hand washing. Among the households responding (N=774), 75.8% (n=587, 95% CI 72.70-78.72) had soap available, 2.3% (n=18, 95% CI 1.48-3.65) had ash available and 21.8% (n=169, 95% CI 19.07-24.88) did not have any washing materials present.

75.3% (n=586, 95% CI 72.17-78.22) of all households (N=778) were found to have a designated hand washing area with soap or other locally available material for hand washing. This result has shown a significantly steady increase since the 2012 survey (62.5%; p-value = 0).

4.8.5 Malaria knowledge and behaviour

Mosquito net use

Table 42: Ownership of LLITNs (N=774)

# of LLITNs	# of households	% of households
0	109	14.1
1	181	23.4
2	179	23.1
3	93	12.0
4	97	12.5
5	32	4.1
6	37	4.8
7	19	2.5
8	16	2.1
9	5	0.7
10	1	0.1
11	1	0.1
12	3	0.4
13	1	0.1
Total	774	100.00%
Total # of households that own LLITNs	**665**	**85.9%**
	Average = 2.5	

One household stated owning 85 LLITNs; this entry has been treated as an outlier and is not considered in the calculation of the average LLITNs per HH.

The Table above represents the distribution of mosquito nets in the surveyed population. Respondents were asked about the number of LLITNs in their households; 774 households answered this question and 85.9% (n=665, 95% CI 83.29-88.19) reported owning at least one LLITN; this is not a significant change from the result found in the 2013 survey (82.7%; p-value = 0.1902). 14.1% (n=109, 95% CI 11.81-16.71) of households reported that they did not own a LLITN. The average number of LLITNs per household is 2.5 which also reflects the previous survey results with the 2013 survey finding 2.6 nets and the 2012 survey finding 2.4 nets.

Sleeping under an LLITN

Of the total number of people living in the households surveyed (N=4937), those who slept under a LLITN the night before the survey was 37.5% (n=1849, 95% CI 36.11-38.81). This survey's findings show a significant increase in the overall population and children under five years old sleeping under a LLITN when compared to the 2013 survey findings (13.5% and 44.1% respectively; both calculations returned a p-value = 0). However it should be noted that in the 2013 survey only children 6-59 months were included in this analysis and in this survey children 0-59 months were included.

Table 40: Numbers of people within households sleeping under an LLITN, night before the survey

	Pregnant women	0-59 months	Others	**Total**
Total found on survey	123	808	4006	**4937**
Number used net night before survey	83	589	1177	**1849**
Proportion used net night before survey	67.5%	72.9%	29.4%	**37.5%**
95% CI	58.78-75.12	69.73-75.85	27.99-30.81	**36.11-38.81**

Malaria knowledge

Table 43: Knowledge of the cause of Malaria (N=777)

	n	**%**	**95% CI**
Don't know	24	3.1	2.08-4.55
Mosquitoes	669	86.1	83.49-88.36
Flies	18	2.3	1.47-3.63
Dirty water	20	2.6	1.67-3.94
Eating bad food	25	3.2	2.19-4.71
Other	21	2.7	1.77-4.10
Total	**777**	**100.0%**	-

'Other' responses included: garbage (n=9), hunger (n=6), unhygienic place (n=2), green grass (n=2), rainy season and stagnant water (n=1), weakness (n=1).

The table above represents the knowledge of the cause of malaria among the surveyed population. Most of the respondents (86.1%, n=669) know that malaria is transmitted by mosquitoes. There has been a significantly steady increase in the population knowing the cause of malaria since the 2010 survey (74.3%; p-value = 0).

4.9 Maternal health

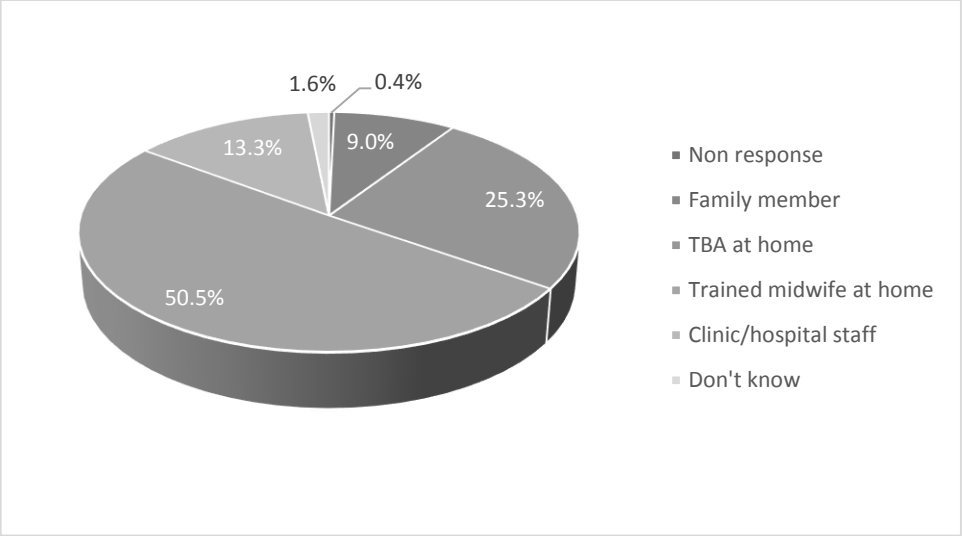
Reproductive health questions were asked to women with at least one child under the age of five, in relation to their last pregnancy and birth. These questions were answered by a total of 525 women.

Table 44: Place of delivery of youngest child (N=513)

Place of delivery	n	%	95% CI
At home	435	84.8	81.43-87.64
Local clinic	9	1.8	0.93-3.30
Hospital	60	11.7	9.20-14.77
Other	7	1.4	0.66-2.79
Don't know	2	0.4	0.11-1.41

The proportion of women who deliver in a health facility is not showing much change over time; compared to the 2013 survey's results (12.0%) there is no significant change (p-value = 0.2187).

Figure 18: Delivery attendant (N=513)



63.7% (n=327, 95% CI 59.49-67.79) of women who gave birth in last five years had a skilled attendant at delivery (trained midwife or clinic staff). This result is a significant decrease compared to the 2012 survey result (74.3%; p-value = 0.00374) and not a significance change compared to the 2013 survey result (67.4%).

Ante natal care (ANC)

Table 45: ANC visits (N=517)

Visits	n	%	95% CI
No visit	16	3.1	1.91-4.97
One visit	8	1.5	0.79-3.02
Two visits	21	4.1	2.67-6.13
Three visits	33	6.4	4.58-8.83
Four or more visits	439	84.9	81.57-87.74
Total	**517**	**100.0%**	**-**

Women were asked how many ante-natal care visits they attended while they were pregnant with their youngest child; 95.4% (n=493, 95% CI 93.19-96.86) attended two or more ANC visits; 84.9% (n=439, 95% CI 81.57-87.74) attended four or more ANC visits, meeting the WHO recommendation for minimum number of ANC visits[48]. This result is a significant increase compared to the 2013 survey result (74.6%; p-value = 0.00244). The minimum number of ANC visits recorded was zero, whilst the maximum was 15. The average ANC visits was 5.0.

Tetanus toxoid during ANC

88.3% (n=444, 95% CI 85.16-90.80) of women with a child under five years old were found to have received at least one dose of tetanus toxoid vaccine during their last pregnancy (N=503) confirmed either by Card or respondent's recall.

60.6% (n=305, 95% CI 56.30-64.81) of women with a child under five years old were found to have received at least two doses of tetanus toxoid vaccine during their last pregnancy determined by card and recall. This is a significant increase compared to the 2013 survey result (40.7%; p-value = 0). The highest number of women receiving two TT injections during their last pregnancy was during the 2010 survey (70.5%) but the difference between these two results is not significant (p-value = 0.69654).

18.1% (n=91, 95% CI 14.97-21.69) of women during their last pregnancy have received five doses and therefore have lifetime immunity.

[48] http://www.who.int/making_pregnancy_safer/publications/Standards1.6N.pdf

Table 46: Tetanus toxoid during pregnancy

TT dose	Before last pregnancy		During last pregnancy	
	n	%	n	%
None	57	13.0	57	11.3
One dose – card	147	33.4	136	27.0
One dose – recall	15	3.4	3	0.6
Two doses – card	74	16.8	126	25.1
Two doses – recall	8	1.8	4	0.8
Three doses – card	42	9.6	38	7.6
Three doses – recall	6	1.4	9	1.8
Four doses – card	22	5.0	30	6.0
Four doses – recall	1	0.2	7	1.4
Five or more doses – card	42	9.6	82	16.3
Five or more doses – recall	2	0.5	9	1.8
Don't know	24	5.5	2	0.4
Total	**440**	**100.0%**	**503**	**100.0%**

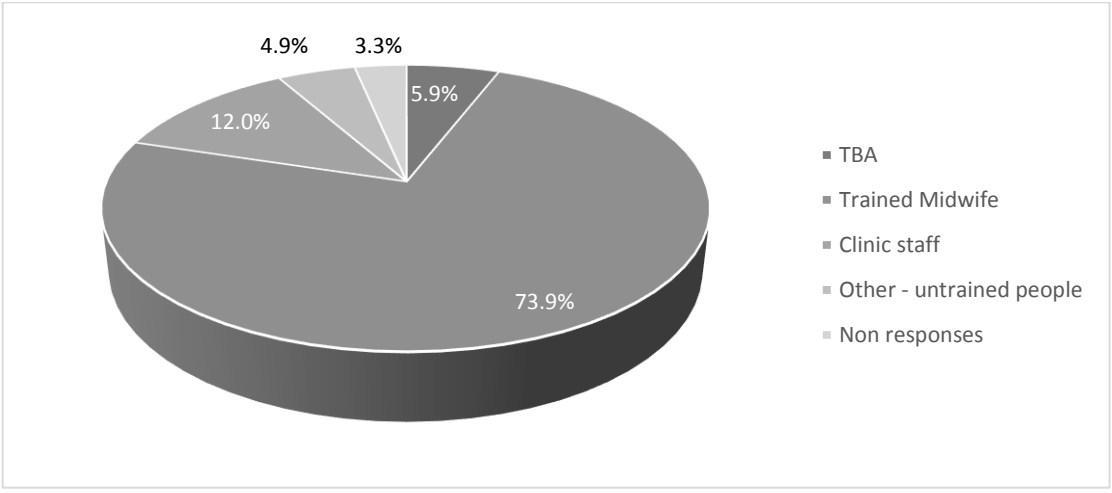
Post natal care (PNC)

The results show that 13.5% (n=69, 95% CI 10.77-16.68) did not have any sort of post natal check by a health care provider or traditional birth attendant (N=513).

64.9% of mothers and babies were both checked at a PNC visit (n=333, 95% CI 60.69-68.92); compared to the 2013 survey result (64.2%) this is not a significant change (p-value = 0.86502). In some cases, only the mother was checked at PNC (14.8%, n=76, 95% CI 12.00-18.15) or only the baby (3.3%, n=17, 95% CI 2.08-5.24). In 3.5% of cases (n=18, 95% CI 2.23-5.48) the respondent did not know who or if either had received a PNC.

Among those women who reported a PNC either for themselves, their baby or for both the Figure below shows who conducted the PNC (N=426).

Figure 19: Mother's recall of who conducted the PNC on the baby, themselves or both



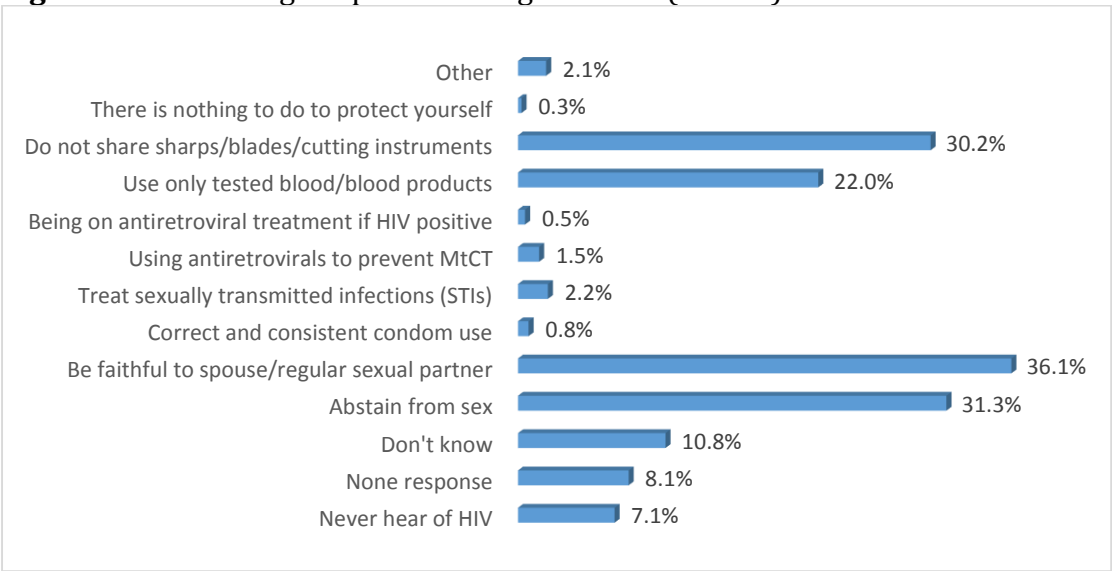
4.10 HIV

HIV questions were asked to all households in the survey (N=779), through the same respondent as the previous questionnaires.

Respondents were asked how they can protect themselves from HIV. Overall, 71.8% (n=559, 95% CI 68.50-74.81) of respondents could name at least one way to protect themselves against HIV and 48.4% of respondents (n=377, 95% CI 44.90-51.90) could identify two or more ways. This is not a significant change from the 2013 survey result (49.1%; p-value = 0.83366). 7.1% of respondents (n=55, 95% CI 5.46-9.08) said they had never heard of HIV, 8.1% (n=63, 95% CI 6.37-10.21) no response, 0.3% (n=2, 95% CI 0.07-0.93) said nothing they can do to protect themselves against HIV; 10.8% (n=84, 95% CI 8.79-13.16) of responses don't know how to protect their self against HIV.

Figure 20 below, captures the specific responses provided.

Figure 20: Knowledge of protection against HIV (N=779)



'Other' responses included: EPI (1), keep far away from HIV patient (4), good food (2), hygiene (2), use syringes (1), be faithful or honest your family (2), not specified (4)

HIV stigma

In order to gauge HIV stigma in communities, a proxy indicator is used, which asks whether or not a respondent would buy food from a shopkeeper who was known to be HIV positive. A total of 765 households responded to this question.

44.6% (n=341, 95% CI 41.09-48.12) of households said that they would not buy food from a shopkeeper who was known to be living with HIV. Those who said they would buy food from a shopkeeper who is known to be living with HIV is 52.0% (n=397, 95% CI 48.35-55.42) and 3.5% (n=27, 95% CI 2.44-5.09) said they did not know.

The is a significant increase in the proportion of respondents who state they would buy food from a HIV+ shopkeeper compared to the 3013 survey results (39.4%; p-value = 0.0003).

3.3% (n=25, 95% CI 2.21-4.75) respondents reported that they had been tested for HIV in the previous 12 months (N=770), among these individuals only 32% (n=8, 95% CI 17.21-51.59) reported that they had been tested for HIV in the previous 12 months and received their results (1.0% of the total respondents, 95% CI 0.53-2.04). NOTE: 40.0% (n=10) of those who said they had been tested did not give a response as to whether they had received their results or not.

5.0 Limitations of the survey

All the surveys were conducted in Kutum urban, Kassab and Fata Borno camps, however the difference in seasonal timings of the 2007 and 2014 survey makes it unsuitable for direct comparison with the other surveys any comparisons with these two surveys need to take seasonality into account. Results for 2009 include the key nutrition, child health and mortality statistics only. No MICS was conducted in 2008 due to insecurity in the area.

Although the survey team informed respondents that the survey was an information gathering exercise only, unrelated to any kind of distribution, it is possible that some respondents may have exaggerated or misrepresented their situation slightly in the hopes of receiving some benefit. This would not have affected the anthropometric measurements, but may have affected variables such as the reported amount of food stores or water availability and access.

6.0 Recommendations

The recommendations below are to be introduced in the next 12 months.

1. GOAL to review NIPP coverage to ensure it is in line with increased GAM and adequately fills the gap left by SFP.

2. Appropriate infant feeding practices to be emphasized through Care group, NIPP, general health education and thematic discussion; specifically exclusive breast feeding.

3. Barrier analyses to be conducted to understand complimentary feeding and design appropriate response.

4. Food security to be improved through home production interventions, increasing access to micronutrient-rich foods such as moringa in collaboration with KEADS who are carrying out livelihood activities in Darfur.

4. GOAL to investigate current income generating activities among women in order to understand barriers and opportunities and then design a plan to support improved access to IGA for vulnerable women.

5. A barrier analysis should be conducted to investigate water storage.

6. Focus group discussions should be held on how hand washing instruction should be carried out within different intervention groups and different groups within the urban community.

6. In 2015, GOAL will work through partners to improve HIV awareness including ways of transmission and prevention of HIV, continue mainstreaming and programmes aimed at reducing stigma.

7. GOAL partners to provide condom distribution only in conjunction with treatment for sexually transmitted infections.

7.0 Appendices

Appendix 1: Assignment of Clusters

Geographical unit	Population size	Cluster
Dababeen East	3432	1
Karkawi	1313	2
Karama East	473	
Karama West	697	
Kassab village	588	3
Salama East	5363	4,5
Salama West	5235	RC,6
Zareeba East	2537	7
Zareeba West	3770	8,9
Dababeen West	2540	10
Dababeen North	4014	11,12
Dalol	1776	
Al-gasor East	4184	13,14
Al-gasor West	3606	15,RC
Al-gasor center	3000	16
Al-thanawi	544	
Istiglal East	2753	17
Istiglal West	322	
Kamboot	1134	18
Eid-Algo North	426	
Amo	346	
Algos Abba	379	
Kokai	463	RC
Eizairig	301	
Al-matar	3120	19
Ain-Sirgilao West	424	
Artogos	159	20
Konfa	295	
Abu-Gaab	277	
Ain-Sirgilao East	424	
Suria	379	

Geographical unit	Population size	Cluster
Mango	325	
Senana	135	
Um-shigaira	242	
Fanga	225	
Labado	201	21
Jambo	197	
Korsi	187	
Hegair	481	
Fola South	339	
Folo North	352	
Tormaiz	674	22
Koka	548	
Adotigko	475	
Tory	279	
Lamboot	290	
Gadara	463	
Um-algora	352	
Kobra	459	23
Daba-Naira	283	
Gibish	263	
Argy	472	
Loboos	709	
Ghibaish	172	
Brimo	495	24
Telay-Koli	470	
Taiwa	289	
Eid-Algo South	451	
Korgay	269	
Fari	236	
Gadara Norht	228	
Booktom	332	25

Geographical unit	Population size	Cluster
Midil	276	
Semair-Barak-allh	309	
Laga	423	
Sabarna	453	
Bait-Alkhair	374	
Kangala	117	
Abara West	359	26
Karmo	225	
Abara East	284	
Dibo East	428	
khr Gangay	330	
Ein-Siro	237	
Tarma	945	27
Gomaiza	101	
Sewini	421	
Fono	497	
Ein-Farah	332	
Dari	668	

Geographical unit	Population size	Cluster
Gakhara	338	
Guba	302	
Barnu	315	
Amaralla (A)	556	30
Kongara	458	

Geographical unit	Population size	Cluster
Semair	372	RC
Dibo West	359	
Ein-Kalaki	198	
Krobat	382	
Kidldil	229	
Gando	330	
Krainik	387	
Masri (B)	305	28
Arbariak	277	
Artulay	287	
Bori	288	
Abu-shok	287	
Ostani	245	
Hila Gidad	273	
Mari (A)	304	
Naro	260	
Amaralla (B)	486	29
Hashaba	447	

Appendix 2: Events Calendar

الشهور	2010		2011		2012		2013		2014	
يناير Jan			رأس السنة الجديدة ضحيتين	48	وحيد عيد الستقلآل	36	ضحيتين	24	وحيد عيد الستقلآل	12
فبراير	كرامة	59	شهر وحيد	47	كرامة مولد النبوى	35	كرامة	23	كرامة	11
مارس	شهر وحيد	58	المولد النبوي / كرامة	46	توم	34	توم	22	شهر توم	10
أبريل	انهيار سوق المواسير توم	57	شهر توم	45	أمتحانات الشهادة السودانية تومين	33	أمتحانات الشهادة السودانية تومين	21	تومين	9
مايو	تومين بداية موسم الخريف الرشاش	56	تيراب- تومين	44	رشاش سايق التيمان	32	رشاش سايق التيمان	20	سايق التيمان	8
يونيو	شهر سايق	55	سايق التيمان	43	رجب	31	رجب	19	رجب- اختطاف موظفي قول	7
يوليو	بداية موسم الخريف رجب التيراب	54	رجب التيراب	42	بداية التيراب - قصير	30	بداية التيراب قصير	18	التيراب قصير	6
أغسطس	الحشاشة – قصير- فيضانات سوق كتم	53	الحشاشة - قصير	41	رمضان- نزوح المعسكر الثاني (اغتيال معتمد الواحة	29	رمضان	17		5
سبتمبر	شهر رمضان	52	شهر رمضان – ظهور الذهب في كتم	40	عيد الفطر	28	عيد الفطر	16		4
أكتوبر	الحصاد (الدرت) عيد الفطر	51	الحصاد (الدرت)/ عيد الفطر	39	فترين	27	فترين	15		3
نوفمبر	ضحية الحصاد (الدرت)	50	فطرين	38	ضحية	26	ضحية	14		2
ديسمبر	ضحيتين	49	ضحية	37	ضحيتين	25	ضحيتين	13		1

Appendix 3: Result Tables for NCHS growth reference 1977

Figure 21: Frequency distribution of weight for height z-scores

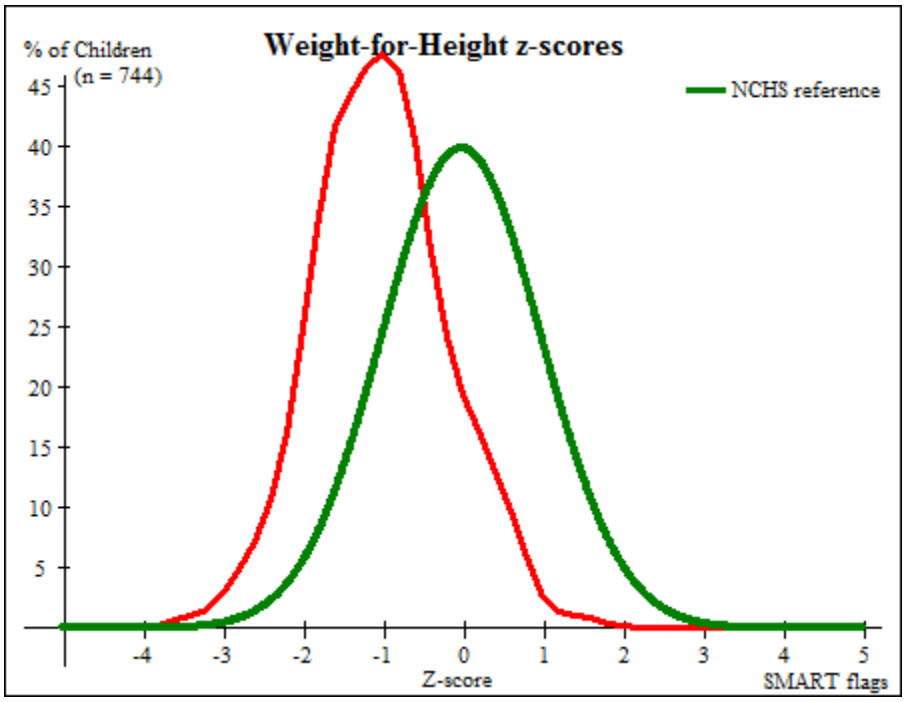


Table 47: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (NCHS, 1977)

	All N = 744	**Boys** N = 372	**Girls** N = 372
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(78) 10.5 % (7.7 - 14.1 95% C.I.)	(37) 9.9 % (6.6 - 14.7 95% C.I.)	(41) 11.0 % (7.4 - 16.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(72) 9.7 % (7.0 - 13.2 95% C.I.)	(35) 9.4 % (6.2 - 14.1 95% C.I.)	(37) 9.9 % (6.8 - 14.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(6) 0.8 % (0.3 - 2.0 95% C.I.)	(2) 0.5 % (0.1 - 2.1 95% C.I.)	(4) 1.1 % (0.3 - 3.6 95% C.I.)

The prevalence of oedema is 0.0 %

Table 48: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema (NCHS, 1977)

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	178	2	1.1	20	11.2	156	87.6	0	0.0
18-29	152	4	2.6	15	9.9	133	87.5	0	0.0
30-41	207	0	0.0	16	7.7	191	92.3	0	0.0
42-53	137	0	0.0	15	10.9	122	89.1	0	0.0
54-59	70	0	0.0	6	8.6	64	91.4	0	0.0
Total	744	6	0.8	72	9.7	666	89.5	0	0.0

Table 49: Distribution of acute malnutrition and oedema based on weight-for-height z-scores (NCHS, 1977)

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 6 (0.8 %)	Not severely malnourished No. 739 (99.2 %)

Table 50: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex (NCHS, 1977)

	All N = 745	**Boys** N = 372	**Girls** N = 373
Prevalence of global malnutrition (< 125 mm and/or oedema)	(33) 4.4 % (2.8 - 6.9 95% C.I.)	(12) 3.2 % (1.7 - 6.2 95% C.I.)	(21) 5.6 % (3.1 - 9.9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(31) 4.2 % (2.6 - 6.5 95% C.I.)	(11) 3.0 % (1.4 - 6.0 95% C.I.)	(20) 5.4 % (2.9 - 9.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(2) 0.3 % (0.0 - 2.0 95% C.I.)	(1) 0.3 % (0.0 - 2.0 95% C.I.)	(1) 0.3 % (0.0 - 2.0 95% C.I.)

Table 51: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema (NCHS, 1977)

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	178	2	1.1	17	9.6	159	89.3	0	0.0
18-29	152	0	0.0	11	7.2	141	92.8	0	0.0
30-41	207	0	0.0	3	1.4	204	98.6	0	0.0
42-53	137	0	0.0	0	0.0	137	100.0	0	0.0
54-59	71	0	0.0	0	0.0	71	100.0	0	0.0
Total	745	2	0.3	31	4.2	712	95.6	0	0.0

Table 52: Prevalence of acute malnutrition based on the percentage of the median and/or oedema (NCHS, 1977)

	N = 744
Prevalence of global acute malnutrition (<80% and/or oedema)	(44) 5.9 % (3.9 - 8.8 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(43) 5.8 % (3.8 - 8.7 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(1) 0.1 % (0.0 - 1.0 95% C.I.)

Table 53: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema (NCHS, 1977)

		Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	178	1	0.6	10	5.6	167	93.8	0	0.0
18-29	152	0	0.0	15	9.9	137	90.1	0	0.0
30-41	207	0	0.0	8	3.9	199	96.1	0	0.0
42-53	137	0	0.0	7	5.1	130	94.9	0	0.0
54-59	70	0	0.0	3	4.3	67	95.7	0	0.0
Total	744	1	0.1	43	5.8	700	94.1	0	0.0

Figure 22: Frequency distribution of weight for age z-scores (NCHS, 1977)

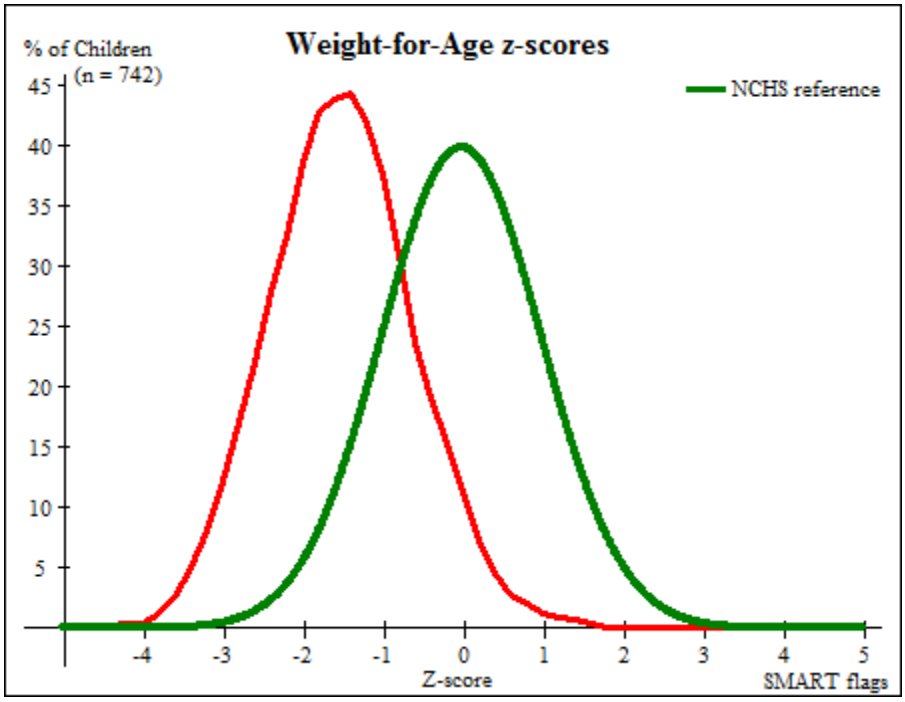


Table 54: Prevalence of underweight based on weight-for-age z-scores by sex (NCHS, 1977)

	All N = 742	**Boys** N = 370	**Girls** N = 372
Prevalence of underweight (<-2 z-score)	(217) 29.2 % (24.2 - 34.8 95% C.I.)	(111) 30.0 % (23.6 - 37.3 95% C.I.)	(106) 28.5 % (22.9 - 34.8 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(182) 24.5 % (19.9 - 29.8 95% C.I.)	(89) 24.1 % (18.9 - 30.1 95% C.I.)	(93) 25.0 % (19.3 - 31.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(35) 4.7 % (3.1 - 7.1 95% C.I.)	(22) 5.9 % (3.3 - 10.4 95% C.I.)	(13) 3.5 % (2.0 - 6.1 95% C.I.)

Table 55: Prevalence of underweight by age, based on weight-for-height z-scores and oedema (NCHS, 1977)

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	175	12	6.9	45	25.7	118	67.4	0	0.0
18-29	152	15	9.9	48	31.6	89	58.6	0	0.0
30-41	208	5	2.4	42	20.2	161	77.4	0	0.0
42-53	137	2	1.5	35	25.5	100	73.0	0	0.0
54-59	70	1	1.4	12	17.1	57	81.4	0	0.0
Total	742	35	4.7	182	24.5	525	70.8	0	0.0

Figure 23: Frequency distribution of height for age z-scores (NCHS, 1977)

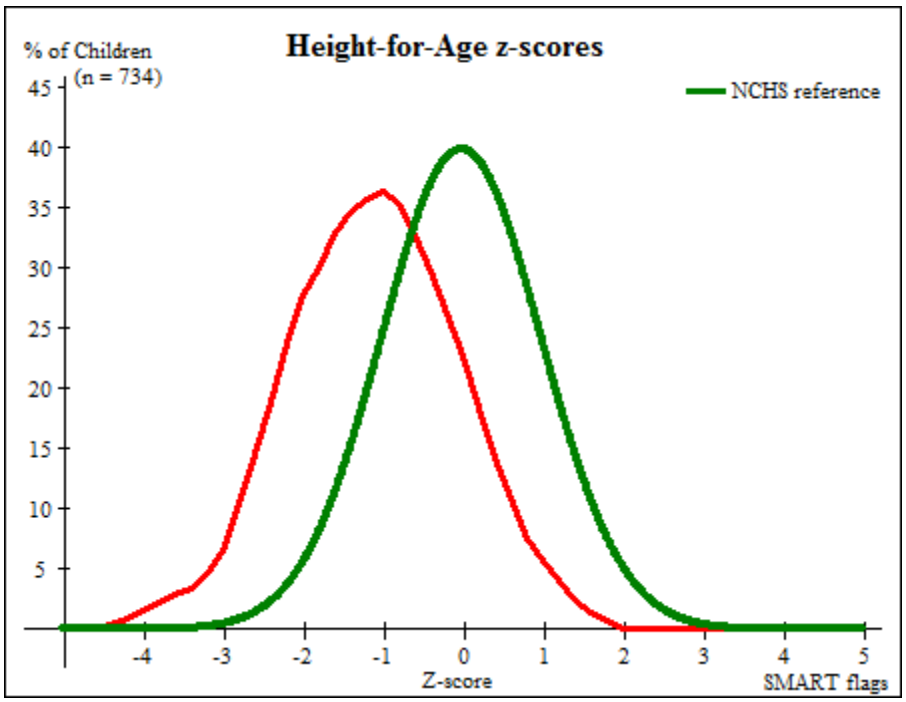


Table 56: Prevalence of stunting based on height-for-age z-scores and by sex (NCHS, 1977)

	All N = 734	**Boys** N = 367	**Girls** N = 367
Prevalence of stunting (<-2 z-score)	(146) 19.9 % (15.1 - 25.8 95% C.I.)	(82) 22.3 % (16.8 - 29.1 95% C.I.)	(64) 17.4 % (12.5 - 23.8 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(121) 16.5 % (12.2 - 21.8 95% C.I.)	(67) 18.3 % (13.6 - 24.0 95% C.I.)	(54) 14.7 % (10.0 - 21.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(25) 3.4 % (2.2 - 5.2 95% C.I.)	(15) 4.1 % (2.3 - 7.3 95% C.I.)	(10) 2.7 % (1.6 - 4.6 95% C.I.)

Table 57: Prevalence of stunting by age based on height-for-age z-scores (NCHS, 1977)

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	175	9	5.1	28	16.0	138	78.9
18-29	149	5	3.4	45	30.2	99	66.4
30-41	203	4	2.0	26	12.8	173	85.2
42-53	136	4	2.9	17	12.5	115	84.6
54-59	71	3	4.2	5	7.0	63	88.7
Total	734	25	3.4	121	16.5	588	80.1

Table 58: Mean z-scores, Design Effects and excluded subjects (NCHS, 1977)

Indicator	**n**	**Mean z-scores ± SD**	**Design Effect (z-score < -2)**	**z-scores not available***	**z-scores out of range**
Weight-for-Height	744	-1.02±0.83	1.95	1	1
Weight-for-Age	742	-1.51±0.88	2.42	1	3
Height-for-Age	734	-1.11±1.04	3.13	0	12

* contains for WHZ and WAZ the children with oedema.

Appendix 4: Survey questionnaires

GOAL Kutum - MICS Survey -Mortality Questionnaire 2014

Team No: Cluster No: Date: Village

HH no.	How many people live in this HH (**people eating from the same cooking pot)**	How many children <5 years in HH	People Joined		People Left		No. of live births during the past 3 months	TOTAL No. of deaths in the family during the past 3 months	No. of deaths how many were children <5 who died during the past 3 months birth)	Cause of death of family members >5 years old	Cause of death of children <5 years old
			people who have joined HH during the past 3 months	How many are <5years	people who have left HH during the past 3 months	How many are <5years					
1											

Register each death and its cause if there is more than one death according to the following definition							
No	**Disease**	**No.**	**Disease**	**No.**	**Disease**	**No.**	**Disease**
1	Fever (Malaria)	**5**	Maternal Mortality	**9**	Bloody diarrhoea	**13**	Accident
2	ARI	**6**	Neonatal Mortality	**10**	Acute watery diarrhoea	**14**	Other
3	Measles	**7**	Acute Flaccid Paralysis (Polio)	**11**	Meningitis	**15**	Unknown
4	Malnutrition	**8**	Diarrhoea	**12**	Violence		

GOAL Anthropometric Survey										
1. Anthropometric Questionnaire										
To be conducted in EVERY household with children 6-59 months from the random starting point *(all children 6-59 months in each HH)*										
	Team No:		Date:		Cluster No:		Area:		Village	

HH Ref. no.	Child Ref. No.	Sex M = Male F= Female	Age in months	Weight in Kg (to the nearest 0.1kg)	Height in cm (to the nearest 0.1cm)	Oedema n = No y =Yes	MUAC (to the nearest mm)	Is the child currently in a feeding programme? 1 = No 2 = SFP 3 = OTP 4 = SC / TFC 5 = Nutrition circle

GOAL KAPB Survey									
1. Child Questionnaire – Health									
To be conducted in EVERY household with children 0-59 months from the random starting point *(all children 0-59 months in each HH)*									
	Team No:		Date:		Cluster No:		Area:		Village	

HH Ref. no.	Child Ref. No.	Has the child been ill in the past 2 weeks? 1 = No 2 =Yes	Type of Illness 1 = None 2 = Malaria/fever 3 = Cough/difficult breathing 4 = Diarrhoea 5= Measles 6 = Eye infections 66 = Other (specify)	If your child had fever in the past 2 weeks what did you do? (One answer only, no prompting) 1 = Don't know 2 = Traditional medicine 3 = Go to a gvt clinic/hospital 4 = Go to a private clinic/hospital 5 = Mobile/Outreach clinic 6 = Buy drugs in market 7 = Buy drugs from a pharmacy 8 = Use local herbs at home 9 = Nothing 66 = Other (specify)	How many days after the fever began did you first seek treatment for fever from a health facility? 1= did not seek treatment from a health facility 2 = same day (within 24 hours) 3= next day or later (more than 24 hours)

HH Ref. no.	Child Ref. No.	Vit. A in last 6 months **(6-59 months ONLY)** _____ 1 = No 2 =Yes 3=don't know/remember	Measles Vaccine **(6-59 months ONLY)** _____ 1 = No 2 =Yes with card 3 =Yes recall	DPT3/ Penta3 vaccine 1 = No 2 =Yes with card 3 = Yes recall	Last night, did this child sleep under a LLITN? 1= No 2 = Yes 77= Don't know	How much liquid did you **OFFER** this child to drink during the last episode of **diarrhoea** compared to when s/he is healthy? --- **1** = Nothing to drink **2** = Much less than normal **3** = Somewhat less **4** = About the same **5** = More than usual **6**.= Not been sick **77** = Do not know / remember	How much food did you **OFFER** this child to eat during the last episode of **diarrhoea** compared to when s/he is healthy? --- **1** = Never gave food **2** = Much less than normal **3** = Somewhat less **4** = About the same **5** = More than usual **77** = Do not know / remember

GOAL KAPB Survey

3. Child Questionnaire – Infant and young child feeding - Page 3

To be conducted in EVERY household with children 0-23 months from the random starting point *(only for children 0-23 months in the HH)*

	Team No:		Date:		Cluster No:		Area:		Village	

HH Ref. no.	Child Ref. No.	How long after birth did you first put the child to the breast? _____ 1 = Never breastfed **2** = Immediately (Less than 1 hour after birth) **3** = from 1-24 hours **4** = from 25-48 hours **5** = after 48 hours	Are you currently breast feeding this child? _____ 1 = No 2 = Yes	What liquids was the child given yesterday during the day and night? Prompt and Record all responses given _____ **1** = None **2** = breast milk 3 = vitamin drops or medicines as drops 4 = ORS **5** = plain water **6** = infant formula (add local brand) **7** = milk (tinned, powdered, or fresh animal milk) **8** = juice or juice drinks **9** = clear broth **10** = other water based liquids **11** = sour milk or yoghurt **12** = thin porridge **66** = Other (Specify)	What foods was the child given yesterday during the day and night? Prompt and Record all responses given _____ 1 = Nothing at all 2 = Grains, roots and tubers 3 = Legumes or nuts 4 = Dairy products 5 = Flesh foods 6 = Eggs 7 = Vit A-rich fruit and veg 8 = Other fruit and veg 66 = Other (specify)	How many times did your child eat yesterday _____ (24hrs before survey, day and night: record number) _____ Not including liquid or breast milk)

GOAL Kutum –MICS -Household Questionnaire

Team No: Cluster No: Date: Village :

HH No		1	2	3	4	5	6	7	8	9	10
	Basic questions										
1	How many people live in this HH in TOTAL?	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**
	(HH def = people eating form the same cooking pot) **A=** Male **B=**Female	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**
2	How many are less than 5 years? **A=** Male **B=**Female	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**	**A.**
		B.	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**	**B.**
3	How many in the HH are pregnant women?										
4	**Origin of HH** 1 = Permanent residents, 2 =Returnees (returned within the last 12mths) ,3 = Nomads ,4 = IDPs (in last 12 months)										
	5 = IDPs (1-5yrs) ;6 = IDPs (5yrs +) ,7 = Refugees (in last 12months) , 8 = Refugees (1-5years) , 9 = Refugees (5years +)										
5	Is the head of this HH male or female? 1 =Male, 2 = female										
6	Is the respondent male or female?1 = male , 2 = female										
7	Education level of the respondent :1= no education 2 = Primary level ,3 = intermediate 4 = High Secondary ,5 = University + ,6 = Other (specify										
	Who in the household makes decisions about:										
8	**Household expenditure: 1**= male **2**= female **3**= Both										
9	**Health matters and seeking treatment**:**1**=male,**2**=female **3**= Both										
10	**Purchases Food and cooking:**										
	1=male,**2**=female,**3**= Both										

11 **Education:** **1**= male **2**= female **3**= Both

12 **Domestic matters:1**=male **2**= female ,**3**= Both

13 **What crops are planted:**

1= male ,**2**= female ,**3**= Both

Water &sanitation questions

14 What is the household's **main** drinking water source? **A**/dry **B**/wet **1**=Protected Source (Borehole, handdug wells) **2**= Unprotected well **3=** Unprotected surface water (rainwater, pond) , **4**= Water seller - protected source ,**5**= Water seller- unprotected source/ source unknown , **6**=0ther (specify).

A.

B.

15 How long would it take to water source (going, coming back and waiting) to bring water? 1 = <30 mins ,2 = 30 mins, 3= <1 hr

4= 1hr or more

16 How many Jerri cans of water did the HH use in total yesterday, (excluding water for clothes washing)? record the number only (count number of litres/jerry cans- (*20Litre jerican used during survey)*

17 How do you transport water from source to home? **1**= Using open container **2**=Covered containers **3**=Jerry cans with lids ,**4**= Jerry cans without lids , **5**=other containers , **6**=delivered by water seller in covered containers **7**=delivered by water seller in uncovered containers

18 How do you store drinking water?

1= In containers (bucket, Jerry Can, pot, bottle)

2= Roof Tank or Cistern,3=No water stored

19 **OBSERVATION:** If water store in containers, what type of containers are these?

1 =narrow mouthed(narrow is not more than adult fist) ,2 =wide mouthed , 3 =both types ,4 = no permission to see*(asked this question when answer question 18)*

20 **OBSERVATION:** Are the containers covered?

1 = all are not covered, 2= some are covered 3=all are covered

21	**OBSERVATION:** Are the containers clean (no green algae on inside, opening and handle free from dirt and dust) 1 = All are not clean , 2 = some are clean 3 = all are clean	
22	Where does the HH usually defecate? 1 = HH latrine ,2 = common /communal latrine ,3 = Designated open area ,4 = Undesignated open area 5 = Other places (specify)	
23	When do you usually wash your hands? 1= After defecating ,2 = After handling child faeces , 3 = Before cooking ,4 = Before eating ,5 = Other (Specify)	
24	**OBSERVATION:** Can you show me where you wash your hands and what you normally use to wash your hands with: 1= Inside/near toilet.,2= Inside/near kitchen/cooking place 3 = other place in yard,4 = Places Outside yard 5 =No specific place ,6 =No permission to see the place	
25	**OBSERVATION:** Is there soap of detergent or other locally used cleaning agent? 1= No ,2=soap ,3 =Ash 4 =other materials (Specify)	

Livelihoods

26	What were the HHs main sources of cash income in the last 30 days?1 = There no source ,2 = Employment ,3 = petty trading ,4 = cash crops ,5 = selling food crops , 6 = skilled worker 7 = other (specify)	**A.** **B.**
27	What do you spend most of this cash on per month? 1 = Food ,2 = Education , 3 = Health care 4 = Family needs 5 = Other (specify)	1
28	Has this HH's income increased in the last 12 months? 1 = Yes ,2 = No ,3 = Don't know	
29	What kinds of animals do you raise? (please select all from list) **1** = There is no animal ,**2** = chickens ,**3** = goats ,**4** = sheep ,**5** = cows **6** = camels ,**7** = Other (specify)	
30	What are the main HH sources of food in the last 7 days? 1 = personal production, 2 = market ,3 = Food Relief 4= Gift ,5 = Wild food ,6 = Other (Specify)	**A.** **B.**

31 **OBSERVATION**

What food stocks are available in the house on the day of the survey? (List all available)

1 = None,2 = Cereals/grains and tubers ,3 = Meat and Fish ,4 = Milk Products ,5 = Vegetables and Fruit, 6 = Legumes,7 = Eggs ,8 = Other food (Specify).

32 Do you by anyway has access to agriculture land? 1 = there is no land ,2 = owned land 3= rented land ,4 = borrowed 5 = shared , 6 = Other way (specify)

33 Did you cultivate in last season?

1 = No ,2 = Yes **(if no, skip to question 37)**

34 If Yes, compare the harvest to last harvest

1 = same amount as last harvest,2 = more ,3 = less ,4 = don't know ,5 = No harvest ,6 = Other

35 If yes, what types of crops did you grow?

(list all answers) 1 = Cereals/Grains and tubers ,2= legumes ,3 = fruits and vegetables rich in Vit A-rich ,4 = Other fruits and vegetables 5 = Other crop (specify)

36 If yes, how long will these grains (sorghum) stock be enough for you from this harvest? 1 = Don't know, 2 = less than 3 months ,3 = between 3-6 months ,4 = between 7-9 months ,5 = between 10-12 months

6 = Don't store grain

37 Has this HH's got a woman who has found a way to get income generation?

1 = No 2 = Yes 3 = Don't know

Health and decision making

38 How do you get Malaria? (One answer only, no prompting) 1 = Don't know , 2 = Mosquitoes ,3 = Flies , 4 = contaminated water , 5 = Eating leftover food , 6 = Other (specify)

39 Number of LONG LIFE INSECTICIDE NETS IN THE HH (observation quality- and check that mosquito net net has LLITN sign)

40 **A.**

	Number of people slept under a LLITN in the household last night (Write numbers for each group)? **A**= Pregnant women ,**B** = Other people more than 5 years old)	**B.**
41	How would you evaluate the general status of family health compared to last year? 1= The same status, 2=improved slightly 3= improved significantly, 4=deteriorated slightly, 5=deteriorated significantly.	
42	If there is a positive change can you indicate what has caused this change1=health services have improved 2= cost of health services more affordable, 3=more access to food 4= more access to water, 5=Other (Specify). (Only ask if response to 41 is 2 or 3. One answers only - record most important reason)?	
43	If there is a negative change can you indicate what has caused this change? 1 = Health services have become worse 2 = Cost of health services too expensive 3 = Less access to food 4 = Less access to potable water 5 = chronic illness in the HH 6 = Other (specify) _____ (Only ask if response to 41 is 4 or 5. One answer only record most important reason)	
	Reproductive Health	
44	How many ANC visits did you attend during your last pregnancy? (Record the number)	
45	Did you receive an injection in your arm during last pregnancy (tetanus toxoid)? 1 = once with card , 2= twice with card 3 = three with card ,4 = four with card ,5= 5 or more ,6 = once recall ,7= twice recall ,8 = three recall ,9 = 4 recall ,10 = I do not recall 5 or more ,11 = I did not get injection ,12 = don't know	
46	At any time before the last pregnancy, Did you receive an injection in your arm (tetanus toxoid)? 1 = once with card , 2= twice with card , 3 = 3times with card ,4 = 4times with card ,5= 5 or more ,6 = once recall ,7= twice recall ,8 = 3times recall ,9 = recall 4times ,10 = I recall 5times or more ,11 = I did not get injection ,12 = don't know	
47	Where did the birth of your youngest child take place (0-59months)? 1= at home , 2= local clinic ,3= hospital , 4 = Other (specify) ,5= don't know	
48	Who helped in delivery (one answer only record most qualified person attend)? 1= Family member,2= TBA at home,3= trained midwife at home ,4= clinic / health staff ,5= Other place (specify),6= don't know	
49	After the delivery, did the mother and baby have a PNC check-up? 1=No none ,2=Yes mother only , 3= Yes child ,4= Yes both mother and child ,5 = don't know	
50	Who conducted the PNC after delivery?	

1= TBA at home,2= Trained midwife at home,3= Health staff in health centre/clinic,4= Other (specify)

HIV

51 How can you prevent yourself from HIV? (Register all the answer mentioned to you)

1 = Never heard of HIV ,2 = Non-response ,3 = Abstain from sex

4 = Be faithful to spouse ,5 = correct and consistent condom use 6 = Treat STI's ,7 = Safe medical male circumcision

8 = Using antiretroviral treatment to prevent mother to child transmission ,9 = Being on antiretroviral treatment if the HIV positive result.,10 = Use only tested blood/blood products ensure safe check.,11 = Do not share sharps/blades/cutting instruments

12 ='There is nothing to do to protect yourself 13 = Don't know ,14 = Other (specify)

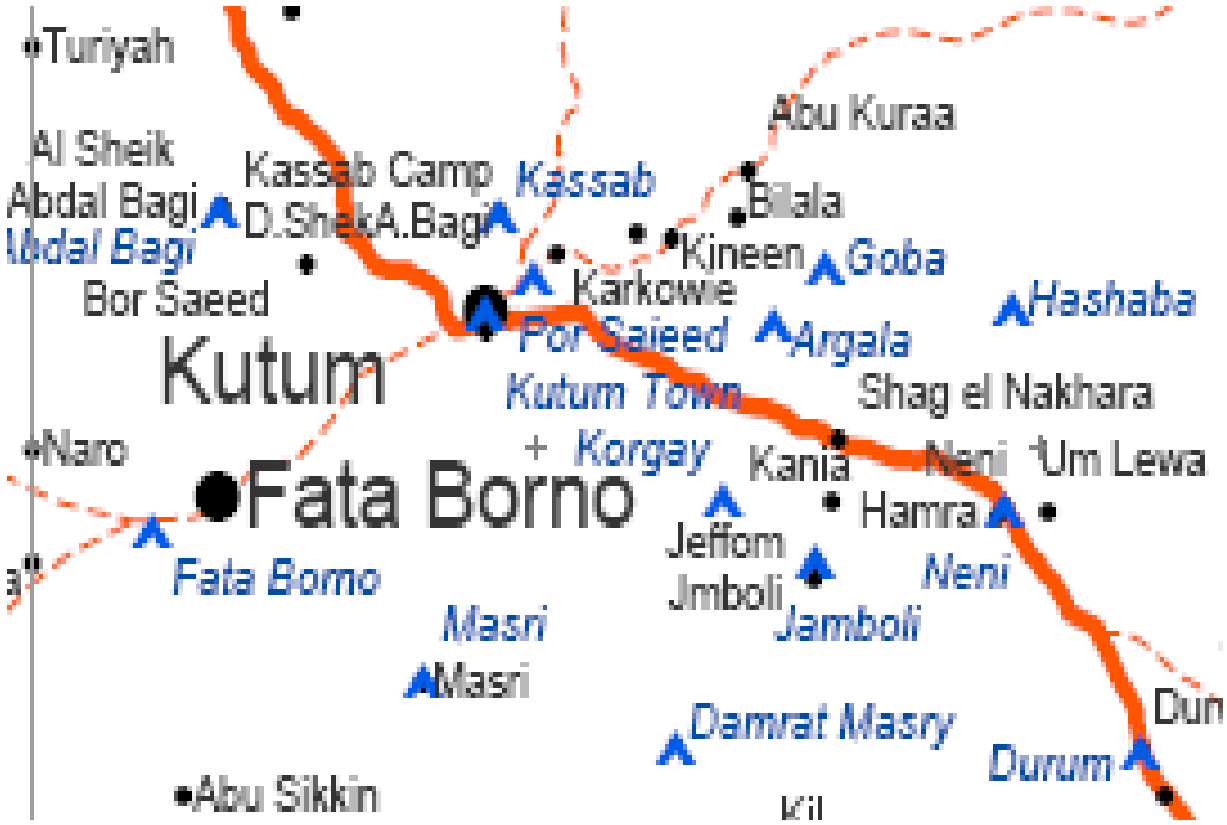
52 If you knew a shop keeper, tea seller, owner of restaurant was HIV positive, would you buy from them? 1 = No , 2 = Yes , 3 = Don't know

53 I don't want to know your results but have you ever been tested for HIV in the previous 12 months? 1 = No ,2 Yes

3 = Non-response

54 If you took a HIV test in the previous 12 months do you know the result 1 = No 2 = Yes 3 = Non-response

Appendix 5: Map of KUTUM



Appendix 6: SMART Plausibility Report

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (0.3 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=1.000)
Overall Age distrib (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0.001)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (7)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (8)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (5)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 2	>0.80 6	<=0.80 20	**0** (0.96)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.03)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.01)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=0.082)
Timing	Excl	Not determined yet 0		1	3	5	
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**6** %

The overall score of this survey is 6 %, this is excellent.