INTERGRATED HEALTH AND NUTRTION SMART SURVEY REPORT: CHALBI DISTRICT JUNE 2012

Esther Ogonda McOyoo
Nutrition Consultant (E' Hadassah Consultants)
P.O. Box 13959, 00100,
Nairobi, Kenya.
Email: sisesta@yahoo.com
Telephone no.: 0722591814

Acknowledgements

The consultant extends her sincere gratitude to the following parties who contributed immensely towards the success of the integrated health and nutrition survey, which is the subject of this report.

1. Members of the District Health Management, particular MoH District Nutrition Officer, George Kuria, UNICEF support Officer for supporting and participating in the survey.
2. Without the technical support of Concern Worldwide staff in Nairobi, Yacob Yishak and Samuel Kirichu this exercise would not have succeeded.
3. Concern Worldwide field staff in Chalbi particularly Bob Kaugi, Project manager, Project officers: Mary Wamuyu, Leonard Kiriama, and Weldon Ngetich as well as the logistics office in Marsabit for their tireless effort during the planning and implementation of the survey.
4. Surveying teams for the hard work and tolerance during the entire period of the survey.
5. The local community especially the mothers/caretakers for their co-operation without which any of the objectives could have been met.
6. Last but not least, the Nutrition Technical working group in Nairobi for their valued input during the discussions and dissemination of preliminary findings.

Table of Contents

Acknowledgements 2
List of Tables 5
List of figures 5
Acronyms 7
Acronyms 7
Executive Summary 8
1 INTRODUCTION: 14
1.1. Rationale and objectives of the Survey 14
2.1.1 Overall Objective 14
2.1.2 Specific Objectives: the specific objectives of the survey were: 15
2 Methodology 16
1.2. Sample Size 16
2.1.1. Sample Size Calculation for the Anthropometric/Malnutrition 16
2.1.2 Sample Size Calculation for the IYCF 16
1.3. Cluster Selection 17
1.4. Data Collected 17
1.5. Data Collection Methods and Tools 17
1.6. Quality Control 18
1.7. Organization of the Survey 18
1.8. Data Entry, Analysis and Report Writing 18
1.9. INDICATORS, GUIDELINES AND FORMULAS USED TO INTERPRET MALNUTRITION DATA 19
2.8.1 Acute Malnutrition 19
2.8.2 Chronic malnutrition and underweight indices 19
3 RESULTS: 20
3.1 Anthropometric results: children (based on WHO standards 2006) 20
3.1.1 Distribution by age and sex 20
3.1.2 Prevalence of acute malnutrition 21
3.1.3 Malnutrition Using MUAC 1
3.1.4 Prevalence of underweight and chronic malnutrition 2
3.1.5 Mean Z scores and design effects: 3
3.2 Trends of Prevalence Of Acute Malnutrition 3
3.3 Admission trends in OTP since January 2012: 4
3.4 Program coverage 5

3.5 Children's morbidity and health seeking behavior 6
3.6 Vaccination Results 7
3.7 Vitamin A supplementation coverage among Children 6- 59 months 8
3.8 INFANT YOUNG CHILD FEEDING PRACTICES 10
3.8.1 Breast feeding practices: 10
3.9 Dietary Diversity Score (DDS): 11
3.10 Household Demographic Characteristics Figure 2
3.11 Maternal Nutrition Status and women's physiology 2
3.12 Iron and Vitamin A Supplementation coverage among women 1
3.13 Household Food security: 2
3.13.1 Household Food Consumption 2
3.13.2 Food AID: 2
3.14 Livelihood sources: 2
3.15 Water and Sanitation and ITN Utilization 3
3.15.1 Water sources and treatment: 3
3.15.2 Sanitation and hygiene practices 4
3.14.1 Insecticide Treated Mosquito Nets (ITN) Holding Rates and Utilization 5
Recommendations 2
4 Annex 3
5.1 CHALBI DISTRICT NUTRITION SURVEY PARTICIPANTS: 3
5.2 CHALBI SURVEY TEAMS 4
5.3 Table of Weighted results- with original results per districts before weighting 5

List of Tables

Table 1: Anthropometric Sample Size for the Chalbi District 16
Table 2: Acute Malnutrition classification (using WHO z-score) 19
Table 3: Interpreting prevalence rates of various forms of malnutrition 19
Table 4: Distribution of age and sex of sample 20
Table 5: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex 21
Table 6: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema .. 1
Table 7: Distribution of acute malnutrition and oedema based on weight-for-height z-scores 1
Table 8: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex 1
Table 9: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema 2
Table 10: Prevalence of underweight based on weight-for-age z-scores by sex 2
Table 11: Prevalence of underweight by age, based on weight-for-age z-scores 2
Table 12: Prevalence of stunting based on height-for-age z-scores and by sex 3
Table 13: Prevalence of stunting by age based on height-for-age z-scores 3
Table 14: Mean z-scores, Design Effects and excluded subjects 3
Table 15: The program coverage 6
Table 16: *Symptom breakdown in the children in the two weeks prior to interview (n= 74)* 6
Table 17: Frequency of disease based on children attending nutrition program 7
Table 18: Vaccination proportions by card and recall 8
Table 19: Vitamin A supplementation by age and frequency 9
Table 20: Meal frequency among Young Children 11
Table 21: Food groups consumed by age category 11
Table 22: Dietary diversity score for Children 6-23 months old 2
Table 23: Physiological status of mothers surveyed 2
Table 24: Percentage of households that received Food Aid from various sources 2
Table 25: water sources and treatment 3
Table 29: Source of mosquito nets 5

List of figures

Figure 1: Population age and sex pyramid 20
Figure 2: Gaussian curve of malnutrition distribution 21
Figure 3: OTP Admission trends Figure 4: SFP Admission trends < 5 4
Figure 5: Overview coverage of key health indicators 7
Figure 6: Percentage of children receiving Vitamin A by age group 8
Figure 7: Breast feeding practices among 0- 5 months 10
Figure 8: House hold size 2
Figure 9: Maternal nutritional status 1
Figure 10: Percentage of women receiving Vitamin A and Iron supplementation 1

Figure 11: Number of meals eaten 2
Figure 12: Duration that Food Aid lasts 2
Figure 13: Socio- economic status of household sampled 2
Figure 14: water sources, treatment and hand washing practices 4

Acronyms

ARIs:	Acute Respiratory Infections
BSFP:	Blanket Supplementary Feeding programme
CHWs:	Community Health workers
CI:	Confidence Interval
CMR:	Crude Mortality Rate
CSB:	Corn Soya Blend
CW:	Concern Worldwide
DDS	Dietary Diversity Score
DHS:	Demographic and Health Surveys
FGDs:	Focus Group Discussions
FHK:	Food for the Hungry Kenya
GAM:	Global acute malnutrition
GoK:	Government of Kenya
H/A:	Height-for-Age
IYCN:	Infant Young Child Nutrition
MOH:	Ministry of health
MoPHS:	Ministry of Public Health and Sanitation
MUAC:	Middle Upper Arm Circumference
NCHS:	National Centre for Health Statistics
NGO:	Non Governmental Organization
OTP:	Outpatient Therapeutic Feeding Programme
SAM:	Severe acute malnutrition
SFP:	Supplementary Feeding Programme
SMART:	Standardized Measurement and Assessments in Relief and Transition
SPSS:	Statistics Package for Social Sciences
U5MR:	Under Five Mortality Rate
CIFF:	Children investment fund foundation
W/A:	Weight-for-Age
W/H:	Weight-for-Height
WFP:	World Food Programme
WHM:	Weight for Height percent of median
WHO:	World Health Organization
WHZ:	Weight for Height Z scores

Executive Summary

The survey took place between 16th and 21st June 2012. Its general objective was to estimate the prevalence of malnutrition in children aged 6-59 months in Marsabit North (Chalbi) districts. Specifically, the survey aimed at assessing the current prevalence of acute malnutrition in children aged 6 – 59 months in addition to looking at the Infant Young Child Nutrition (IYCN) practices, morbidity among children under five years, Measles vaccination coverage and 'Vitamin A' supplementation. The survey also assessed the food security and food consumption patterns, water and sanitation situation of the surveyed population as well as nutritional status of women of child bearing age.

The survey was a cross sectional study with a nutritional and food/ livelihoods survey according to SMART methodology and current best practices using 2 staged cluster sampling methodology, complemented with focus group discussions and interviews with key informants. The sample size was calculated using the estimated under 5 population size of 5731 children (20% of total population) and the prevalence of malnutrition of previous survey in November 2011 (13.4%). 792 children (6-59moths), 254 children 0- 5 months and 827 households were included in this survey.

Using the new 2006 WHO standards, results show a prevalence of Global Acute Malnutrition (GAM), measured in weight for height Z-scores (WHZ), for children aged 6-59 months in this population of 10.7 % (8.2 - 13.8 95% C.I.) for both genders and a prevalence of Severe Acute Malnutrition (SAM) of 1.5 % (0.9 - 2.6 95% C.I.) with no statistical differences between the 2 genders for either severe or global malnutrition[1] although boys were more malnourished than girls. The prevalence of severe malnutrition using MUAC defined as less than <11.5 cm, was 0.9 % (0.4 - 1.9 95% C.I.), while GAM using MUAC (< 12.5cm) was 3.5 % (2.4 - 5.2 95% C.I.). Older children age group 30- 59 months were more malnourished with GAM prevalence of 13.5% and SAM 2.2% for wasting compared to the younger children 6- 29 months old whose GAM was 7.6% and 0.8% SAM - all figures in Z scores. This phenomenon was also observed in the last survey. No cases of oedema were reported.

Comparing the current weighted GAM prevalence (12.4%: 10.4- 14.7%) with that of November 2011 (12.8%: 9.8-16.9%) and May 2011 31%[2] show a significant decrease for the latter (May, same season) although the change from November survey is not significant as the confidence intervals overlap and may be due to chance. P value was also at 0.3. SAM prevalence has also reduced from 5.0% (3.5 - 7.2) in May 2011, to 2.0% (1.1-3.6) in November, to the current 2.3% (1.6- 3.3%), weighted results, although the change from November is also not significant as in GAM (p value =0.48).

While malnutrition among children under 5 years is serious according to WHO standards, maternal malnutrition prevalence was found to be high, affecting 10.2% women with one out of every 10 women, (10%), being moderately malnourished: of major concern is the high proportion (28%) of women who are risk of malnutrition, MUAC 21.1 – 23 cm. SAM for mothers was 0.2% (MUAC <18cm). Vitamin A supplementation amongst lactating women showed that 4 out of 10 women receiving it (45.2%) a low proportion but higher compared to the greater Marsabit (weighted coverage is 30.3%). The percentage of women who received some form of iron supplementation during their last pregnancy was 68%.

The SFP coverage (49%) is slightly below the set minimum target by sphere standards of 50% in rural set up although the TFP coverage of 92.6% is acceptable (above 70%).

[1] P value is 0.05 and confidence intervals overlap and difference likely due to chance boys GAM for boys is 12.9 % (10.2 - 16.2%) and girls 8.3% (5.4 - 12.5%) while SAM is 1.9 % (1.0 - 3.9%) and 1.1 % (0.4 - 2.9%) respectively.

2 The actual prevalence from the greater Marsabit survey in May was (27.1%: 21.6 - 33.3%) and 31% was recalculated statistically specifically for Chalbi district. The weighted prevalence for current greater Marsabit is 12.4 % (10.4 - 14.7 %) GAM and 2.3 % (1.6 - 3.3%) SAM

Other issues identified related to nutrition were:

1. 10.8% of the children sampled had been sick 2 weeks prior to the survey. Almost half of the sick children 41.9% had suffered from acute respiratory infections, followed by fever cases (28.4%); Diarrhoea affected 6.8% of the sampled sick population; Only 1 of those diarrhoea cases was dysentery (have blood) and most of the diarrhoea (83%) are managed through other traditional ways, as only 1 case out of 6 was given ORS/ oralite. 1 out of every 4 malnourished children (26.5%) suffered from a sickness 2 weeks prior to the survey, most of them having been ARI (25.8%) and 0.3% other infections. 35.3% of those who had been sick did not seek any medical assistance, although majority (29.4%) of those who sought intervention went to public clinics/ dispensaries. 14.7% went to private clinics. Although mosquito nets should help reduce malaria related fever, only half of the households sampled (51.1%) have mosquito nets.

2. Measles immunization amongst children 9 months and above is very high at 90.8% with 75.7% being confirmed by the presence of vaccination card. Of concern though is that 1 out of 10 children (10.4%) who had not received measles immunization were malnourished. Vitamin A supplementation in the last 6 months is 75.2% (7:10 children) with nearly half 45.7% receiving the supplement twice in the last 1 year. The coverage of Oral Polio Vaccine (OPV 1) and OPV 3 was 91.2% and 88.2% respectively.

3. IYCN: 9 out 10 children under 2 years (96.9%) were still breastfeeding although 62.8% of these were given other foods (including water), before they reached 6 months and 5.3% being weaned after 6 months. Half of the children 6-23 months sampled (50.3%) ate 3 meals the day prior to the survey while 6 out of 10 (64.4%) 24- 59 months old ate 3 meals. The percentage of households that usually eat 3 meals a day was 85% although the day before the survey fewer households (77.4%) had eaten the 3 meals, while more households (19.5%) had taken 2 meals compared to 10.5% that usually take 2 meals per day.

4. Exclusive breastfeeding practices is a cause for concern: Only slightly less than half of the mothers (48.2%) of the mothers gave nothing other than breastfeeding the day before the survey although 93.6% of newborns were given colostrums and 94.4% of mothers initiated breastfeeding within the first hour. Nearly all (99.2) the sampled children < 6 months old were still breastfeeding. These children were also given powdered milk (28.3%), plain water (19.5%), sugared water (3.2%) and cows' fat (0.4%). When further probed, half of mothers (49.6%) admitted to having given plain water the previous day.

5. While the main source of food consumed is 58.9%, the main source of livelihood is livestock (80.9%) though it was noted that most town dwellers do not have any livestock. 94.3% of sampled households confirmed having livestock and the animal products that are consumed are milk and meat though currently milk is largely unavailable & costs up to 60 Kenya shillings per Liter in some places & the animals are as far as more than 100 km away and not expected back for 4 months (November when short rains are expected). Dependence on Food aid/ Relief food was also reported. Although the food basket is also not always complete, 73% of sampled house holds received relief food at least once in the last 3 months (March- May). Sharing of the food ration with house holds not officially targeted is common and almost the norm as it done through the relief committees. Food for the Hungry (FH) has been distributing food to

communities in the larger Marsabit district on monthly basis although in May and June, no distribution was done as it was believed that the communities had adequate food and moreover the blanket supplementary feeding program that was initiated as part of emergency response exited after six months in March 2011. The last general distribution was done in April, 2012 and it consisted of 10.35kgs of wheat, 1.4kgs slip peas (pulses) 0.6L of vegetable oil and 1.2kgs of Corn soy blend (all rations for 1 person). 22,200 beneficiaries (37.9% of population) people were targeted in this distribution although concern was expressed that the situation on the ground did not warrant the reduction of General Food distribution beneficiaries as recommended by in February by KFSSG team.

6. On average the amount of water used daily is 47.2 Litres per household although this ranges from 1 Litre to 800 Litres. The average water used per person per day in Chalbi is 8.7L[3]. This is less than the minimum required as per sphere standards recommendation of 15 L per person per day. Most people (28.5%) use unprotected wells, although protected wells are also accessed by 18% of the population. Boreholes are a source of water to 13.4% of the population, public pans 6.6%, and tap water 3.4% with only 0.3% currently using water from rivers which are almost dry. The total proportion of those using safe sources of water constitutes 34.9%. Despite this low utilisation of improved water, more than half of the sampled population (59.4%) do not treat their drinking water although among the 40.6% that treat; those who use chemicals such as aquatabs and purr are 29.9%, 9.2% boil, with only 0.7% and 0.1% use traditional herbs and decant respectively to make the water they drink safe. Only 9% of caretakers washed their hands during all the 4 critical times (before feeding baby, after cleaning the Childs bottom, before eating and before handling any food). Only 40.6% have access to a toilet leaving more than half of the sampled households with no access.

In conclusion, the nutrition situation of the Chalbi population is improving as a result of concerted effort of partners, although the nutrition and food security situation is still fragile (serious). Households are still struggling with the effects of previous consecutive poor rainy seasons: long rains were not good although the short rains were better. The dry season is just beginning and is expected to continue till the end of October. The results also indicate the need to continue promotion of exclusive breastfeeding and proper infant feeding practices as well as appropriate hygiene and sanitation practices through health.

Recommendation:

Short term

1. There is need for partners to continue with comprehensive health and nutrition interventions with emphasis on improving infant and young child care practices without neglecting mothers' nutrition and health concerns. Given the important role grandmothers play in influencing IYCF, they should be targeted for nutrition education and behaviour change communication.

2. Stake holders like Concern, MOH, FBO to continue with hygiene promotion and sensitization and promotion of use of toilets, improve toilet access and other sanitation concerns, particularly

[3] Sphere Handbook.**The Sphere Project-** Humanitarian Charter and Minimum Standards in Disaster Response

targeting areas that continue to report high cases of diarrhoea diseases. Multifaceted approach could be deployed here targeting also training institutions and in particular primary schools on initiation of hygiene clubs, erection of talking walls in schools and market places. Due to migratory nature of pastoralist in Chalbi, sensitization on cat skill disposal of faeces should be encouraged as partners are also encouraged to support the community with portable latrine materials to compliment the fixed VIP toilets.

3. DSG should follow up and advocate for more people to be targeted for the food intervention from the current 37.9% of the district population. Vulnerable households still need consistent food aid assistance with a complete food basket and the Food for Asset (FFA) which is the highly recommended food assistance is in the agro-pastoral areas and this should be advocated for in Chalbi.

Long term

4. Concern should adopt and continue advocacy for use of community conversations (cc) in health and nutrition education, especially with emphasis on the (IYCN) EBF for the first six months. The CC strategy is a holistic vehicle for delivery of health and nutrition services at community level which concern is committed to uphold. In Kenya, Concern has used CC since July 2010 to December 2011 in Hygiene promotion & IYCN. Although the CC process has not yet been rolled out in Chalbi, plans are under way through CIFA concern partnership to introduce this strategy to the already existing mother to mother support groups.

5. To understand the cause of continuous higher malnutrition among the older children, there is need for stakeholders in the nutrition programs to look in to why older children (30- 59) months are more vulnerable to malnutrition.

Summary of key findings:

		2011 May Marsabit [95% C. I]	2011 Nov Marsabit [95% C. I]	2012 June Chalbi [95% C. I]	Weighted Marsabit June 2012
z-score based on WHO standard (2006)	**Wasting: Global Acute Malnutrition** WFH <-2 z-score	27.1% (21.6 - 33.3)	12.8 (9.8-16.9 95% CI)	(785) 10.7 % (8.2 - 13.8 95%	(211) 12.4 % (10.4 - 14.7 95% C.I.)
	Wasting: Severe Acute Malnutrition WFH < -3 z-score and/or oedema	5.0% (3.5 - 7.2)	2.0% (1.1-3.6 95% CI)	(12) 1.5 % (0.9 - 2.6 95% C.I.)	(39) 2.3 % (1.6 - 3.3 95% C.I.)
	Prevalence of Stunting HFA <-2.0 z-score		38.6% (34.7 – 42.7 95%)	(228) 28.9 % (25.4 - 32.7)	(459) 27.0 % (24.2 - 29.9 95% C.I.)
	Severe chronic malnutrition (stunting) HFA < -3 z-score			(64) 8.1 % (6.1 - 10.7)	(139) 8.2 % (6.7 - 10.0 95% C.I.)
	Prevalence of Underweight < -3 z-score and/or oedema		30.3% (25.6 – 35.5 95% CI)	(186) 23.6 % (19.1 - 28.8)	(400) 23.5 % (20.5 - 26.8 95% C.I.)
	Severe underweight < -3 z-score			(30) 3.8 % (2.6 - 5.6)	(83) 4.9 % (3.7 – 6.5 95% C.I.)

Median based on WHO standard 2006	Wasting: **Global Acute Malnutrition** WFH <80% and/or oedema n = 785		7.2% (5.2-9.9 95% CI)	(13) 1.7 % (0.7 - 2.6)	
	Severe Acute Malnutrition WFH < 70% and/or oedema			(2) 0.3 % (-0.2 - 0.7)	
MUAC	**Prevalence of global malnutrition (< 125 mm and/or oedema)**	36.9%[4]	6.9%	(28) 3.5 %(2.4 - 5.2 95% C.I.)	(105) 6.1 % (4.4 - 8.2 95% C.I.)
	Prevalence of severe malnutrition (< 115 mm and/or oedema)		1.7%	(7) 0.9 % (0.4 - 1.9)	(28) 1.6 % (1.0 - 2.5 95% C.I.)

DEMOGRAPHY	**Number**	
Number of HH surveyed	827	
Number of children 6-59 months surveyed	792	
Number of children 0-23 months surveyed for IYCN	**441**	
Number of children 0-5 months surveyed for IYCN	254	
Average number of persons per HH	5.3	±0.07

OTHER KEY INDICATORS	**2012 June**
% of women received iron supplementation in last pregnancy (N=478)	68% (325)
Iron supplementation against currently breast feeding mothers (N=350)	70.6(247)
Iron supplementation against Pregnant & breast feeding mothers (N=3)	66.7(2)
Iron supplementation against Not pregnant/ not breast feeding mothers(N=71)	59.2 (42)
Iron supplementation against Pregnant mothers (N=54)	63.0 (34)
MUAC: Women in reproductive age N = 596 SAM <18 GAM <21 cm: MAM 20- 21 cm At risk 21.1- 23 cm:	 0.2% (1) 10.2% (61) 10.0% (60) 28.8% (172)
Vit. A supplementation amongst Currently breastfeeding	**45.2% (122)**
Vit. A supplementation amongst Not pregnant/not breastfeeding	**48.3% (28)**
Total Vit A supplementation amongst women	**45.7% (150)**
Infant Young Child Feeding And dietary Diversity	
6- 23 months Still breast feeding (N= 194)	96.9% (188)
% 0-5 months given prelacteals within the first 3 days	51.8% (130)
Age for complementary feeding for 6- 23 months (N= 18) Before 6 months At 6 months	 62.8% (118) 31.9% (60)
Meal frequency (6- 23 months N=179) No eating 3 meals a day No eating 2 meals a day No eating 1 meal a day	 50.3% (90) 22.9% (41) 5.6% (10)
Meal frequency (24- 59 months N=396) No eating 3 meals a day No eating 2 meals a day No eating 1 meal a day	 64.4% (255) 21% (83) 1.8% (7)

[4] Using MUAC cut off 135 mm

Dietary diversity score for Children (% 6-23 months old Consuming 3+ food groups (breastfed children) Consuming 4+ food groups (non-breastfed children) Consuming 3+ or 4+ food groups (breastfed and non-breastfed children)			 38.2% (21) 32.7% (18) 35.5% (39)
% of people having livestock (N=634)			94.3% (598)
% of people having mosquito nets (N=675)			51.1% (345)
VACCINATION			
Measles vaccination coverage N= 655		Yes by recall Yes by card Total vaccinated	15.1% (99) 75.7% (496) 90.8% (595)
OPV 1 coverage N= 684 Yes by recall Yes by card Total vaccinated	 14.5% (99) 76.8% (525) 91.3% (624)	OPV 3 coverage N=685 Yes by recall Yes by card Total vaccinated	 15% (103) 73.1% (501) 88.1% (604)
Percentage of children who received Vit A in the last 6 months (N= 682) 6- 11 moths (n=52): 12- 59 months (n=630):			77.5% (526) 67.3% (35) 77.8% (490)
Frequency of Vit A supplementation amongst children in the last 1 year (N= 665)		zero Once Twice 3 times	10.2% (68) 42% (279) 45.7% (304) 2.1% (14)
Water and Sanitation			
% of people having access to a toilet (N=675)			40.6% (274)
% of people treating their drinking water (N=739)			40.6% (300)
% of people accessing safe water			35.1% (261)
Average water usage per person per day			8.7 Litres

1 INTRODUCTION:

Marsabit North (Chalbi) District is one of the 5 districts in Marsabit County, Eastern Province in Northern Kenya. It is one of the five newly-formed districts within the former larger Marsabit District. The district boarders Ethiopia to the North, Lake Turkana to the West, Laisamis District to the South, Sololo District to the East and Isiolo County to the South East. The estimated population for the district in 2011 is 29,561 where 5,9125 is the estimated under five populations. Pastoralism is the pre-dominant livelihood with the main livestock kept being cattle and goats although camels and sheep are also kept. The district receives bimodal rainfall pattern with long rains received in March to May and short rains between October and December. The rainfall ranges from 300-800 mm.

Malnutrition is an important public health problem in Kenya, with notably high levels of acute and chronic malnutrition in the Arid and Semi-Arid Land (ASAL) districts (which include the Chalbi District), as a result of frequent drought and other disasters. In 2011, the Horn of Africa (where Kenya is inclusive) experienced the worst drought in over 60 years. The situation was much severe in the ASAL districts and as a results the level of malnutrition both acute and chronic are expected to have gone up. This situation was also complicated by the failure of the short rains in late 2011, rising food and commodity prices, reduced cereal production and livestock diseases converged to dramatically increase food insecurity among many vulnerable populations throughout the country.

Concern Worldwide with financial support from children investment fund foundation (CIFF) is supporting Ministry of Public Health Sanitation, (MoPHS), in Scaling up of High Impact Nutrition Interventions for improved nutrition in children and women in Chalbi District. The goal is to contribute to reduction in mortality and chronic malnutrition in children aged 0 to 5 years. The interventions are in line with the priorities outlined in the nutrition sector partnership framework which supports scaling up of high impact interventions, supporting the MoH to deliver essential nutrition services through cost effective and feasible interventions in prevention and treatment of malnutrition. Key activities include detection and referral of acute malnourished cases (i.e. children and pregnant/ lactating mothers) at health facilities, promotion and protection of infant and young child feeding practices, promoting micronutrient supplementation for children and mothers, de-worming, nutrition education, coordination of nutrition initiatives, nutrition surveillance, reporting and monitoring.

1.1. Rationale and objectives of the Survey

In order to assess the prevalence of malnutrition and the performance of the HiNi indicators in the greater Chalbi District, Concern Worldwide in collaboration with MoPHS and CIFF carried out a nutrition survey between 16th June and 21st June 2012. The survey would also aim at understanding the most affected age groups among the children aged 6-59 months and analyzing the possible factors contributing to malnutrition and recommend appropriate interventions.

2.1.1 Overall Objective

The general objective of the survey was to estimate the prevalence of malnutrition in children aged 6-59 months in Chalbi District

[5] Projections based on the KNBS population growth rate

2.1.2 Specific Objectives: the specific objectives of the survey were:

- To estimate the current prevalence of acute malnutrition in children aged 6 – 59 months
- To estimate the morbidity rates 2 weeks prior to the survey among under five children in the survey area.
- To estimate Measles, vaccination and 'Vitamin A' supplementation for children 9-59 months and 6-59 months respectively, as well de worming practices.
- To compare the overall nutritional changes with the previous GAM and SAM
- To assess the current food security situation of the surveyed population
- To measure the IYCN indicators

2 Methodology

The survey applied a two stage cluster sampling using the SMART methodology with the clusters being selected using the probability proportional to population size (PPS). The target population for this survey was children aged 6 – 59 months for the anthropometric component, 0 – 5 months for EBF rates, the caregivers of the targeted children.

1.2. Sample Size

The sample size for both the anthropometric and EBF was calculated using the SMART survey calculator. The projected population size for 2012 for Chalbi District was used as the sampling frame. The population will be projected using the Geometric Population Growth Models with the annual growth rate being 2.69%[6]. Both sample sizes for the anthropometric and EBF surveys were calculated separately as outlined below:

2.1.1. Sample Size Calculation for the Anthropometric/Malnutrition

The malnutrition/anthropometric sample size was based on the following parameters:

1. The GAM Prevalence of 12.8%[7]
2. A Design Effect of 1.5 is used. This is after taking into consideration the heterogeneity of the survey area and the results of the last year survey
3. Since the estimated GAM Rate is 12.8%, then a precision of 3% is required to obtain accurate estimate of the malnutrition prevalence
4. The under 5 population used is 5731[8] (20% of the total projected population)
5. The under 5 population per household of 1.4[9]

Table 1: Anthropometric Sample Size for the Chalbi District

Population	U5 Population	Estimated Prevalence	Precision	Design Effect	% of Non-Response	Sample Size (Children to be Included)	HH to be included (Average U5 per Household 5.5)	Number of Clusters
28,654	5731[10]	12.8%[6]	3%	1.5	3%	778	810	36

22 households and 23 children 6- 59 months were targeted in each cluster. The actual sample size for children 6- 59 months was 792 children, 827 households in the 36 villages/ clusters.

2.1.2 Sample Size Calculation for the IYCF

For the IYCN sample size, the sample was calculated only for the 0-5 month's old children since they were not part of the anthropometric sample size. The EBF rate (based on previous November survey results) was used for the calculation. The following were the parameters which were considered for the sample size:

1. The EBF rate – 65.6%
2. Precision – 7%
3. Design Effect – 1.5

For other IYCN, the largest number of sample size amongst all the indicators was 11 children. Given that in the anthropometry sample calculation, a sample size of 22 children per cluster was higher, it was appropriate to

[6] Growth Rate as Projected by the Kenya National Bureau of Statistics
[7] Based on the November, 2011 Marsabit SMART Survey
[8] The Projected Population for Marsabit using the 2009 Census Data as the Base Year
[9] This is based on the November, 2011 Marsabit SMART Survey
[10] 20% estimated child population for <5ves yrs old

collect the IYCN information from all the children in the anthropometric sample and 8 children per cluster for EBF among <6 months.

1.3. Cluster Selection

All accessible villages were included in the initial sample selection with each village considered a cluster and clusters sampled with probability proportional to size. All villages along with their respective populations entered into the ENA software and clusters selected accordingly using the SMART ENA software. At stage two each team esed the modified EPI method in household selection. Within selected households all children 6-59 months fitting the inclusion criteria were measured.

1.4. Data Collected

Both qualitative and quantitative data collection method were used to collect the survey data; the following data were collected:

Age: The exact date of the childs birth was recorded where health records or other documentation were available. Most of the caregivers had birth certificates and child health cards with children's birth dates. A local event calendar of events was used to estimate the ages for the rest of the children.

Weight: Children were measured using a 25 kg hanging spring Salter scale to the nearest 100g. Over clothing and shoes were taken off for measurement of weight. When over clothing could not be removed for cultural reasons which were duly respected, 100 grams was deducted.

Height: Standard Shorr wooden measuring boards for children were used to measure height, and the measurements were recorded to the nearest 0.1 cm. Recumbent length was taken for children less than 85 cm while those greater or equal to 85 cm or more than 2 years of age were measured standing up.

MUAC: Mid Upper Circumference (MUAC) was measured using standard methodology, in mm. In the event of a disability or for the left-handed, the right arm was used.

Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time.

Other variables Measured

Vaccination status: For all children 6-59 months, information on measles vaccination status, whether with or without MCH cards was gathered. To estimate measles coverage, only children older than 1 year were considered.

Illness: Retrospective incidence of illness in children 2 weeks prior to the survey.

Information on child Feeding Practices: Information on exclusive breastfeeding, and complementary feeding was solicited based on recall for children under 6 months and 2 years only respectively. Caregivers were also asked about infant feeding practices in the 24 hours prior to the survey for children under 5 years old.

Food source and coping mechanism of the households: Information on the source of food, frequency of meals and foods eaten in the last 24 hours and coping mechanisms was solicited to establish the food security status of the households.

Livelihood: information was also collected on the main source of income.

Water and sanitation information collected ranged from main source of water, treatment of drinking water, quantity of water used per day as well as access and usage of toilet facilities.

1.5. Data Collection Methods and Tools

10 focus group discussions (FGDs) were held in 10 clusters/ villages that were randomly selected using ENA. Trained facilitators who led the FDGs were the coordinators and the consultant. The focus of the FGDs was IYCF practices, the food security situation, morbidity, as well as food access and availability at the village level. Key informant interviews were also done with key stakeholders such as village leaders/ administrators, NGO officials such as FH, WFP, DC s office, UNICEF support officer, MOH nursing staffs in health facilities

1.6. Quality Control

Quality control followed standard procedures: In addition to a detailed 4 days training prior to the actual survey, during the survey, the teams leaders checked forms during data collection and before leaving the site to ensure all data was taken with further checks done with the supervisors and the experienced coordinators from various stakeholders within the district (MoH, Arid Lands officers, District Health Management Team members and CW). The coordinators also performed field visits during data collection to support and supervise enumerators. The data entry clerks also followed up any ambiguous and/ or any identified inconsistent answers.

1.7. Organization of the Survey

Training of the Survey participants: Recruitment was done in collaboration with the District Health office to give ownership and participation in the survey. Five teams of four were selected to include two enumerators, 1 interviewer and a team leader, most of who were from the ministry and Community Health Workers from the 5 sub locations within chalbi district. 4 coordinators from Concern and Arid lands formed the supervision teams in liaison with the consultant. All enumerators, supervisors and coordinators participated in a 4-day training on 16th to 19th June prior to field work. The training and survey was officially opened by the District Medical Officer, Health, (DMOH), Marsabit south who was represented by the DPHO, District Public Health Officer, Loiyangalani. Data collectors were trained on taking anthropometric measurements, completion of questionnaires, conducting focus group discussions and sampling methodology. The training also included standardization test and piloting the survey in one of the villages within Marsabit central that was not included in the actual survey sample.

Sensitization: Before the survey was conducted meetings were held with the respective district authorities and key stakeholders to brief them about the purpose, objectives and methods for the survey. The survey details was discussed with the District Steering Group, the Arid Lands Resource Management, key partners on the ground (NGO and UN) and conducted in collaboration with the District Health Office. Chalbi, DC and acting DMOH were informed about the survey and he issued authorization letter for the same that were dispatched to all sub locations. The MoH outreach teams together with the local authorities were requested to officially inform the communities (villages) that would be involved in the assessment.

Ethical considerations: Verbal consent for all caregivers and survey respondents of the sampled households was sought before any administration of the questionnaire. All information collected during the survey were treated as confidential and used for the survey and programming purposes only. Children or/ and Pregnant and lactating mothers who were found as severely malnourished, not yet de-wormed, those who had not received Vit A supplementation or with any other medical condition during the survey were referred to the nearest health facility or outreach site for medical attention and appropriate treatment.

1.8. Data Entry, Analysis and Report Writing

- **Data Analysis:** the data entry and analysis was done using ENA for SMART, and SPSS Statistical softwares. MS Excel was also used as well as the CDC calculators for calculating the P values. In addition, to improve on the data entry quality, double data entry was done. An external consultant was responsible for the data entry, analysis and report writing, but this process was conducted in collaboration with Concern staff at Nairobi. Results have been presented using the new 2006 WHO reference levels.
- **Preliminary Results and Dissemination of findings and Survey Report:** the preliminary findings were submitted by the consultant to the DHMT, and key stakeholders in Maikona, 2 days after data collection ended. Further dissemination was done at National level one month later and it included mainly the minimum indicators information and other relevant information.
- **Compilation:** once the survey has been accepted by the information working group the results will be distributed at each level through the appropriate channels.

1.9. INDICATORS, GUIDELINES AND FORMULAS USED TO INTERPRET MALNUTRITION DATA

2.8.1 Acute Malnutrition

For the children, acute malnutrition prevalence was estimated from the weight for height (W/H) indices values combined with the presence of oedema. The W/H indices are compared with WHO 2007 references, which have been accepted and are use in the country. W/H indices are expressed in Z-scores. Using MUAC, severe malnutrition is defined by measurements <115mm (new WHO cut off point) and < 125 mm and/or oedema for GAM for children, whereas for acute malnutrition in adults, the Sphere Minimum Standards recommendation of a cut-off point of 210 mm (21.0cm) for identification of nutritional risk in pregnant women in emergencies was used.

2.8.2 Chronic malnutrition and underweight indices

Chronic malnutrition is estimated from the height and age indexes in comparison with the WHO 2006 reference mentioned above. The indicator is also expressed in Z scores. The underweight classification of malnutrition gives the characteristics of a Childs' weight according to its weight in comparison to that of a normal child of the same age. This system is used in public health screening and to evaluate the impact of such interventions although it has limited clinical use for individuals, as it does not differentiate between acute and chronic malnutrition.

Table 2: Acute Malnutrition classification (using WHO z-score)

Bench marks used for interpreting stunting, wasting and underweight are adopted from WHO guidelines.

Type of malnutrition	Anthropometric index	Degree of malnutrition	Definition using Z-score
Acute/ Underweight/ stunting	Weight-for-height Weight for age Height for age	None	≥ -2.0
			≥ -3.0 but < -2.0
		Severe	< -3.0 or edema
Global acute (GAM)		Moderate severe	<-2.0 or edema
Severe acute (SAM)		Severe	<-3.0 or edema

Table 3: Interpreting prevalence rates of various forms of malnutrition

Index	Stunting <- 2 SD %	Wasting <- 2 SD %	Underweight <- 2 SD %
Low	< 20%	<5%	<10%
Medium	20- 29%	5- 9%	10- 19%
High	30- 39%	10- 14%	20- 29%
Alarming/critical	≥ 40%	≥ 15%	≥ 30%

3 RESULTS:

3.1 Anthropometric results: children (based on WHO standards 2006)

In total 787 children were included in this analysis. 8 children were excluded as flags as their anthropometry was probably not taken accurately. The design effects were WHZ: 1.8 %, HAZ: 3.3 %, WAZ: 1.1 %. However the flagged children were included in the analysis of other indicators.

3.1.1 Distribution by age and sex

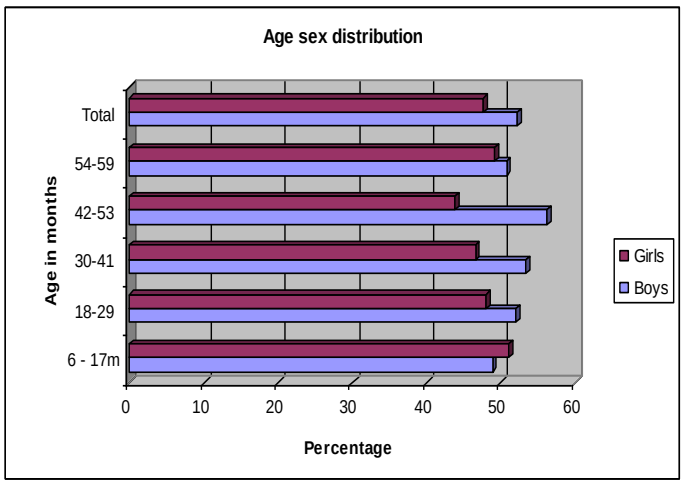
More boys were sampled in the survey, constituting 52.3% and girls were 47.5%. The overall sex ratio of 1.1 is acceptable and thus validates the sample. The distribution of the gender and ages is as seen in the table and graph below.

Table 4: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	110	48.9	115	51.1	225	28.4	1.0
18-29	77	52.0	71	48.0	148	18.7	1.1
30-41	87	53.4	76	46.6	163	20.6	1.1
42-53	109	56.2	85	43.8	194	24.5	1.3
54-59	31	50.8	30	49.2	61	7.7	1.0
Total	414	52.3	377	47.7	791	100.0	1.1

It was possible to obtain the exact dates in most of the sampled children as they had records with birth dates. 67.5% (420) dates were picked from the health cards, 6.3% (39) from birth certificates and 26.2% (163) were based on recall. A local calendar of events was therefore used to change dates into months. Age ratio of 6-29 months to 30-59 months was 0.87. The overall sex ratio of 1.1 is within acceptable range and validates sample selection. Figure 1 below illustrates these percentage distributions.

Figure 1: Population age and sex pyramid



Error! Reference source not found.

3.1.2 Prevalence of acute malnutrition

Using the new 2006 WHO standards, the prevalence of global acute malnutrition (GAM) among children under five was 10.7 % (8.2 - 13.8 95% C.I.); 9.2 % (7.0 - 11.9 95% C.I.) were moderately malnourished, whereas 1.5 % (0.9 - 2.6 95% C.I.) were severely malnourished, all measurements in Z scores, representing both genders. These GAM prevalence rates are serious based on the WHO standards[11] with concerns also on the proportion of severely malnourished children.

As detailed in the table below boys were found to be more moderately malnourished (10.9% compared to the girls (7.2%). Boys were also more severely malnourished than girls (1.9% and 1.1% respectively. However the number of cases was low, confidence intervals overlap and statistical analysis indicate no significant differences between the 2 sexes for either severe or global malnutrition as P value is 0.05 indicating that difference in malnutrition prevalence was likely due to chance

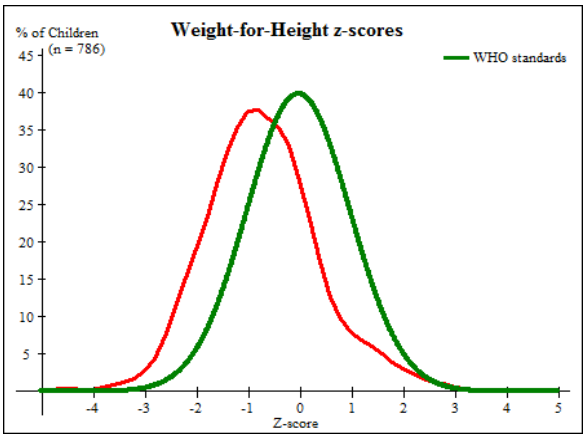
Table 5: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 786	**Boys** n = 412	**Girls** n = 374
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(84) 10.7 % (8.2 - 13.8 95% C.I.)	(53) 12.9 % (10.2 - 16.1 95% C.I.)	(31) 8.3 % (5.4 - 12.5 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(72) 9.2 % (7.0 - 11.9 95% C.I.)	(45) 10.9 % (8.3 - 14.2 95% C.I.)	(27) 7.2 % (4.9 - 10.6 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(12) 1.5 % (0.9 - 2.6 95% C.I.)	(8) 1.9 % (1.0 - 3.9 95% C.I.)	(4) 1.1 % (0.4 - 2.9 95% C.I.)

The prevalence of oedema is 0.0 %

Figure 2: Gaussian curve of malnutrition distribution

The distribution curve shows a shift towards the left of than the standard WHO curve of a normal population, illustrating a higher prevalence in malnutrition in Chalbi than in the WHO reference population.



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

Analysis of the nutritional status per various age groups is important in examining the effect of age on nutritional status and is necessary for guiding targeted of interventions. Table 6 below shows these analyses.

Table 6: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	224	1	0.4	13	5.8	210	93.8	0	0.0
18-29	147	2	1.4	12	8.2	133	90.5	0	0.0
30-41	162	3	1.9	17	10.5	142	87.7	0	0.0
42-53	193	5	2.6	21	10.9	167	86.5	0	0.0
54-59	59	1	1.7	9	15.3	49	83.1	0	0.0
Total	785	12	1.5	72	9.2	701	89.3	0	0.0

Moderate acute malnutrition was highest (15.3%) in the older children aged between 54 to 59 months, although severe acute malnutrition was highest amongst the 42- 53 months (2.6%). Older children age group 30- 59 months were more malnourished with GAM prevalence of 13.5% and SAM 2.2% for wasting compared to the younger children 6- 29 months old whose GAM was 7.6% and 0.8% SAM - all figures in Z scores. Although this phenomenon was also observed in the last survey, statistical analysis did not reflect any significant difference was not noted.

No case of oedema (hence kwashiorkor) was identified as seen below. Only 1.5% (12) marasmic cases representing SAM were in the sample surveyed.

Table 7: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 12 (1.5 %)	Not severely malnourished No. 774 (98.5 %)

The nutrition program has also not registered any child with oedema since January 2011 to the time of the survey.

3.1.3 Malnutrition Using MUAC

The prevalence of severe acute malnutrition using MUAC defined as less than <11.5 cm, was 3.5 % (2.4 - 5.2 95% C.I.), while GAM using MUAC (< 12.5cm) was 0.9 % (0.4 - 1.9 95% C.I.).

Table 8: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 790	**Boys** n = 414	**Girls** N = 376
Prevalence of global malnutrition	(28) 3.5 %	(12) 2.9 %	(16) 4.3 %
(< 125 mm and/or oedema)	(2.4 - 5.2 95% C.I.)	(1.7 - 4.9 95% C.I.)	(2.6 - 6.8 95% C.I.)
Prevalence of moderate malnutrition	(21) 2.7 %	(9) 2.2 %	(12) 3.2 %
(< 125 mm and >= 115 mm, no oedema)	(1.7 - 4.2 95% C.I.)	(1.2 - 3.8 95% C.I.)	(1.6 - 6.1 95% C.I.)
Prevalence of severe malnutrition	(7) 0.9 %	(3) 0.7 %	(4) 1.1 %
(< 115 mm and/or oedema)	(0.4 - 1.9 95% C.I.)	(0.2 - 2.3 95% C.I.)	(0.4 - 2.7 95% C.I.)

Analysing nutritional status by age group based on MUAC cut offs indicate that the most severely wasted children are between 30 to 41 age group (1.9%) while most affected by moderate malnutrition are in the 6 to 17 age bracket (5.8%).

Table 9: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 & < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	225	2	0.9	13	5.8	210	93.3	0	0.0
18-29	148	1	0.7	4	2.7	143	96.6	0	0.0
30-41	162	3	1.9	2	1.2	157	96.9	0	0.0
42-53	193	1	0.5	2	1.0	190	98.4	0	0.0
54-59	61	0	0.0	0	0.0	61	100.0	0	0.0
Total	789	7	0.9	21	2.7	761	96.5	0	0.0

3.1.4 Prevalence of underweight and chronic malnutrition

Underweight is a composite measure of both low weight-for-age and low height-for-age, indicating both acute and chronic nutrition situation in an area. The prevalence of underweight in Chalbi district (as seen in table 10 below) is 23.6% (19.1 - 28.8 95% C.I.) for both boys and girls although boys are more underweight than girls (27.2 % (22.2 - 32.8 95% C.I.) and 19.7 % (14.3 - 26.4 95% C.I.) respectively. The global prevalence is interpreted and classified as high at falls between 20-29%, Alarming levels is when the underweight percentage is >=30%, while 10- 19% is medium and <10% is low. The proportion of severe underweight was significantly different using the CDC calculator and CI do not overlap when assessing the severe underweight between the genders with boys being more severely underweight 5.8 % (3.9 - 8.5 95% C.I.) compared to girls 1.6 % (0.7 - 3.5 95% C.I.).

Table 10: Prevalence of underweight based on weight-for-age z-scores by sex

	All: n = 788	**Boys:** n = 412	**Girls:** n = 376
Prevalence of underweight (<-2 z-score)	(186) 23.6 % (19.1 - 28.8 95% C.I.)	(112) 27.2 % (22.2 - 32.8 95% C.I.)	(74) 19.7 % (14.3 - 26.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(156) 19.8 % (15.9 - 24.4 95% C.I.)	(88) 21.4 % (16.7 - 26.9 95% C.I.)	(68) 18.1 % (13.2 - 24.3 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(30) 3.8 % (2.6 - 5.6 95% C.I.)	(24) 5.8 % (3.9 - 8.5 95% C.I.)	(6) 1.6 % (0.7 – 3.5 95% C.I.)

The most severely underweight age group is 18- 29 months (5.4%), while the most moderately underweight is 42-53 age category (24.2%).

Table 11: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 & <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	225	4	1.8	26	11.6	195	86.7	0	0.0
18-29	147	8	5.4	34	23.1	105	71.4	0	0.0
30-41	163	6	3.7	35	21.5	122	74.8	0	0.0
42-53	194	9	4.6	47	24.2	138	71.1	0	0.0
54-59	59	3	5.1	14	23.7	42	71.2	0	0.0
Total	788	30	3.8	156	19.8	602	76.4	0	0.0

Stunting, an indicator of chronic malnutrition which is mainly attributed to long-term food deficiency is generally a sign of poor socioeconomic situations linked to cultural food habits, lifestyle and poverty. The prevalence of stunting in Chalbi district was 28.9[12] % (25.4 - 32.7 95% C.I.) for both genders although boys were more moderately and severely stunted than girls: MAM 23.2 % (18.9 - 28.2 95% C.I.) for boys and for girls: 18.1 % (14.7 - 22.2 95% C.I.). The prevalence of severe stunting was 8.1 % (6.1 - 10.7 95% C.I.) with the proportions of severe stunting for boys and girls being 9.2 % (6.6 - 12.6 95% C.I.) and 6.9 % (4.6 - 10.4 95% C.I.) respectively.

Table 12: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 788	**Boys** n = 413	**Girls** n = 375
Prevalence of stunting (<-2 z-score)	(228) 28.9 % (25.4 - 32.7 95% C.I.)	(134) 32.4 % (27.6 - 37.6 95% C.I.)	(94) 25.1 % (20.7 - 30.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(164) 20.8 % (18.3 - 23.6 95% C.I.)	(96) 23.2 % (18.9 - 28.2 95% C.I.)	(68) 18.1 % (14.7 - 22.2 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(64) 8.1 % (6.1 - 10.7 95% C.I.)	(38) 9.2 % (6.6 - 12.6 95% C.I.)	(26) 6.9 % (4.6 - 10.4 95% C.I.)

Table 13 below shows that the most severely stunted age group was 18- 29 months (14.9%) while the most moderately stunted age group was 30- 41 months (27.2%)

Table 13: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	224	9	4.0	41	18.3	174	77.7
18-29	148	22	14.9	33	22.3	93	62.8
30-41	162	10	6.2	44	27.2	108	66.7
42-53	193	17	8.8	36	18.7	140	72.5
54-59	61	6	9.8	10	16.4	45	73.8
Total	788	64	8.1	164	20.8	560	71.1

3.1.5 Mean Z scores and design effects:

The table below summarises thee mean z scores, design effect and flags.

Table 14: Mean z-scores, Design Effects and excluded subjects

Indicator	N	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	785	-0.68±1.18	1.56	5	0
Weight-for-Age	786	-1.21±1.11	2.64	4	0
Height-for-Age	787	-1.35±1.39	1.26	3	0

* contains for WHZ and WAZ the children with edema.

3.2 Trends of Prevalence Of Acute Malnutrition

The findings of the 2 last nutrition surveys conducted by FHI in May and Oct-Nov. 2011 covering the greater Marsabit can not be directly compared to this Chalbi district survey without weighting due to the effect of the different sampling designs and frames. Given that FHI and Concern factored this

[12] This prevalence is at the borderline of medium and high as 20-29% is interpreted as medium, 30- 39% is high, >=40% is critical/ alarming whereas <20% of stunting is considered low.

during the planning of the nutrition surveys, both organizations conducted 2 independent surveys using standardized methodology and tools and over the same period, making weighting of the 2 surveys possible, in order to get prevalence for the greater Marsabit district. After calculations, a normalizing 1.6 and 0.3 for Marsabit and Chalbi respectively were used and comparable results obtained for purposes of analyzing trends. The prevalence of acute malnutrition rates across the same season has reduced from GAM (z-scores) 27.1% reported in May 2011 to GAM (z- scores) 12.4% (weighted). The prevalence of stunting and underweight have all reduced.

Arid Lands surveillance report also shows that the nutritional status of children below 5 years using MUAC showed that proportion of children at risk to malnutrition decreased by 5.79% between April and May from 2012 although 22.52% (298 out of 1323 sampled children) were still below 135mm (or at risk malnutrition) in May. Between December 2011 and January 2012, the rates reduced from 26.8% to 22.94%.

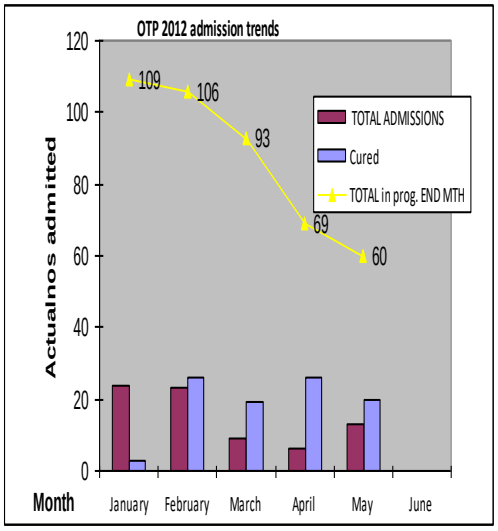
This significant improvement in the nutrition status of children is attributed to response interventions carried out by partners and government from July 2011 to date. FHI implemented blanket supplementary from October 2011 to March 2012 in addition to therapeutic feeding interventions among children below three years at first then targeting all 6- 59 months implemented by MoH in partnership with other partners. Concern, in coloration with the MoH and Catholic mission dioceses in Maikona has been implementing nutrition interventions in Chalbi district since September 2011. The program focuses on implementation and monitoring of high impact nutrition interventions (HINI). Integrated outreach activities done range from providing integrated health services in hard to reach areas through supporting outreach sites, nutritional screening and referral for children under five years, pregnant and lactating women identified as malnourished, vitamin A supplementation for pregnant women, de-worming of children and pregnant women as well as promoting Zinc based treatment for diarrhoea and IYCF. The population in targeted catchments areas is 6,203 children under five years, of whom 353 children with severe acute malnutrition, 1,672 children with moderate malnutrition, 1,861 PLW have been treated through the integrated program in 2012.

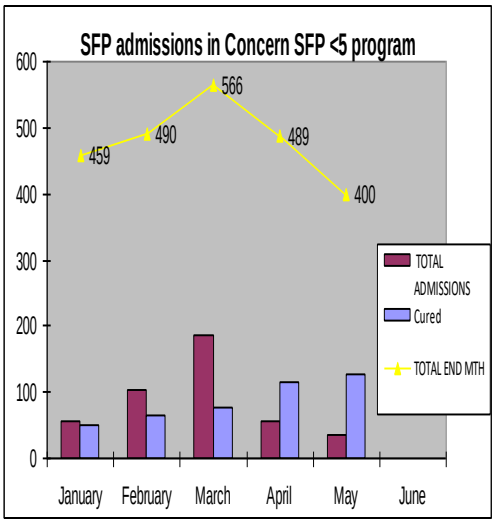
3.3 Admission trends in OTP since January 2012:

Mass screenings are conducted across Chalbi district during which both WHZ and MUAC are used to refer and admit malnourished children. Those with MUAC of <11.5 and Z scores: <-3 SD, are referred to the out patient therapeutic program (OTP), while supplementary feeding program (SFP) admission criteria is MUAC <12.5 cm & WHZ of <-2 SD. Both OTP and SFP are implemented through the MOH/ Concern partnership. The following admission trends were reported in Concern/ MoH nutrition program.

Figure 3: OTP Admission trends

Figure 4: SFP Admission trends < 5





The general increase in admissions was attributed to improved access to households as roads were opened up and also mass screening conducted across the district. Low turn up of old beneficiaries and new referrals in some outreach sites towards the end of May and early June was linked to the cultural festivals among the Gabra community i.e. Sorio and weddings.

Occasional spikes have been experienced in the admission trends in both OTP and SFP. In February 2011 there was an increase in number of admission cases in OTP (87 admissions) and SFP for under-fives (229 admission) as compared to January while in the following month the same rise was seen in SFP for the pregnant and lactating mothers(60 admissions).

Admissions also went up between July and October in both OTP (61 admissions in Oct) and SFP (243 admissions in Oct). This was attributed to the prolonged drought experienced as a result of failed long rains in March-May 2011 coupled with high cost of food items as well as non-food items which was beyond reach of Chalbi community members. The sharp drop in admissions experienced in December was as a result of poor accessibility to outreach sites resulting from the heavy rains experienced in the entire Chalbi in the months of October and November.

From the trends in most cases the increase in admissions are usually three months after short rains and before the onset of long rains. This can be attributed to the fact that after the rains most animals (goats and camels) are brought closer home and therefore the households have access to milk and meat which is a major source of food for the pastoralists. As a result the nutrition status of children improves. As the pasture gets depleted the animals are moved further from the homes, “fora” resulting to reduction in the household food security. Consequently there is an increase in malnutrition thus the increase in admission trends.

3.4 Program coverage

Estimating program coverage using PPS approach (two-stage cluster sampling), has limitations as it gives a single wide-area coverage estimate, favouring densely populated areas. However in the absence of the CSAS or SQUEAC methodologies that are more accurate in estimating programme coverage, in this nutrition survey point coverage was estimated using direct methods and was calculated using the formula presented below:

The direct estimation method:

The direct method involves adding a question to the anthropometric questionnaire to record whether or not a child is currently registered in the feeding programme.

Cumulative number of children registered in SFP: 50
Cumulative number of children registered in OTP: 20
Cumulative number of children referred for SFP: 52 (Children with WHZ<-2 z-score and >=-3z-score that are not enrolled)
Cumulative number of children referred for OTP/: 7 (Children with WHZ<-3 z-score that are not enrolled)

SFP coverage = Children registered in SFP x 100
Children registered in SFP+ children with WHZ<-2 z-score and >=-3z-score that are not enrolled

=50/ (50+52) *100= 49.0%

OTP coverage = Children registered in OTP x 100
Children registered in OTP + children with WHM=<-3 z-score that are not enrolled
=20/ (20+7) *100 = 92.6%

The feeding program coverage is summarized in the table below:

Table 15: The program coverage

Programme type	Direct method
Supplementary feeding programme coverage (SFP)	49.00%
Therapeutic feeding programme coverage (TFP)	92.60%

The SFP coverage is slightly below the set minimum target by sphere standards of 50% in rural set up although the TFP coverage is acceptable (above 70%).

3.5 Children's morbidity and health seeking behavior

Another important factor that influences children's nutritional status is diseases. In particular, diarrhoea and pneumonia cases in children experienced during the cold and rainy seasons have been noted to lead to the increase in malnourished children admission trends. A 2-week child morbidity recall period was used to establish the prevalence of common illnesses among the children. The proportion of U5s was reported to have been sick was 10.8% (n=74).

Table 16: *Symptom breakdown in the children in the two weeks prior to interview (n= 74)*

Illness among 6-59 months	Frequency	% of illness
Diarrhoea	5	6.8
Diarrhoea & fever	1	1.4
Fever	21	28.4
Fever & ARI	3	4.1
ARI	31	41.9
Others	13	17.6
Total	74	100.0

In triangulating data, clinical malaria (24.9%) was noted to be the second cause of morbidity in Chalbi district after ARI (30.5%) and diarrhoea (14.4%) being third[13]. Reports from Concern/ MoH nutrition program also indicate that ARIs have consistently remain the main illness affecting

13 Health records and monthly reports from concern.

between 4 and 6 children out of 10 children attending the program every month, followed by skin infections, then malaria and diarrhoea.

Table 17: Frequency of disease based on children attending nutrition program

Disease	Jan	Feb	Mar	Apr	May	TOTAL
ARI	68.3	50.4	48.7	42.0	46.8	47.9
Malaria	2.9	10.6	6.0	3.0	1.0	4.2
Diarrhoea	1.0	6.1	1.9	0.9	0.6	1.9
Skin infection	9.6	17.5	13.5	22.5	22.3	19.1
Others	18.3	15.4	29.8	31.7	29.3	26.8

Correlation analysis showed that 1 out of every 4 malnourished children (26.5%) suffered from a sickness 2 weeks prior to the survey, most of them having been ARI (25.8%) and 0.3% other infections. 35.3% of those who had been sick did not seek for any medical assistance, although majority (29.4%) of those who sought intervention went to public clinics/ dispensaries. 14.7% went to private clinics[14]. Although mosquito nets should help reduce malaria related fever, only half of the households sampled (51.1%) have mosquito nets.

With implementation of the HINI project, a target of 50% zinc supplementation has been set in the prevention and treatment of diarrhoea. However challenges experienced in promoting Zinc supplementation are largely due to insufficient and inconsistent supplies at the district levels. The findings of this survey indicate that none of the 6 surveyed children who had suffered from diarrhea 2 weeks before the survey had been given Zinc supplementation, although 1 (16.7%) had been given oral re-hydrating solution (ORS) and the other 5 (83%) used other home made solutions in managing diarrhea. During the last Malezi bora campaigns, zinc sulphate was given to 18 children <5 years in the treatment and management of diarrhea.

3.6 Vaccination Results

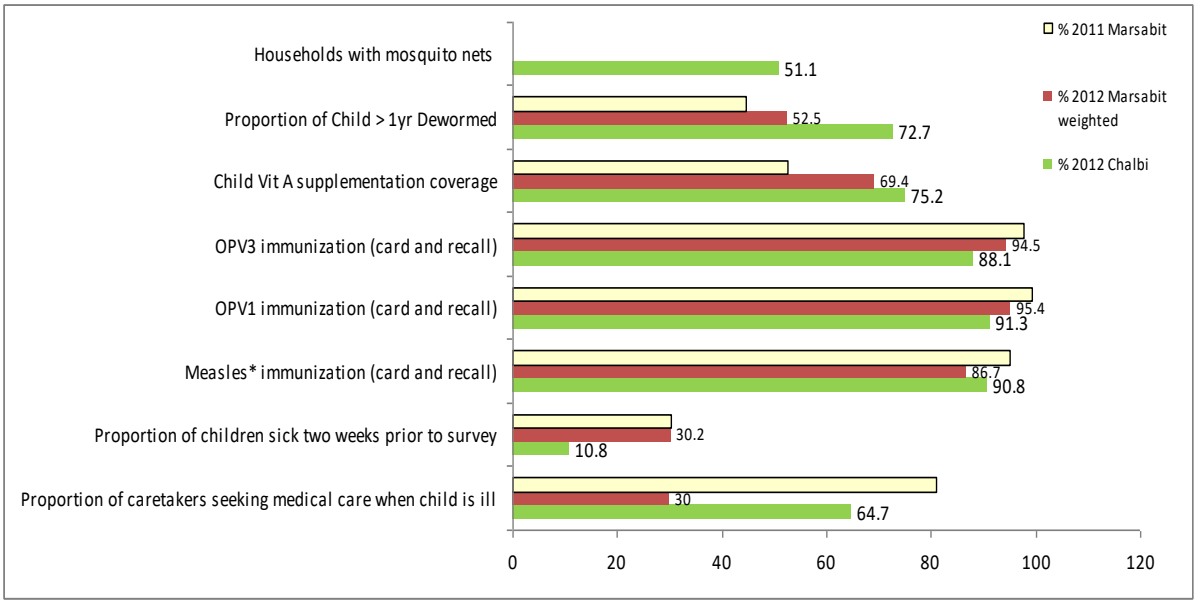
The immunization coverage rates for OPV 1 (91.2%), OPV 3 (88.2%) and measles (90.8%) in Chalbi have all met the Kenya Expanded Program on Immunization (KEPI) recommendation of above 80%[15] for all immunizations as shown in figure below. This excellent coverage is largely due to the comprehensive outreach programs that are undertaken by MoPHS and partners (CONCERN, Catholic Diocese and the Anglican Church) in the district. Percentages of children over 1 year olds that have been de-wormed in the last 6 months are also high at 72.7%, a major increase from last years' 44.7% for the same age category (52.5% for the greater Marsabit weighted results). During the last *Malezi bora*[16] campaigns conducted in June 2012, 1488 children < 5years were also de wormed hence contributing to the better coverage.

Figure 5: Overview coverage of key health indicators

[14] Chalbi district has a total 8 operational health facilities, 2 faith based (Maikona and Kalacha) and the rest are government. The latter are usually characterised by staffing challenges in an area where geographical vastness and few health facilities are already a challenge.

[15] Kenya Expanded Programme on Immunization (KEPI) Kenya

[16] Malezi bora are national campaigns conducted twice a year in June and September led by UNICEF, in partnership with other partners, including INGO and MOH



Majority of the indicators above were verified by card as shown in table……

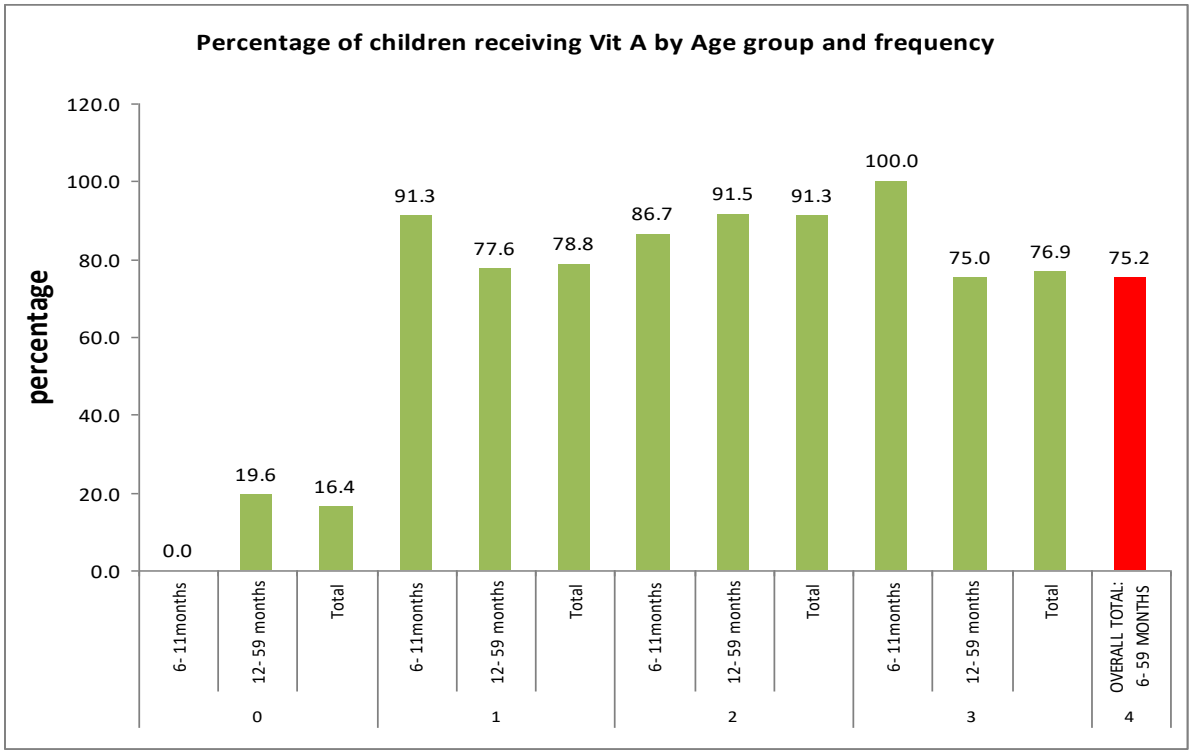
Table 18: Vaccination proportions by card and recall

Immunisation	Yes (by card)	Yes (by recall)	Total % (N)
Measles immunization	75.7% (496)	15.1% (99)	90.8% (595)
OPV 1	76.8% (525)	14.5% (99)	91.2% (624)
OPV 3	73.1% (501)	15% (103)	88.2% (604)
De-worming 6-11 months	8.% (9)	38.4% (43)	46.4% (52)
De-worming 12- 59 months	38.4% (79)	34.3% (305)	72.7% (436)

3.7 Vitamin A supplementation coverage among Children 6- 59 months

WHO recommends that vitamin A supplementation starts at 6 months, and subsequently at 6 months interval until a child reaches age of 5 years. To determine vitamin A supplementation coverage for children aged 6-59 months in the last 6 months as well as the frequency of supplementation in the last 1 year was assessed. Findings indicate Vitamin A supplementation in the last 6 months to be high 75.2% (7 out of every 10 children) with nearly half 45.7% receiving the supplement twice in the last 1 year as per table 19 below. Analysis was also divided by 6- 11 months and 12- 59 months.

Figure 6: Percentage of children receiving Vitamin A by age group



19.6% (11) of the children aged 12- 59 months had not received Vit A, although 77.6% (198), 91.5% (260) and 75% (9) of this age group received once, twice and thrice respectively. The exact numbers for all the age categories are as seen in table below:

Table 19: Vitamin A supplementation by age and frequency

Frequency of supplementation	Age Category	%	N
0	6- 11months	0.0	0
	12- 59 months	19.6	11
	Total	16.4	11
1	6- 11months	91.3	21
	12- 59 months	77.6	198
	Total	78.8	219
2	6- 11months	86.7	13
	12- 59 months	91.5	260
	Total	91.3	273
3	6- 11months	100.0	1
	12- 59 months	75.0	9
	Total	76.9	10
	OVERALL TOTAL: 6- 59 MONTHS	**75.2**	**513**

In the last National *Malezi bora* campaigns in Marsabit, 1805 children were supplemented with vitamin A, 339 were between 6-11 months, 1466 were between 12-59 months. This, in addition to the outreach activities, has contributed toward this significant increase Vitamin A coverage.

3.8 INFANT YOUNG CHILD FEEDING PRACTICES

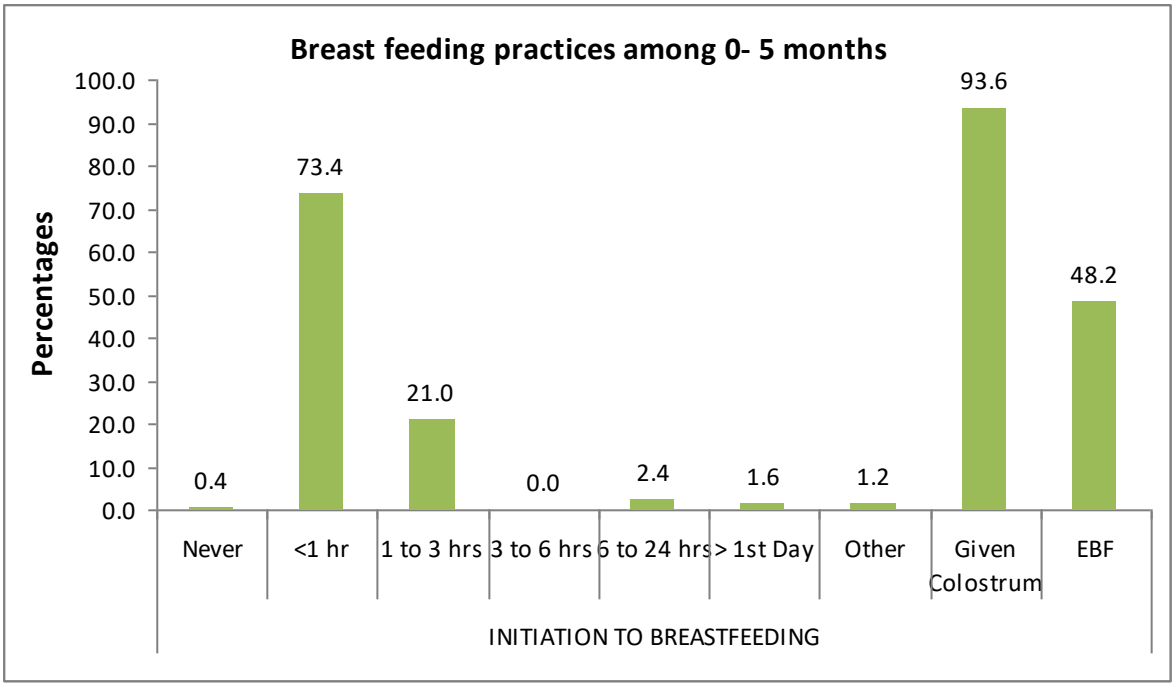
Infant and young child feeding practices were obtained based on the 24 hour recall for children aged 0-23 months.

3.8.1 Breast feeding practices:

Exclusive breastfeeding practices up to 6 months is a cause for concern and was analysed among the 0- 5 months old: Slightly less than half of the mothers (48.2% n= 121) of the mothers gave nothing other than breastfeeding the day before the survey although 93.6% (n=235) of newborns were given colostrums and 94.4% (n=238) of mothers initiated breastfeeding within the first 3 hours upon delivery. Nearly all (99.2%) the sampled children < 6 months old were still breastfeeding. These children were also given powdered milk (28.3%), plain water (19.5%), sugared water (3.2%) and cows' fat (0.4%). When further probed, half of mothers (49.6%) admitted to having given plain water the previous day. During the FGDs, it was clarified that the purpose of giving milk to new borns is deeply rooted in the Gabra/ Borana culture as it is one way to introduce the new arrival to pastoralist as well as a way of honouring the baby.

Low level on IYCF uptake at community and facility level have also been reflected from HINs as only 1% of mothers were counselled on IYCN in the months of February 2012[17] hence concern deliberate efforts to boost the IYCF component at community level through initiation of mother to mother support groups and also at facility level. Intensive health and nutrition education using proven approaches is being used to discourage the practice of giving pre-lacteals as it interferes with proper establishment of breastfeeding, not to mention the higher risks of infection that the babies are exposed to. Mother to mother support groups have been established in Maikona and Turbi dispensaries. These are forums where mothers were mentored on the mother support groups, the benefit to be enrolled into the group and who are eligible to join the group. Health and nutrition education on topics like the importance of exclusive breastfeeding are usually passed during these meetings.

Figure 7: Breast feeding practices among 0- 5 months



[17] **Briefs on stakeholders meeting for Chalbi district (Marsabit North District) held on** 9th February 2012

Complementary feeding: Extended breast feeding up to 2 years and correct introduction to other foods is also very important for the young of children as it further strengthens infant immunity among other advantages. Almost all children under 2 years (96.9%) were still breastfeeding although 6 out of 10 children (62.8% n= 118) of these were given other foods (including water), before they reached 6 months. and 5.3% being weaned after 6 months. 31.9% (60) are the only ones who were weaned at exactly 6 months.

Table 20: Meal frequency among Young Children

Meal frequency (6- 23 months N=179)	Percentage (N)	Meal frequency (24- 59 months N=396)	Percentage (N)	Meal frequency by Age:	Percentage (N)
No eating 3 meals a day No eating 2 meals a day No eating 1 meal a day	50.3% (90) 22.9% (41) 5.6% (10)	No eating 3 meals a day No eating 2 meals a day No eating 1 meal a day	64.4% (255) 21% (83) 1.8% (7)	6- 8 breast feeding (minimum 2 meal) 9 -23 breastfeeding (3 meal) 6- 23 non breast feeding (4 meals)	86.3% (19) 53.3% (40) 40% (2)

Half (50.3%) of the children 6-23 months sampled ate 3 meals the day prior to the survey while 6 out of 10 (64.4%) 24- 59 months old ate 3 meals. The percentages of those that ate 1 and 2 meals were 5.6% (10) and 22.9% (41) respectively. Table …shows the frequency of meals amongst the older 24- 5 year olds children.

3.9 Dietary Diversity Score (DDS):

FGDs discussions highlighted that the staple food in this community is grains. Household interviews results also demonstrate that more than half of all people from the different age groups ate foods that were grouped as grains and legumes as well. 8 out of every 10 people, whether child 6-23 months, 24- 59 months or those above 5 years, all took milk/ or milk products the day before the survey. Meat, poultry, fish and eggs (all main sources of proteins) are the least consumed food groups as shown in the table below.

Table 21: Food groups consumed by age category

Food group	6 to 23	24-59	> 5 years
Grains	54.3	63.8	65.8
Vit. A rich foods	1.3	0.7	1.1
Fruits & vegetables	4.8	6.1	6.0
Meat, poultry fish	6.0	7.7	8.1
Eggs	9.1	8.0	5.7
Pulses & legumes	56.5	64.7	68.0
fats & oils	77.5	92.1	93.2
Milk & milk products	79.1	87.1	87.7
Miscellaneous	7.4	37.1	4.7

Dietary diversity Score is based on the fact that the more food groups consumed, the more likely a person/ household is able to consume adequate nutrients. Information of DDS was obtained by asking respondents a series of questions on the different food groups consumed in the previous 24 hours. Calculation of DDS was: Sum of DDS/Number of children for children and Sum of DDS/Number of households for household consumption.

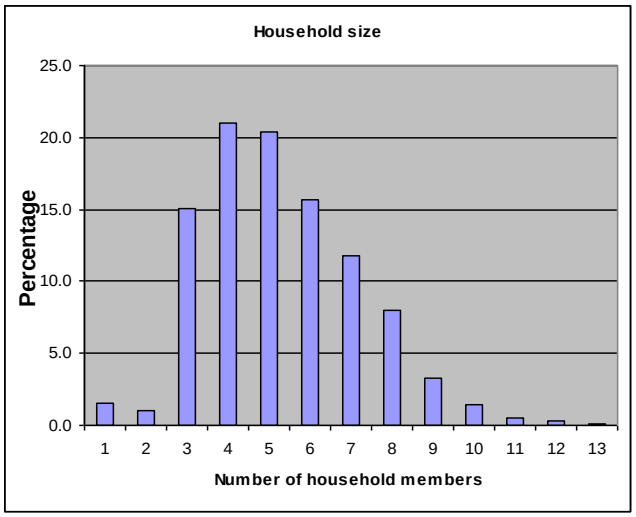
For children aged 6-23months the minimum recommended is >=4 food groups out of seven groups and in Chalbi, 3 out 10 children received 4 or more food groups based on the 24 hour recall done as seen in the table below.

Table 22: Dietary diversity score for Children 6-23 months old

Dietary diversity (6-23 year old children	
Consuming 3+ food groups (breastfed children)	38.2% (21)
Consuming 4+ food group (non-breastfed children)	32.7% (18)
Consuming 3+ or 4+ food groups (breastfed and non-breastfed)	35.5% (39)

3.10 Household Demographic Characteristics Figure

Figure 8: House hold size



The mean household size was 5.3±0.07, ranging from 1 to 13 household members with a mode of 4 members and median of 5 members from 827 households. Of the household population, 923 (22.8%) were children under 5 years, with 1, 3128 (77.2%) were above 5 years old. The mean age of women included in the survey was 29.2 with a mode of 30 years old, ±0.3., ranging from 17years to 50 years old. 88.7% (674) of 760 households were male headed, while 11.3% (86) were female headed.

Most (89.7%- 677) of the caretakers were married living together, although 6.6% (50) were widows/ widowers. Caretakers who were singles, divorced or married but living separately constituted 1.9% (14), 1.1% (8) and 0.8% (6) respectively. Most of the survey respondents were the mothers (94.6%- 724), although in cases where the mother was absent, 3.9% (30) were grandparents, 0.8% (6) were siblings and 0.7% (5) were other relatives.

3.11 Maternal Nutrition Status and women's physiology

Nutritional status of the women was determined for all mothers/caregivers in the child bearing age (15- 49 years) whose children aged 6-59 months had been included in the anthropometric survey. The table below summarizes the physiological status of sampled mothers.

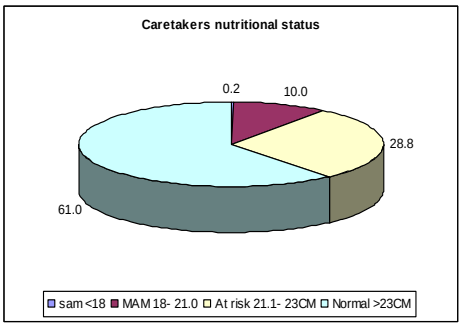
Table 23: Physiological status of mothers surveyed

Physiological status	Freq (N)	Percent
Breast feeding child <0 to 5 months	147	25.8
Breast feeding child >6- 59 months	286	50.3
Pregnant & breastfeeding	3	0.5
Not Pregnant & Not breastfeeding	76	13.4
Pregnant	57	10.0

76.1% of the mothers were breastfeeding, 50.3% of the mothers were breastfeeding children between 6 to 59 months old. Those who were neither breastfeeding nor pregnant yet had children below 5 years were 13.4%, while those pregnant were 10.5%.

Figure 9: Maternal nutritional status

Of the 601 women measured, 62 of them (10.2% were malnourished with MUAC <21.0cm. 1 of them 0.2% was severely malnourished with MUAC =<18.5cm. of concern is the high proportion (28.6%) of women at risk of malnutrition (MUAC 21- 23 cm). Of these pregnant and lactating women, 12.7% were malnourished with MUAC <21.0cm.

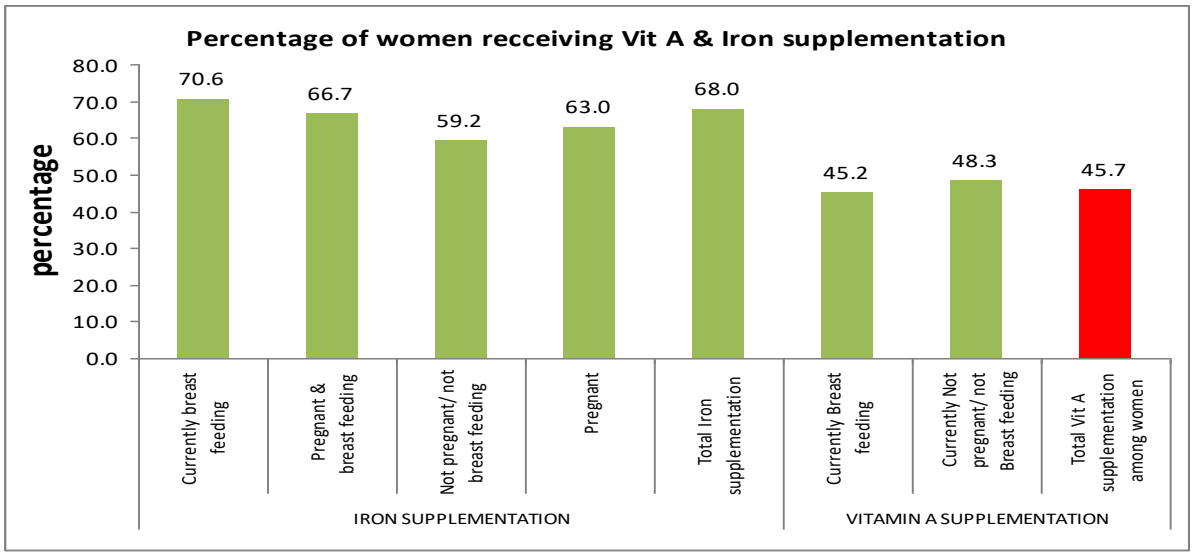


These rates were lower than those in the May 2011 (same season) findings where GAM was 45.9%, and 13.3% in November (last survey). SAM was 11.7% and 1.3% respectively. Weighted results show GAM of 22.1%, showing that women's nutrition status has significantly deteriorated since November 2011, raising concern as the rate of malnutrition is still high among pregnant and lactating women in Chalbi.

3.12 Iron and Vitamin A Supplementation coverage among women

Iron supplementation of women during pregnancy protects the mother and infant against anaemia, which is estimated to cause one-fifth of perinatal mortality and one-tenth of maternal mortality[18]. Anaemia also results in an increased risk of premature delivery and low birth weight. In general 68% (325) of all the women sampled had received iron supplementation in their last pregnancy, a major increase from last years (33.3% in November, and 58.7% using weighted results for entire Marsabit June survey). The coverage was highest among the mothers who were breastfeeding at the time of the survey (70.6% n=247), followed by those who were pregnant and still breastfeeding (66.7% n=2), pregnant and not breastfeeding (n=63% n=34) and lowest amongst those not pregnant and not breastfeeding mothers (59.2% n=42). During the last Malezi bora campaigns in Chalbi, 80 lactating women 177 pregnant and lactating women were supplemented with iron.

Figure 10: Percentage of women receiving Vitamin A and Iron supplementation



Vitamin A coverage from 328 women was 45.7% (150). Coverage was 45.2% (122) among the currently breastfeeding and 48.3% (28) among those who were neither pregnant nor breastfeeding. Although

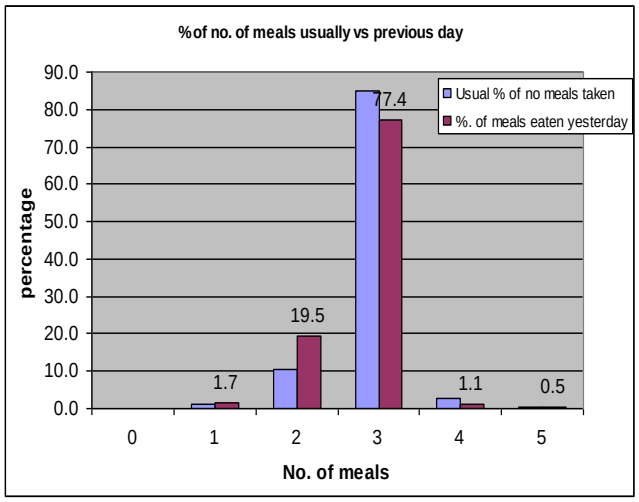
[18] Kenya Demographic and Health survey 2008-09

Vitamin A coverage among care givers was not done in last year November survey, this coverage is still low compared to the national coverage (69.1%- DHS 2008-9) and the set target of above 80%.

3.13 Household Food security:

3.13.1 Household Food Consumption

Figure 11: Number of meals eaten



The percentage of number of meals normally eaten by the older persons above 5 years old and adults and number of meals eaten the day preceding the survey is shown in figure 10. There was no significant difference between the meals normally eaten and those consumed the day preceding the survey. The percentage of households that usually eat 3 meals a day was 85% although the day before the survey fewer households (77.4%) had eaten the 3 meals, while more households (19.5%) had taken 2 meals compared to 10.5% that usually take 2 meals per day.

3.13.2 Food AID:

World food program in partnership with Food for the Hungry (FHI) as the lead agency has been distributing General Food distribution beneficiaries (GFD) to 22,200 beneficiaries (37.9% of population) in Chalbi through 22 Food distribution sites. 310 metric tons were distributed in the 4th cycle in April in Chalbi district. An assessment done in February 2012 by KFSSG team expressed concern that the situation on the ground did not warrant the reduction of from 144,100 to 71,000 (figures for greater Marsabit)[19]. 73% of sampled house holds received relief food at least once in the last 3 months (March- May). WFP is also giving out food Supplementary feeding to all registered primary schools and ECD centers in the district in their school meals program, supplying them cereals, pulses, vegetable oil and CSB. CSB in only for ECD centres in addition to supplying food supplements to all the 7 health facilities in Chalbi district.

Table 24: Percentage of households that received Food Aid from various sources

Organizations	Freq (N)	Percent
PISP	13	2.0
CIFA	167	25.3
SOS	1	0.2
Government	17	2.6
WFP/ FH	428	64.8
CARE	1	0.2
PACIDA	1	0.2
Others	6	0.9
FHI & government	22	3.3
FHI & PACIDA	4	0.6

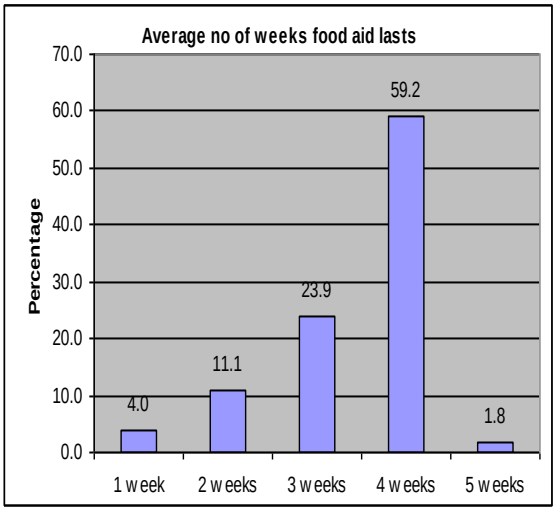
Other Food Aid and related interventions in Chalbi district in the recent past include Government, Supplementary feeding by CAFOD, Food for Assets by PACIDA, and Provision of Unimix by Kenya Red Cross Society targeting. It should however be noted that except for WFP. FHI, the other food aid sources were on adhoc with no major commitment for longer food aid. Food vouchers by Solidarities International targeting some households within Hurri Hills ended in April 2012 after a 5 months intervention.

[19] SRA report conducted in February 2012 by KFSSG team

The main food sources being used at the time of the survey was maize, wheat, rice, peas and beans. Short rains assessments estimated that over 90 percent of the stocks held by households in the pastoral livelihood zones in greater Marsabit were from relief supplies. FDGs also showed that majority of the households depend on relief Aid food for these items. 73% (493 out of 670) of households had received some food aid 3 months prior to the survey. The last distribution done by the lead agency was in April 2012 and the commodities distributed included 10.35kgs of wheat, 1.4kgs slip peas (pulses) 0.6L of vegetable oil and 1.2kgs of Corn soy blend (all rations for 1 person) for 22,200 beneficiaries in Chalbi. Fewer people were targeted in the last distribution as the new targeting criterion of 30% of the total population, aiming at the most vulnerable poor was used[20]. FGD showed that sharing of the food Aid and redistribution of the same resulted in almost everyone getting some ration and it was done by the relief committees. 66.3% (293) received the distribution once in the 3 months, 27.4% (121) received twice and 3.6% (16) received 3 times.

Looking at usage of the food aid, as assessed in the household interviews, 77.3% (381) households used all of the food received, although 12% (59) shared it with other kin, 2.2% (11) saved for seed, with minimal household 0.8% (4) reselling or battering for other items. The duration that Food Aid lasts was also analysed. Most households have food aid stored up to 4 weeks (59.2% 294), followed by 3 weeks (23.9% 119), 2 weeks (11.1%- 55), 1 week (4%- 20) and 5 weeks (1.8%- 9). The average length food aid lasts is 3.4 weeks.

Figure 12: Duration that Food Aid lasts



While comparing the food situation this year, communities members interviewed indicated that although last years drought and food insecurity was worst compared to 2012, the prevailing situation is more precarious as the relief food distribution is not as consistent and smaller in quantity compared to 2011.

[20] The scaling down of people receiving food assistance under PRRO programme from 76.9% to 30% of the total population was based on the recommendations of the short rains assessments that observed a good performance of the 2011 short rains.

According to the short rains assessments, 2011/ 2012, Maikonas' food security ranking is classified as poor due to low livestock holdings and low milk availability. During this nutrition survey milk shortages were reported in the district as a result of livestock movements to forage camps. Whereas milk is consumed at forage camps up to three to four litres per day for camel herders and at least two litres for shoats' herders, milk availability is very minimal among households due to the prolonged drought. Low milk availability is evidenced by higher prices which are about 50 percent above average in both the agro pastoral and pastoral zones. A litre of milk is retailing at Ksh. 60, up from the normal Ksh. 40 in all livelihoods[21]. More milk is expected to be available in November when the next short rains fall.

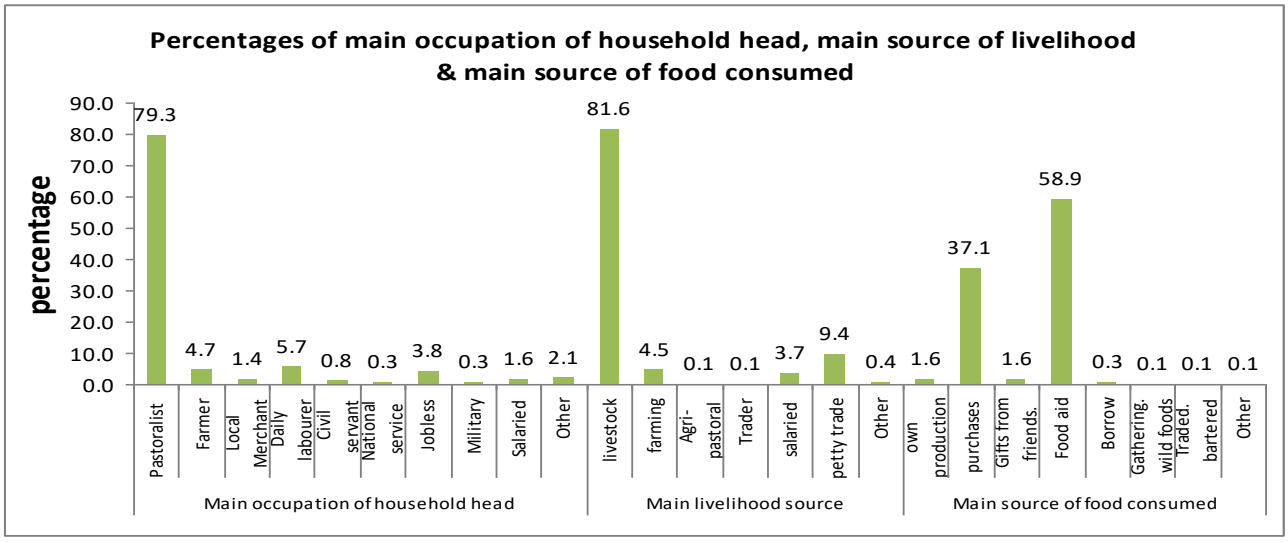
Generally, higher maize prices have been recorded in Chalbi (50.00/=) compared to 41.70/= per kg in Central Marsabit division. Although cereal prices are expected to decrease in the next three months22, the purchasing power of the residents of Chalbi district remains questionable as Maikona and Kalacha were named as pockets characterised by over 70% of the population living below the poverty line[23]. Due to high prices, most households do not have cereals.

Although Hurri hills is agriculturally potential given its fair weather and rich soil, and has been in the last been the agricultural backbone of Maikona and Kalacha divisions, trends has changed in the last 5 years because farm produce has been very poor. Crops that used to be grown include maize, potatoes, beans wheat, sorghum. Some of these were planted in March/ April but because of very poor rain performance in the long rainy season, it is expected that these will dry up and yield minimal produce, if any.

3.14 Livelihood sources:

Socio economic status of sampled households is as follows:

Figure 13: Socio- economic status of household sampled



The main occupation of the household head is pastoralist (79.3%- n= 602) even though at the time of this survey 94.3% (598) admitted to having livestock. Alternative forms of occupation include daily labour (5.7%, n= 43) and farming (4.7%- n=36). The main source of livelihood was also noted as livestock (81.6% n= 546), followed by involvement in petty traders (9.4% n= 63) and farming (4.5% n= 30). The 2 main sources of food consumed were food aid (58.9% n= 398), purchases and (37.1% n= 251) with all other sources borrowing, gifts, gathering wild foods among others each scoring less than 2%.

Coping mechanisms reported include reducing the quantities of food (esp. reducing lunch) so that supper is available, households skipping meals as well as borrowing and sharing food from neighbours and friends.

21 Arid lands Marsabit May 2012 bulletin

22 Arid Lands Marsabit May 2012 monthly bulletin.

23 Marsabit short rains situation (2011/ 2012) Analysis Report February 2012

Reliance on credit facilities as a coping strategy was largely reported both in the FGD and household interviews. Sources of income for Chalbi district residents range from casual labourers for NGO related opportunities like digging dams, to selling firewood, selling miraa (khat), selling "dessert salt". Catholic diocese is implementing Livelihood groups on micro finance and access loans in some parts of Chalbi.

It was estimated that only 20%[24] of the people have livestock (goats, cows, camels, and sheep), although most of the 20% have only 1-3 cows which are normally herded in a group of several pastoralists. According to the Marsabit District KFSSG mid season assessment conducted at the end of 2012 long rains by DSG members, the current livestock figure per household per household has reduced from 4.6%to 1%. 80% of the population are settling in towns and these are generally the most vulnerable group as they have no livestock. Due to the ongoing dry season, the few people with livestock currently do not have access to them as they are away in Fora (some as far as ….km from Maikona & Kalacha to North Horr) in search of pasture. Some of the herds currently in Hurri Hills are from other parts of Chalbi district as Hurri Hills still has some pasture for animals. Livestock body condition was good due to availability of forage and browse and access to water in the grazing areas with no significant livestock diseases reported in the district.

3.15 Water and Sanitation and ITN Utilization

The important role Water and sanitation in Nutrition and health can not be ignored when assessing nutrition status. Water sources, treatment, disposal of stool and hygiene at the household level were all investigated in this survey.

3.15.1 Water sources and treatment:

The main 3 water sources are underground wells 28.5%, n=212), dams (24.6%, n=143)) and protected wells (18.1%, n=135). Using the WHO/UNICEF (2010) description of improved drinking water sources[25], which include piped water, tap water, borehole, protected well/spring and rain water collection, the total proportion of these constitutes improved sources constitute 34.9% (260). Despite this low utilisation of improved water more than half of the sampled population (59.4%, n=439) do not treat their drinking water using any water treatment methods. Among the 40.6% that treat, those who use chemicals such as aquatabs and purr are 29.9% (221), 9.2% (68) boil, with only 0.7% (5) and 0.1% (1) use traditional herbs and decant respectively to make the water they drink safe. 0.7% (5) do both boiling and decantation. See the table and graph below for the actual percentages of water sources, treatment and hand washing practices.

The sources of water and treatment of drinking water are presented in Table 25.

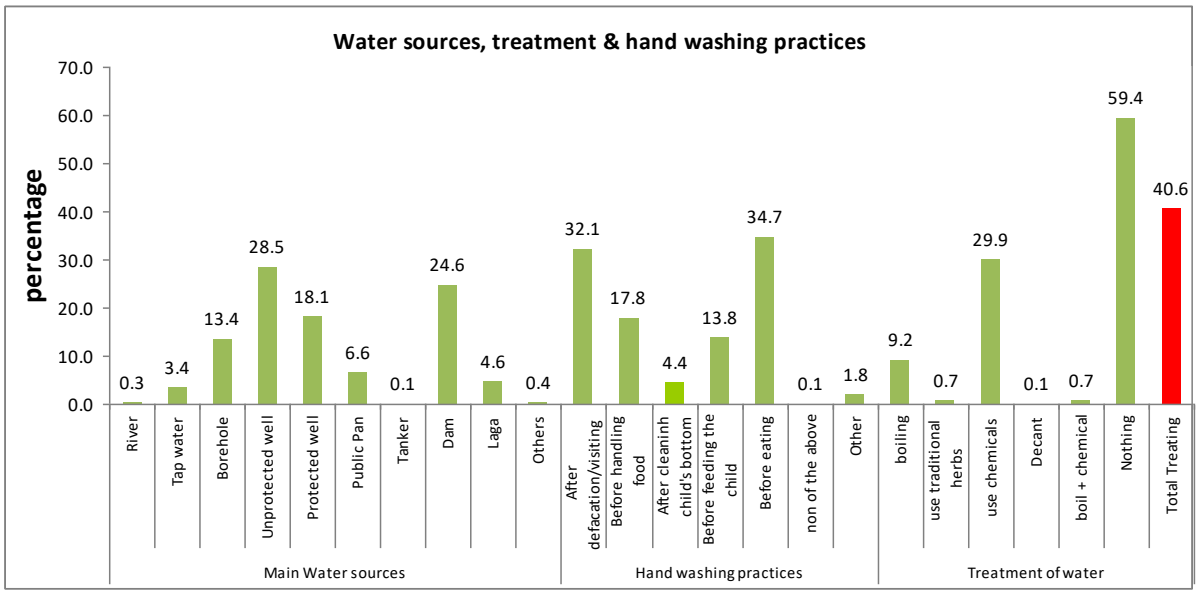
Table 25: water sources and treatment

Main Water sources	%	Freq		Treatment of water	%	Freq
River	0.3	2		Boiling	9.2	68
Tap water	3.4	25		Use traditional herbs	0.7	5
Borehole	13.4	100		Use chemicals	29.9	221
Unprotected well	28.5	212		Decant	0.1	1
Protected well	18.1	135		Boil + chemical	0.7	5
Public Pan	6.6	49		Nothing	59.4	439
Tanker	0.1	1		**Total Treating**	**40.6**	**300**
Dam	24.6	183				
Laga	4.6	34				
Others	0.4	3				

[24] Focus group discussion in Hurri Hills

[25] WHO/UNICEF (2010). Progress on sanitation and drinking water: 2010 update. Geneva:WHO

Figure 14: water sources, treatment and hand washing practices



On average the amount of water used daily is 47.2 Litres although this ranges from 1 Litre to 800 Litres, with median and mode of 40 L each. The average water used per person per day in Chalbi is 8.7L[26]. This is less than the minimum required as per sphere standards recommendation of 15 L per person per day. Most households (93.8% n=697) store their water in jerry cans, while 3.5% (26) store in buckets, 0.9% in sufurias and 0.3% (2) use ken tanks. Those who can afford buy water at Kshs. 50 for every 20 litre jerry and this is expected to increase up to 80ksh as the long dry season of July to October approaches. The total proportion of households that have access to safe water source i.e. protected water, bore holes, roof catchments of rain water, tankers and tap water3 is 4.9% (260.

Although water is an alarming subject in ASALs, it remains a main concern especially in Hurri Hulls where stomach aches, diarrhoea and dysentery cases have particularly been high. Drought and food insecurity in Chalbi district is characterised by lack of water which results to livestock crossing over to other districts in search of water and pasture. Crop failure follows suit leading to the cycle of food shortage. Food insecurity is usually highest during the long dry months of July to October, although recent trends show that due to poor rain fall patterns, food shortage are experienced even in the months that traditionally recorded highest rains (between April and June and November to December).

3.15.2 Sanitation and hygiene practices

Sanitation and hygiene practices have direct impact on infectious disease, especially diarrhoea, making it very important for preventing of malnutrition. Only 4 0ut of 10 households (40.6%, 274) have access to a toilet leaving more than half of the sampled households with no toilet access. Most of these toilets were the traditional pit latrines (50.8%, 155), followed by the ventilated improved pit latrine, (37.4%, 114), while another 10.8% (33) improvised and used a bucket, especially for the night hours. Only 1 household (0.3%) had a flush toilet. Of the 59.4% households who did not access a toilet facility, most of them used open fields (51.6%, 244) bushes (38.1%, 180) and near rivers (8.2%, 39). Other possible locations scored less than 1%. While comparing results with the weighted district for 2012, Chalbi district access to toilet is slightly more than the entire greater Marsabit district (33.9%). Low coverage of latrines remains a major concern in the district as it was also highlighted in the February DHMT meeting[27].

Of concern also is the low numbers of caregivers (22.7%, 198) that disposed off children feaces immediately and in a hygienic manner, while 60.9% % disposed the child's stool in the bush and 5% did not dispose the

[26] Sphere Handbook.**The Sphere Project-** Humanitarian Charter and Minimum Standards in Disaster Response
[27] February 2012 Monthly report

child's stool. These unhygienic practices of stool disposal predispose children to diseases such as diarrhoea. Concern has been supplying households with soap for hygiene promotion and purr for water sterilization. Poor hygiene was however raised as concern particularly in Hurri Hills where 4 out of every 10 children seen in Hurri Hills dispensary in May and June 2012 suffered from water related diseases (diarrhoea, dysentery and stomach aches), while another 4 suffered from Acute Respiratory Infections. The Catholic diocese, Marsabit, has construction of dams at Hurri hills.

Hand washing practices were also analysed and the findings show that 34.7% (648) washed hands before eating, 32.1% (601) washed hands after visiting the toilet, 17.8% washed before handling food, 13.8% (258) before feeding a child, 4.4% (83), washed after cleaning a child's bottom while 0.1% (2) did not wash their hands at all. See figure 13 above. Only 9% (68) of caretakers washed their hands during all the 4 critical times (before feeding baby, after cleaning the Childs bottom, before eating and before handling any food). These results indicate the need to continue promotion of appropriate hygiene and sanitation practices through health. The practice of washing hands using water and soap was by 31.8%, of the households, water only by 21.0%. Although subjective in nature, 50.1% (377) of households sampled were had clean compounds according to the surveyors.

3.14.1 Insecticide Treated Mosquito Nets (ITN) Holding Rates and Utilization

Half of the households 51.1% (345) reported having mosquito nets. Most of them (57.3%, 376) received the nets from an agency, followed by MoH (22.0%, 144) while 16.9% (111) bought from the shop. See table below for complete list of sources.

Of concern however is the fact that ¼ (25%, 80) of those who have the nets were not using them at the time of the survey. 49.7% (169) were using 1 net, 20.2% (69) were using 2 nets and 4.1% (14) were using 3 nets for the entire family. Utilization of the nets during the night preceding the survey was highest (51.2%, n=42) among the U5s and mother, followed by fathers (24.4%, n=20), then mothers (17.1%, n=14), and then others (2.4%, n=2).

Table 26: Source of mosquito nets

Source	Frequency	Percent
Shop	111	16.9
Agency	376	57.3
MoH	144	22.0
Others	1	0.2
Shop + agency	8	1.2
Shop + MOH	2	0.3
Agency + MOH	10	1.5
Total	656	100

It is necessary to continue sensitizing the community on the importance of ITN use. The nets obtained from hospitals and NGOs are usually treated with long-term insect-repelling chemicals while the ones obtained from shops or vendors may not be treated, which makes it necessary to wash them in the chemicals to repel mosquitoes and other insects. Only 17.6% (59) were treating their nets although 31.9% (107) of the nets were already treated. The frequency of treating mosquito nets amongst 45 of the households was as seen in the table below

In conclusion, the nutrition situation of the Chalbi population is improving as a result of concerted effort of partners, although the nutrition and food security situation is still fragile (serious). Households are still struggling with the effects of previous consecutive poor rainy seasons: long rains were not good although the short rains were better. The dry season is just beginning and is expected to continue till the end of October. The results also indicate the need to continue promotion of exclusive breastfeeding and proper infant feeding practices as well as appropriate hygiene and sanitation practices through health.

Recommendations

Short term

1. There is need for partners to continue with comprehensive health and nutrition interventions with emphasis on improving infant and young child care practices without neglecting mothers' nutrition and health concerns. Given the important role grandmothers play in influencing IYCF, they should be targeted for nutrition education and behaviour change communication.

2. Stake holders like Concern, MOH, FBO to continue with hygiene promotion and sensitization and promotion of use of toilets, improve toilet access and other sanitation concerns, particularly targeting areas that continue to report high cases of diarrhoea diseases. Multifaceted approach could be deployed here targeting also training institutions and in particular primary schools on initiation of hygiene clubs, erection of talking walls in schools and market places. Due to migratory nature of pastoralist in Chalbi, sensitization on cat skill disposal of faeces should be encouraged as partners are also encouraged to support the community with portable latrine materials to compliment the fixed VIP toilets.

3. DSG should follow up and advocate for more people to be targeted for the food intervention from the current 37.9% of the district population. Vulnerable households still need consistent food aid assistance with a complete food basket and the Food for Asset (FFA) which is the highly recommended food assistance is in the agro-pastoral areas and this should be advocated for in Chalbi.

Long term

4. Concern should adopt and continue advocacy for use of community conversations (cc) in health and nutrition education, especially with emphasis on the (IYCN) EBF for the first six months. The CC strategy is a holistic vehicle for delivery of health and nutrition services at community level which concern is committed to uphold. In Kenya, Concern has used CC since July 2010 to December 2011 in Hygiene promotion & IYCN. Although the CC process has not yet been rolled out in Chalbi, plans are under way through CIFA concern partnership to introduce this strategy to the already existing mother to mother support groups.

5. To understand the cause of continuous higher malnutrition among the older children, there is need for stakeholders in the nutrition programs to look in to why older children (30- 59) months are more vulnerable to malnutrition.

4 Annex

5.1 CHALBI DISTRICT NUTRITION SURVEY PARTICIPANTS:

S/NO.	POSITION	NAMES	DESIGNATION	AREA/FACILITY	DISTRICT
1	Coordinator	Weldon Ng'etich	Project officer	CWW	Moyale
2	"	Leonard Kiriama	"	CWW	Chalbi
3	"	Mary Wamuyu	"	CWW	Chalbi
4		Galma Waqo Shuke	IT Arid lands	Arid lands	Marsabit
5	Team leaders/supervisors	Salesa Racha Tuye	Sociologist Moi university	Bubisa	Chalbi
6	"	Boru Gura	DDSC: District Disease Surveillance coordinator	Chalbi	Chalbi
7	"	Amina Sharamo	DASCO: District AIDs & STI coordinator	Chalbi	Chalbi
8	"	Edwin Kariuki	Nutritionist	MDH	MDH
9	"	Adi Bulge	Nutritionist	MDH	MDH
10	Enumerators	Wato Galgallo	Sociologist UON	Maikona	Chalbi
11	"	Duba John Godana	CHW	Maikona	Chalbi
13	"	Guya Dulacha	Disaster Mgt.Masinde muliro uni	Bubisa	Chalbi
14	"	Ali Godano Dolo	AUSI	Kalacha	Chalbi
15	"	Hillary Halkano	Social worker	Turbi	Chalbi
16	"	Mamo Wato	Social work, Moi uni	Bubisa	Chalbi
17	"	Bokayo Molu	Bsc. FND Egerton uni	Turbi	Chalbi
18	"	Isacko Umuro	CHEW	Kalacha	Chalbi
19	"	Luka Gutola	Public Health Officer	Maikona	Chalbi
20	"	Talaso Godana	CHEW	Maikona	Chalbi
21	"	Jane Daki	Nurse	Elgade	Chalbi
22	"	Hadijah Galgallo	Nurse	Turbi	Chalbi
23	"	Artho Dosso	Nurse	Maikona	Chalbi
24	"	Esborn Nganga	Nurse	Turbi	Chalbi
25	"	Polycarp Owuor	Nutrition student intern	MDH	Marsabit
26		Data clerk	Abdi Hussein		Moyale
27		Data clerk	Zachary Mwangi		Marsabit
28					
29					

5.2 CHALBI SURVEY TEAMS

Team one

1. Sales Racha Tuye – supervisor
2. Jane Daki – Enumerator
3. Hillary Halkano – Enumerator
4. Talaso Godana – Enumerator

Team two

1. Boru Gura - Supervisor
2. Hadijah Galgalo - Enumerator
3. Wato Galgallo – Enumerator
4. Polycarp Owuor – Enumerator

Team three

1. Amina Sharamo – Supervisor
2. Esborn Ng'ang'a – Enumerator
3. Guya Dulacha – Enumerator
4. Isacko Umuro – Enumerator

Team Four

1. Edwin Kariuki – Supervisor
2. Bokayo Molu – Enumerator
3. Duba John Godana –Enumerator
4. Ali Godana Dolo – Enumerator

Team Five

1. Adi Bulge - Supervisor
2. Artho Dosso – Enumerator
3. Luka Gutola - Enumerator
4. Mamo Wato -Enumerator

5.3 Table of Weighted results- with original results per districts before weighting

		2012 June Chalbi: [95% C. I] N= 792	2012 June (Central, Laisamis, Loiyangalani & North Horr)N. Marsabit (95% CI) All N = 916	2012 June weighted Marsabit (95% CI) N = 1701
z-score based on WHO standard (2006)	**Wasting: Global Acute Malnutrition** WFH <-2 z-score and/or oedema:	(84) 10.7 % (8.2 - 13.8 95% C.I.)	(127) 13.9 % (10.8 - 17.6 95% C.I.)	(211) 12.4 % (10.4 - 14.7 95% C.I.)
	Wasting: Severe Acute Malnutrition WFH < -3 z-score and/or oedema	(12) 1.5 % (0.9 - 2.6 95% C.I.)	(27) 2.9 % (1.8 - 4.8 95% C.I.)	(39) 2.3 % (1.6 - 3.3 95% C.I.)
	Prevalence of Stunting HFA <-2.0 z-score	(228) 28.9 % (25.4 - 32.7)	(241) 26.3 % (22.3 - 30.7 95% C.I.)	(459) 27.0 % (24.2 - 29.9 95% C.I.)
	Severe chronic malnutrition (stunting) HFA < -3 z-score	(64) 8.1 % (6.1 - 10.7)	(79) 8.6 % (6.5 - 11.4 95% C.I.)	(139) 8.2 % (6.7 - 10.0 95% C.I.)
	Prevalence of Underweight < -2 z-score and/or oedema	(186) 23.6 % (19.1 - 28.8)	(218) 23.8 % (19.8 - 28.3 95% C.I.)	(400) 23.5 % (20.5 - 26.8 95% C.I.)
	Severe underweight < -3 z-score	(30) 3.8 % (2.6 - 5.6)	(53) 5.8 % (4.2 - 8.0 95% C.I.)	(83) 4.9 % (3.7 - 6.5 95% C.I.)
Median based on WHO standard 2006	Wasting: **Global Acute Malnutrition** WFH <80% and/or oedema n = 785	(13) 1.7 % (0.7 - 2.6)	(73) 8.0 % (5.0 - 12.5 95% C.I.)	
	Severe Acute Malnutrition WFH < 70% and/or oedema	(2) 0.3 % (-0.2 - 0.7)	(3) 0.3 % (0.1 - 1.0 95% C.I.)	
MUAC	**Prevalence of global malnutrition (< 125 mm and/or oedema)**	(28) 3.5 %(2.4 - 5.2 95% C.I.)	(76) 8.3 % (5.5 - 12.3 95% C.I.)	(105) 6.1 % (4.4 - 8.2 95% C.I.)
	Prevalence of severe malnutrition (< 115 mm and/or oedema)	(7) 0.9 % (0.4 - 1.9)	(20) 2.2 % (1.2 - 3.8 95% C.I.)	(28) 1.6 % (1.0 - 2.5 95% C.I.)

OTHER KEY INDICATORS

VACCINATION Indicator	Chalbi		Marsabit Central, North Horr, Loiyangalani & Laisamis		Total
Measles Vaccination	Yes by Card = 75.75 (496) Yes by Recall = 15.1% (99) Total =595% (595)		Yes by Card 73.3% (663) Yes by Recall 17.8% (154) **Total 91.1% (797)**		Yes by Card = 70.0% (1193) Yes by Recall = 16.7% (285)
OPV 1	Yes by card 76.8% (525) Yes by recal: 14.5% (99) Total Yes: 91.3% (624)		Yes by card 78.6% (720) Yes by Recall 18.5% (170) **Total 97.1% (890)**		Yes by Card = 78.4% (1340) Yes by Recall = 17.9% (306)
OPV 3	Yes by card: 73.1% (501) Yes by recall: 15% (103) Total Yes: 88.1% (604)		Yes by Card 76.7% (703) Yes by recall 18.8% (172) **Total 95.5% (875)**		Yes by Card = 76.3% (1303) Yes by Recall = 18.2% (310)
% of children who received Vitamin A in the last 6 months	6 – 11 Months n-52	77.5% (526)	N = 109	69.7% (76)	69.4% (134)
	12 – 59 Months n= 630	67.3% (35)	N = 807	78.6% (634)	78.4% (1190)
	Total 6- 59 months (682)	77.8% (490)	N = 916	76.3% (710)	
% of children 12-59 months received twice			N = 807	32.3% (261)	
% of children sick 2 weeks preceding the survey	32.1% (98)		28.5% (261)		(30.0%) 534

% of people having access to a toilet (N=675)	40.6% (274)	33.7% (279)	33.9% (568)
% of people treating their drinking water (N=739)	40.6% (300)	41.6% ( )	39.4 (611)
% of children de-wormed: 12-59 months	Yes by Card = 38.4% (79) Yes by Recall = 34.3% (305) Total =72.7% (384)	Yes by Card = 23.9% (130) Yes by Recall = 34.6% (189) Total 58.5% (314)	Yes by Card = 22.5% (382) Yes by Recall = 30.0% (509)
% of PLW	86.2% (163)	N = 534 79.8% (441)	80.8% (1023)
% of PLW with MUAC < 21	10.2% (22)	N = 441 21.5% (95)	22.1% (250)
% of women with MUAC < 21.0cm		N = 534 21.8% (126)	
Iron Supplementation for women in reproductive age N = 478	68% (325)	N = 689 57.3% (331)	58.3% (767)
Vit A supplementation (Lactating women) N= 337	(122) 45.2%	N = 246 32.1% (79)	342 (30.3%)

5.4 LOCAL CALENDER OF EVENTS: MARSABIT, CHALBI, LOIYANGALANI, NORTH HORR AND LAISAMIS

MONTH	Seasons	2007 : Gumat	2008: Sabdi	2009: Ahath	2010: Alsinin/ Almin	2011: Talasa/ Talatha	2012: Arbah
JANUARY RAGAR 2 JIBOR 1			53 POST ELECTION VIOLENCE	41 OLA GAN	29	17	5 MOYALE VIOLENCE
FEBRUARY KEEYE JIBOR 2			52 POST ELECTION VIOLENCE	40	28	16	4 MOYALE VIOLENCE
MARCH HAYTI BORARU FAITE			51 BUBE BUBISA	39 BADES	27 BADES	15 BADES/ LONG RAINS START (ELENEGONEGO) LGERGERUA	3 BADES MOYALE VIOLENCE
APRIL HAYTI BORAR 2 RAGAR 1	GAN (LONG RAINS)		50 GONASADI (LONG RAINS ONSET)	38 LONG RAINS FAIL	26	14	2 MOYALE VIOLENCE
MAY SORIO 1 RAGAR 2	SORIO/ CULTURAL FESTIVAL IN LOIYANGALANI		49 ADOLES	37 ADOLES ONEST OF HOLA DROUGHT	25 ADOLES	13 SHANATA/ LOTS OF RAIN & DEATH OF GOATS/ CHINESE ARIVE IN MARSBIT	1 ADOLES/ NKOPIRO/ GONGRO-SAMBURU 4 DAY SINGING
JUNE SORIO 2 SOMDER 1		SORIO	48 DABA GALLA (CAMELS STOLEN NEAR WAJIR FOUND NEAR BUBISA	36 SORIO/ CHOLERA OUTBREAK IN LAISAMIS	24	12 SOMDER QARA SORIO	0
JULY: SACOM SOMDER 2	WEEDING MONTH	59 KHANDI/ SOMDER EGE/ KMETELI CIRCUMSION/ ONSET OF DROUGHT	47	35	23 DROUGHT	11 SOMDER OGE	
AUGUST: FIRAM SOM		58 LMUGETH	46	34 HESABU NAMA/ NATIONAL POPULATION CENCUS	22 KURA KATIBA/ REFERUNDUM	10 RAMADHAN VMMC IN LOIYANGALANI/ TURKANA MED. CIRCUMSION/ KIBAKI OPENS ROAD CONSTRUCTION	
SEPTEMBER ABYAL FURAM		57 START OF DAM CONSTRUCTION IN MARSABIT	45	33	21	9 KOLOMTE CULTURAL EVENT/ CLASHES BETWEEN RENDILE & TURKANA (SALE)	
OCTOBER HORAPA IDIAL		56 AGAY/ BADES AGAYA	44 AGAY SHORT RAINS FAILED (HOLA)	32 AGAY	20 AGAY	8 AGAY	
NOVEMBER SORIO/ DAKA	BAR AGAYA (SHORT RAINS)	55 BAR AGAYA	43 BAR AGAYA	31 BAR AGAYA	19 BAR AGAYA	7 BAR AGAYA	

ARAFA	SORIO	(SHORT RAINS)	(SHORT RAINS)/ SORIO	(SHORT RAINS)	(SHORT RAINS)/ SORIO	(SHORT RAINS) THOUGH RAINED A LOT & FLOODED IN MARSABIT	
DECEMBER RAGAR 1	WEEDING MONTH / SORIO	54 KURA CHACHU NATIONAL ELECTIONS/ SORIO	42 YAQA/ FURMAT	30 SORIO/ FURMAT	18 FURMAT	6 KALACHA POLITICAL DECLARATION THABASA UKURA/ HARAFU/ SORIO/ YAQA	