



## **NUTRITION SURVEY- MAY 2011**

**MARSABIT DISTRICT, KENYA**

**FOOD for the HUNGRY, KENYA**

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## Acronyms

|        |   |
|--------|---|
| ARIs   | Acute Respiratory Infections                                      |
| BSFP   | Blanket Supplementary Feeding programme                           |
| CHWs   | Community Health workers  |
| CI     | Confidence Interval   |
| CRM    | Crude Mortality Rate  |
| CSB    | Corn Soya Blend   |
| 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  |
| MoPHS  | Ministry of Public Health and Sanitation                          |
| MMS    | Ministry of Medical Services                                      |
| 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   |
| UNICEF | United Nations International Children's Fund                      |
| W/A    | Weight-for-Age  |
| WFP    | World Food Programme  |
| W/H    | Weight-for-Height   |
| WHM    | Weight for Height percent of median                               |
| WHO    | World Health Organization   |
| WHZ    | Weight for Height Z scores  |



## 1.0 EXECUTIVE SUMMARY

This report summarizes outcomes of the nutrition survey undertaken between 18<sup>th</sup> and 30<sup>th</sup> May, 2011 in Marsabit County to assess the nutritional status and to determine the prevalence of malnutrition, mortality as well as assess other components of the conceptual framework in tackling malnutrition. Ministry of Public Health and Sanitation, Food for the Hungry Kenya implementing partner in the health/ nutrition sector commissioned the survey, UNICEF funded this survey.

FHK carried out a District wide health and nutrition survey between 18<sup>th</sup> -30<sup>th</sup> May 2011. The main aim was to assess the current situation of nutrition and food security of the district, to determine the health and nutrition status of the children under five years, pregnant and lactating mothers and find the causes of poor nutritional status in this district with the possibility of coming up with recommendations for future programming.

### 1.1 Purpose of the survey

The main objective of the nutrition survey was to assess the prevalence of acute and chronic malnutrition of the vulnerable groups and assess general food security trends, and find possible causes and come up with recommendation for future programming in the larger Marsabit district.

### 1.2 Specific objectives

The specific objectives of the survey were to:

2. Determine the prevalence of acute and chronic malnutrition among children aged between 6-59 months, pregnant and lactating mothers
3. Determine factors contributing to acute and chronic child and maternal malnutrition
4. Estimate the crude and under five mortality rate in the district
5. Estimate coverage of nutrition interventions in the district
6. Estimate morbidity rates of under fives in the district two weeks prior to the survey.
7. Assess household food security situation
8. Estimate coverage of selective feeding programs in the district
9. Estimate coverage of immunization and Vitamin A

### 1.3 Methodology

The SMART methodology for nutritional assessment in emergency situations was used to plan and to collect data on nutritional status from 724 children aged 6-59 months in Marsabit District. Data on children aged 6-59 months were collected on nutritional status, immunization coverage, vitamin A supplementation coverage, de-worming, supplementary feeding programme (SFP), outpatient therapeutic programme (OTP) and morbidity. Data on 688 households were collected on availability and usage of mosquito bednets, food security/consumption, water, hygiene and sanitation. Data on nutrition status using MUAC, physiology and iron supplementation during pregnancy were collected for 549 women in reproductive age (16-49 years). Sixteen women did not their ages and had no identity cards. Information on infant and young child feeding practices (IYCF) was collected on a sample of 349 children; 149 being children aged 0-<6 months and 200 children aged 6-23 months old.

## 1.4: Summary of Findings in Tables

Table 1: Nutrition Status in Marsabit District May 2011

| <b>Demographic Characteristics</b>                                 |                                     |
|--|-------------------------------------|
| Household size   | 5.3±1.9                             |
| Number of households for anthropometric measurements               | <b>688</b>                          |
| Children aged 6-59 months  | 724                                 |
| Males  | 385                                 |
| Females  | 339                                 |
| Sex ratio  | 1.1                                 |
| <b>Nutrition Status Children 6-59 months N= 721</b>                |                                     |
| <b>WHO Standards 2006</b>  |                                     |
| Prevalence of global acute malnutrition <- 2 Z-scores              | (195) 27.1 % (21.6 - 33.3 95% C.I.) |
| Prevalence of Severe acute malnutrition -3 Z-scores                | (36) 5.0 % (3.5 - 7.2 95% C.I.)     |
| Prevalence of Underweight <-2 Z scores                             | (328) 45.6 % (39.5 - 51.9 95% C.I.) |
| Prevalence Stunting <-2 Z scores                                   | (166) 23.6 % (20.1 - 27.5 95% C.I.) |
| <b>Percent of the Median</b>                                       |                                     |
| Prevalence of global acute malnutrition (<80% and or edema)        | (114) 15.7 % (11.6 - 21.2 95% C.I.) |
| Prevalence of moderate acute malnutrition (<80% and ≥70% no edema) | (111) 15.3 % (11.2 - 20.8 95% C.I.) |
| Prevalence of severe acute malnutrition (<70% and/or edema)        | (3) 0.4 % (0.1 - 1.3 95% C.I.)      |
| <b>Nutrition Status using MUAC N = 724</b>                         |                                     |
| <b>MUAC: Children 6-59 months</b>                                  |                                     |
| ✓ Severe acute malnutrition <11.5cm and/or edema                   | 10 (1.6%)                           |
| ✓ Moderate acute malnutrition <12.5 - >11.5cm                      | 55 (8.6%)                           |
| ✓ At risk <13.5 > 12.5 cm  | 198 (41.4%)                         |
| Total malnourished =<13.5cm + edema                                | 272 (37.6%)                         |
| <b>MUAC: Women in reproductive age N = 556</b>                     |                                     |
| ✓ GAM % of Pregnant women with MUAC < 23.0cm                       | 18 (58.1%)                          |
| ✓ Severe wasting % of Pregnant women with MUAC <20.7cm             | 8 (25.8%)                           |
| ✓ GAM % of non-pregnant women with children < 5years MUAC <21.0cm  | 76 (14.5%)                          |
| ✓ Severe wasting women with children < 5years MUAC <18.5cm         | 5 (1.0%)                            |
| ✓ GAM % of lactating women with MUAC < 23.0cm                      | 184 (45.9%)                         |
| ✓ Severe wasting % of lactating women with MUAC <20.7cm            | 74 (11.7%)                          |
| <b>Iron Supplementation for women in reproductive age N = 556</b>  |                                     |
| Non-pregnant & not breastfeeding women                             | 58.9% (73)                          |
| Lactating women  | 58.2% (233)                         |
| Pregnant women   | 45.2% (14)                          |

**Table 2: Plausibility Checks for Anthropometric Data**

| Indicator                   | Survey      |
|-----------------------------|-------------|
| Overall age distribution    | 4 (p=0.009) |
| Digit preference weight     | 0 (3)       |
| Digit preference height     | 4 (12)      |
| WHZ (Standard deviation)    | 0 (1.08)    |
| WHZ (Skewness)              | 0 (0.18)    |
| WHZ (Kurtosis)              | 5 (-0.01)   |
| Percent of flags            | 0 (0.6%)    |
| Age distribution (%)        |             |
| 6-17 months                 | 1.3         |
| 18-29 months                | 1.0         |
| 30-41 months                | 1.2         |
| 42-53 months                | 0.0         |
| 54-59 months                | 1.3         |
| Age Ratio: ages 6-29: 30-59 | 0.81        |

Overall score is 13% which is acceptable.

**Table 3: Children's Mortality, Morbidity, Immunization, Vitamin A Supplementation and De-worming**

|  |   |
|--|---|
| <b>Child morbidity:</b><br>Total children sick N = 724<br>Among the sick: N = 219  | 219 (30.2%)   |
| <ul style="list-style-type: none"> <li>Fever (alone or in combination with other symptoms)</li> <li>ARIs (Cold/cough/difficult in breathing)</li> <li>Diarrhoea</li> <li>Malaria (fever without ARIs)</li> </ul> | 149 (59.1%)<br>79 (36.2%)<br>67 (30.3%)<br>50 (22.9%) |
| <b>Diarrhoea management</b><br>Fluid made from a special packet ORS<br>Home made sugar-salt solution<br>Another home made liquid e.g porridge, soup<br>Zinc  | 20 (29.0%)<br>8 (11.6%)<br>18 (26.1%)<br>7 (10.15%)   |
| <b>Immunization coverage:</b> <ul style="list-style-type: none"> <li>OPV 1</li> <li>OPV 3</li> <li>Measles (Age ≥ 9 months)</li> </ul>   | 93.9%<br>86.6%<br>86.9%                               |
| <b>Vitamin A supplementation coverage</b> <ul style="list-style-type: none"> <li>Children 6-11 months</li> <li>Children 12-59 months (received twice)</li> <li>Children 12-59 months (received once)</li> </ul>  | 61 (69.3%)<br>90 (14.2%)<br>361 (56.8%)               |
| <b>De-worming</b> children aged ≥ 24 months N = 493  | 40.3%   |
| <b>Child Mortality</b>   |   |
| Crude mortality rate (CMR)   | 0.19 deaths/10,000/day                                |
| Under five mortality rate (U5MR)   | 0.13 U5deaths/10,000/day                              |

**Table 4: Household Food Consumption**

|                                      |                             |                              |
|--------------------------------------|-----------------------------|------------------------------|
| <b>Households where meals missed</b> | 8.8%                        |                              |
| <b>Number of meals</b>               | <b>Meals Normally eaten</b> | <b>Meals eaten Yesterday</b> |
| >=3 meals                            | 33.3% (213)                 | 31.4% (200)                  |
| 2 meals                              | 49.2% (314)                 | 48.2% (311)                  |
| 1 meal                               | 17.4% (111)                 | 19.4% (125)                  |
| Household Dietary Diversity Score    |                             |                              |
| • 7 day dietary diversity Score      | 6.6 $\pm$ 2.5               |                              |
| • 24 hour dietary diversity score    | 5.4 $\pm$ 2.1               |                              |

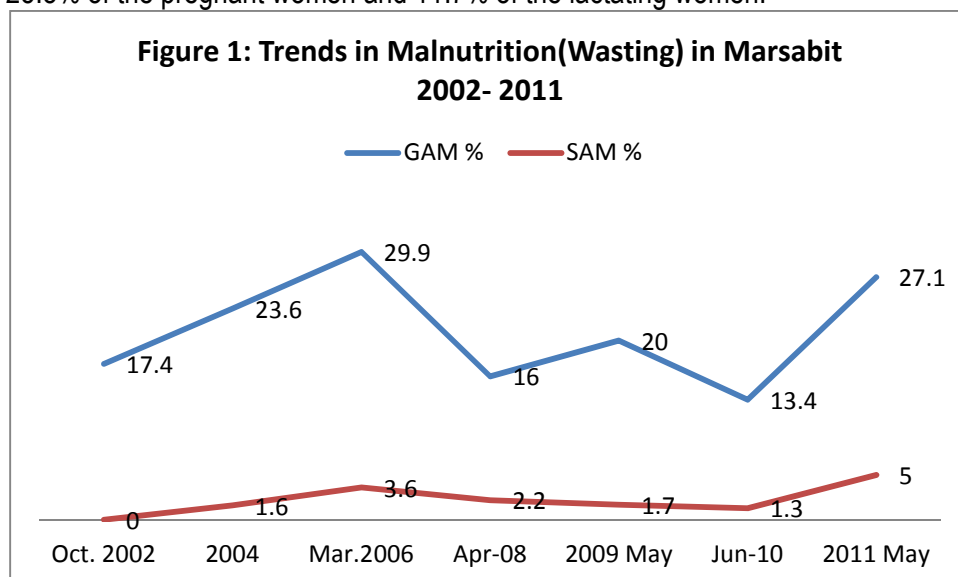
**Table 5: Infant and Young Child Feeding Practices Children 0-23 months**

| <b>Child Practice</b>  | <b>N=349</b>      |
|--|-------------------|
| Early breastfeeding practices  |                   |
| • Ever breastfeed  | 99.4% (347)       |
| • Put to breast within one hour  | 75.9% (265)       |
| Given colostrum  | 89.1% (311)       |
| Pre-lacteals given:  | 25.2%             |
| • Plain water  | 18.3% (64)        |
| • Sweetened water  | 0.3% (1)          |
| • Infant formula   | 0.3% (1)          |
| • Powdered/fresh milk  | 6.3% (22)         |
| • Others   | 0.3% (1)          |
| Exclusive breastfeeding for children<6 months  | 36.9% (45) n=149  |
| Currently breastfeeding  | 95.1% (333)       |
| Maintenance of breastfeeding:  |                   |
| • Age 6-11 months  | 95.0% (76) n=80   |
| • Age 12-17 months   | 96.8% (60) n=62   |
| • Age 18-23 months   | 93.1% (54) n=58   |
| Age 6-23 months  | 95.0% (190) n=200 |
| Complementary Feeding rate for children 6-9 months of age N=66                       | 75.4% ( 40)       |
| Minimum dietary diversity (children (>= 6 months receiving >=four food groups) N=192 | 34.9% (67)        |
| Frequency of feeding:  |                   |
| • Children 6 – 8 months mean number of times /day (N=51)                             | 1.29 $\pm$ 1.12   |
| • Children 9 – 23 months old mean number of times /day (N=141)                       | 2.06 $\pm$ 1.09   |
| • Children 6 – 8 months receiving 2 or more meals including snacks /day (N=51)       | 19 (37.35)        |
| • Children 9 – 23 months receiving 3 or more meals including snacks /day (N=141)     | 39 (27.6%)        |
| Mean Dietary Diversity Score   |                   |
| • Children 6-8 months (N=51)   | 1.39 $\pm$ 1.46   |
| • Children 9-23 months (N=141)   | 3.18 $\pm$ 2.06   |

## 1.5 Conclusion

### Nutrition status

The malnutrition rates in this survey indicate rates considered “critical emergency” with GAM of 27.1 % (21.6 - 33.3 95% C.I.) and SAM of 5.0 % (3.5 - 7.2 95% C.I.) (Figure 1). These rates show a marked increase from the 2010 survey of GAM of 13.4% (10.3-17.2 CI) and SAM of 1.3% (0.7-2.5 CI). Acute malnutrition WHZ was higher among boys, 29.4% than girls 24.5%. Malnutrition rates were high among all the age groups being considered “critical” emergency situation. Malnutrition rate among children aged 12-59 months was also high using MUAC with 36.9% of children being with MUAC <13.5cm. The nutrition situation of women in reproductive age was worse among pregnant and lactating women with GAM: MUAC <23.0cm for 58.1 % of pregnant women and 45.9% for lactating women, while for non pregnant women GAM: MUAC <21.0cm was for only 14.5% of these women. Severe wasting, MAUC <20.7cm, was high, for 25.8% of the pregnant women and 11.7% of the lactating women.



### Factors that contribute to children and maternal malnutrition

Factors that contribute to the poor nutrition situation include: food insecurity as evidenced by reduced number of meals and low,  $2.12 \pm 0.7$  mean meals consumed per household and persons missing meals due to inadequate food. High morbidity and poor health seeking behavior and low coverage of vitamin A and de-worming. In addition, low ownership, utilization and treatment of mosquito bednets; long distances to collect water and high cost of water plus lack of treatment of water and poor hygiene and sanitation.

Only 40.1% of the households owned mosquito bednets with half, 51.1% obtaining them from MoPHS and 32.1% purchasing them. Of those who purchased them, only 32.1 % had treated them. Most under fives 76.0% and mothers 60.3% slept under mosquito bednets while 11.1% of the households did not use mosquito bednets although they owned them.

About 53.3% of the households obtained water from improved water sources and a larger proportion, 61.8% took over 30 minutes to collect water contrary to WHO recommendations. This indicates that caregivers end up collecting less water and this compromises childcare practices and economic activities of caregivers that contributes to poor nutrition. Among the 35.3% of households who purchased water, the cost ranged from 1 to 50 Ksh. per 20 liter jerrican with the townships charging highest amounts. The high cost of water means most of these households will purchase less water for household use thereby

compromising water consumption needs. Additionally, a large proportion of households, 81.3% did not treat drinking water which predisposes family members to water borne diseases.

Less than half of the households, 48.3% accessed toilet facilities while a large proportion, 51.7%, used the bush or open land. Similarly, only 42.6% of the caregivers disposed the child's stool immediately and hygienically. This practice predisposes children to diseases such as diarrhoea that contribute to malnutrition.

The practice of washing hands before eating was done by 54.5% of the caregivers and before feeding the child by 27.5% of the caregivers. Caregivers also washed hands after defecation by 53.2% and before handling food by 68.8% of the caregivers. A moderate proportion of the caregivers, 30.1% did not practice hygienic practices of cleaning of hands hence predisposing them to being agents of transmitting infections which then contributes to malnutrition.

#### **Crude and under five mortality rate**

The crude and under five mortality rates were within the acceptable levels in this survey. The crude mortality rate (CMR) was 0.19 (0.09-0.41 CI) per 10,000 people/day while the under five mortality rate (U5MR) was 0.13 (0.02-0.96 CI) per 10,000 children under five/day. However, with the high levels of both severe and moderate acute malnutrition in the district, these levels could increase if the prevailing conditions are not addressed.

#### **Food aid**

Food Aid had been received by 65.7% of the households. Of these, 28.2% had received food aid from GoK through the Provincial Administration and 65.6% had food aid received from WFP/Food for the Hungry while 6.2% of the households had received food aid from both GoK and WFP/Food for the Hungry. Slightly over half of the households, 52.3%, had received food commodities in the last month, 30.7% in the last 1-2 months and 17% over three months as at May 2011. This was due to transporters failing to deliver food due to high cost of fuel in March April, however the situation has improved will normal delivery. Commodities lasted 5-14 days. There were disparities in the quantities that households received suggesting that quantities need to be re-assessed to ensure equity in the food basket. Food aid was shared among some households; this was by 12.1% for maize, 8.5% for vegetable oil and 3.3% for CSB.

#### **Morbidity and Health seeking behaviour**

Morbidity status two weeks prior to the survey for children was for about a third, 30.2% of the under-fives. Over half of the sick suffered from fever, 59.1%, ARIs was for 36.2%, diarrhea for 30.3% and malaria for 22.9% of the sick children. This is likely due to the dry weather in which diseases such as diarrhea is low. The morbidity rates were slightly higher than in the 2011 nutrition survey, but this was not significant. Odds ratio showed that 29.4% of those who were sick were malnourished. The likelihood ratio was 0.058 while Odds ratio was 0.970 indicating that those who were sick were at risk of being malnourished. However this was not significant.

About two thirds of the mothers/caregivers, 62.4%, sought health care services from public clinics, however still, a large proportion, 40.9%, did not seek any assistance for their sick children and a small proportion, 0.6% used mobile services. There is need to promote utilization of mobile services to make health care access within reach of families that are far from the existing health care facilities.

## **Food Security**

The food security situation is worse than in 2010 as evidenced by households consuming fewer meals. Only 31.4% of the households had consumed three (3) or more meals the day preceding the interview. Additionally, the dietary diversity score of 6.6 for households and of 3.2 for children aged 9-23 months is low indicating limited variety of foods consumed.

Majority of the households, 98.8%, purchased food. This suggests the need to get money into the hands of caregivers to purchase food. Coping strategies to food insecurity show that a large proportion of households, 75.3% reduced the size of meals, 64.7% reduced the number of meals and 45.9% skipped food consumption for a day. Purchasing of food on credit was by 39.8% of the households. This may suggest low economic situation among households.

## **Coverage of SFP and OTP**

The coverage of supplementary feeding programme was 51.4% while Outpatient Therapeutic programme was 90.9%. The SFP and OTP coverage rates were a big improvement from the 2010 rates and they were also above the recommended coverage of the SPHERE Standards 2004 (>50%). However these are only estimates of the coverage. Chi-square test of GAM and feeding programme gave a likelihood ratio of 7.458 with  $p < 0.05$ , indicating that those children in a feeding programme are seven times more likely not to be malnourished. This shows that need for functional supplementary feeding programmes in the area.

## **Coverage of Immunization, Vitamin A supplementation and De-worming for children < 5 years**

The immunization coverage was above the 80% recommended for all the vaccinations; OPV1 was 93.9%, OPV3 was 86.6% and measles was 86.9%, however, these coverage rates were slightly higher than the same vaccinations in the 2010 nutrition survey. Odds ratio indicated that 10.2% of the children who had not received OPV1 vaccination were malnourished and were 7.158 times more likely to be malnourished; 21.3% of children who had not received OPV3 vaccination were malnourished and they were 13.546 times likely to be malnourished while 14.6% of children who had not received measles vaccination were malnourished and they were 0.013 times likely to be malnourished. This indicates the importance of ensuring all children are vaccinated in Marsabit.

Vitamin A supplementation coverage was low. This was 69.3% for the children aged 6-11 months. For children aged 12-59 months coverage was 14.2% (taken twice) and 56.8% (taken once). Chi-square test indicated that children aged 12-59 months who had not taken vitamin A supplementation were 5.042 times more likely to be malnourished.

Similarly, the de-worming coverage for children aged  $\geq 24$  months was low for 40.3% of these children but this was an improvement from the 2010 coverage of 27.6%. Odds ratio showed that 60.9% of those who had not been de-wormed were malnourished and chi-square test gave the likelihood ratio of 0.368 but this was not significant.

There is need to promote vitamin A supplementation and de-worming among under five children through both health facilities and mobile services.

## **Coverage of iron supplementation for pregnant women**

Iron supplementation during pregnancy among women was also low. This was 57.7% for non-pregnant women and 45.2% for pregnant women. There is need to promote iron supplementation among women in reproductive age in Marsabit through both health facilities and mobile services.

## Infant and young child feeding practices (IYCF)

Infant and young child feeding practices are satisfactory in terms of initiation of breast feeding, feeding colostrums, currently breastfeeding and complementary feeding rate. However pre-lacteals are used by 25.2% of the children and 63.1% of the children aged 0-6 months are not exclusively breastfed. The dietary diversity of complementary foods is low being less than 4 groups of foods. The mean dietary diversity score was  $1.4 \pm 1.1$  for children aged 6-8 months and  $3.2 \pm 2.1$  for children aged 9-23 months. Frequency of feeding was also very low at  $1.3 \pm 1.1$  for children aged 6-8 months and  $2.1 \pm 1.1$  for children aged 9-23 months.

### 1.6 Recommendations

- **Mobile clinics** should be promoted (by MoPHS and FHK) in the area to ensure areas that are not in close proximity receive health and nutrition services such as vitamin A and iron supplementation and de-worming.
- **BSFP**: BSFP programme should be undertaken by NGOs and partners such as Food for the Hungry as a stop gap measure to ensure improvement in the nutrition and food security situation in Marsabit for children under five years and lactating and pregnant women due to the high rates of malnutrition among these groups in the area. This should be done until the situation improves.
- **GFD**: Transportation of food aid should be re-analyzed to ensure that food reaches the vulnerable in time. Since Food Aid is shared, there is need to cater for this so that vulnerable families get appropriate amounts. Follow-up mechanisms should be put in place to ensure food gets to the intended users and that beneficiaries receive food aid from one source.
- **OTP and SFP**: The transportation of therapeutic foods should be re-analyzed to ensure it reaches the health facilities regularly in time. Identification of malnourished children at the community level should be stepped up to ensure that children who are moderately and severely malnourished are attended to in time. Appropriate mobile clinics may be one of the avenues in addition to the CHWs.
- **Immunization**: **Immunization** coverage needs to be sustained or improved and be recorded in the health cards even during vaccination campaigns.
- **Vitamin A Supplementation, Iron Supplementation and De-worming**: Vitamin A supplementation, iron supplementation and De-worming should be given priority and recording of issue indicated on the health cards by NGOs working in the area by MoPHS and MMS and NGO partner FHK. The coverage could be increased through use of mobile clinics, ECD centres, mother support groups and the CHWs. Feedback should be given to health facilities to bolster coverage. Recording of these should be indicated on the health cards even during campaigns to assist in follow-up activities.
- **Health education** focusing on: **IYCF** especially exclusive breastfeeding and continued breastfeeding, complementary feeding; use of **hygiene and sanitation** (use of latrines and hand washing using soap), treatment and boiling of drinking water need to be given a major attention by MoPHS, MMS and NGO partner agencies in Marsabit.
- **Incomes**: Since most families purchase food, income generating activities and food vouchers should be incorporated in the NGOs agenda to help households in Marsabit acquire more resources to purchase food and non-food items.
- **Water**: Strategies to improve water in those divisions that are not within 30 minutes collection time is necessary. The cost of water in the townships should also be monitored by the government to make sure the cost is within the purchasing power of the residents. The communities and partners should strengthen the conservation of water and improve accessibility by the community for household use and livestock which is the main livelihood of the people of Marsabit district. More boreholes need to be drilled closer to the communities in order to improve access and protection of wells continued.



- **Mosquito bed nets:** Continued provision of mosquito bed nets and promotion of their use and treatment should be given priority by MoPHS, FHK and other NGOs in the district as a way to prevent malaria.
- **Follow-ups:** Follow up facilities should be enhanced by the NGOs through the CHWs in-order to monitor nutrition and food security services in Marsabit.

## 1.7 Limitations

### **Documentation of health cards**

Verification of age was done by use of health cards; however, in some cases no exact date of birth was recorded on the card other than the date a child first seen at the health facility or just the month of birth. Recall bias may link to wrong age. This may lead to wrong weight for age and height for age indices.

Some of the mothers indicated that their children had been immunized and had received Vitamin A and de-worming while these were not recorded in the health cards. This may lead to wrong computation of coverage for these indices.

## 2.0 NUTRITION SURVEY REPORT MARSABIT DISTRICT 2011

### 2.1 Background

Marsabit with a population of 187,367<sup>1</sup> people remains among one of the districts with the highest poverty index in the country. Basic health indicators documents high rates of malnutrition throughout the year, the last nutrition survey showed a GAM and SAM rates of 13.4% and 1.3%<sup>2</sup> respectively, the situation was classified as serious. In March 2011 the Surveillance report showed GAM of 22.7% and SAM of 4.0% which is a worsening condition of nutrition situation.

The district remains beset by inequality and underdeveloped and marginalized for long from the development actors and even the government. Besides limited access to critical services, other major factors contributing to high malnutrition rates in the district include chronic and acute food insecurity due to erratic or poor rainfall, poor dietary diversity and low purchasing power due to eroded capacity by seasons of successive droughts, and also worthy to note is suboptimal child care and feeding practices and poor practices related to hygiene and sanitation, cultural beliefs and low access to essential health services also plays a major role in nutritional status of children in this district. Other factors like occasional Inter clan conflict and cattle rustling continue to exhaust the capacity and ability of communities to achieve a stable measure of development. The District is classified as acute food security and livelihood crisis by the Kenya food security steering group assessment reports<sup>3</sup>.

Although the nutrition situation had considerably improved during the 2009/2010 in Marsabit mainly due to accelerated coverage, prevailing rates of child malnutrition of under- nutrition of women, as well as micronutrient deficiencies are still very high compared to other parts of the country. The current drought from end of 2010 to 2011 is likely to contribute to poor nutrition situation in the area. It is a common knowledge that widespread malnutrition contributes largely to high infant and child mortality and an important cause of poverty which impacts negatively on the full development of the human resource bases and the achievements of the Millennium Development Goals and other national targets.

FKH carried out a District wide health and nutrition survey between 17<sup>th</sup> - 30<sup>th</sup> May 2011. The main aim was to assess the current situation of food security of the district, to determine the health and nutrition status of the children under five years, pregnant and lactating mothers and find the causes of poor nutritional status in this district with the possibility of coming up with recommendations for future programming.

The main purpose of this nutrition survey was to assess the prevalence of acute and chronic malnutrition of the vulnerable groups and assess general food security trends, and find possible causes and come up with recommendations for future programming in the larger Marsabit.

### 2.2 Specific objectives

The specific objectives of the survey were to:

1. Determine the prevalence of acute and chronic malnutrition among children aged between 6-59 months, pregnant and lactating mothers
2. Determine factors contributing to acute and chronic child and maternal malnutrition
3. Estimate the crude and under five mortality rate in the district
4. Estimate coverage of nutrition interventions in the district

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<sup>1</sup> 2009 Kenya Housing and Population Census

<sup>2</sup> 2010 larger Marsabit District nutrition survey

<sup>3</sup> KFFSG 2011 short rain assessments.

5. Estimate morbidity rates of under fives in the district two weeks prior to the survey.
6. Assess household food security situation
7. Estimate coverage of selective feeding programs in the district
8. Estimate coverage of immunization and Vitamin A

### **3. Methodology**

#### **3.1.1 Geographic area:**

The district-wide nutrition survey covered the larger Marsabit District (the newly formed Chalbi, Laisamis and Marsabit Districts) in Eastern Province, Kenya.

#### **3.1.2 Target Population**

The area's total population was approximated to be 187,367 persons based on 2009 population census<sup>4</sup> for the district. The assessment targeted the caregivers of households and children aged 6-59 months for the anthropometric measurements, child care practices (immunization, vitamin A supplementation, deworming and SFP and OTP), morbidity, diarrhea management and health seeking behavior. Information was also gathered to establish the infant and young child feeding practices (IYCF) among children aged 0 to 23 months as well as the nutritional status of women of reproductive age (15-49 years). Additionally information was sought from the principal caregivers on food security, water, sanitation and hygiene..

#### **3.1.3 Survey Design and Sampling Technique**

Standardized Measurement and Assessments in Relief and Transition (SMART) methodology was utilized in both planning and carrying out the anthropometric and mortality surveys. The sub-location was used as the smallest unit for sampling during the planning stage. This was due to the fact that no approximations of population statistics existed at the village level in Marsabit District. Gathered data were inputted into the ENA for SMART software October 2008 version for planning<sup>5</sup>. After cluster assignment per sub-location (Annex 1), a village was randomly selected from the list of villages obtained in the field, thus making the village the smallest unit for data collection.

#### **3.1.4 Sample Size Calculation**

In the anthropometric survey, prevalence of WHZ, WAZ and HAZ in the 2010 survey and respective design effects were used to calculate sample size since both acute and chronic malnutrition were to be investigated. Prevalence of WHZ =13.4% WAZ = 25.4% and HAZ 30.1% for the 2010 survey<sup>6</sup>, desired precision of 3.5%, design effect of 1.65%, 1.33% and 1.12% respectively, household size of 5.4 (based on 2010 Nutrition survey), 20% of the population (672) of under fives, 0.90 as children aged 6-59 months and non-response rate of 3% were keyed into ENA for SMART October 2010 version planning template for sample size calculation. The highest sample size obtained was 655 children aged 6-59 months from 672 households for this survey using the underweight prevalence figures.

For the mortality survey; the total population of 187,367 was used in planning. The population was calculated based on 2010 Nutrition Survey for the district, crude death rate of (0.26/10000)<sup>7</sup>, precision (0.4), design effect (2) and a 90-day recall period. These were keyed into the planning template (mortality section) so as to determine the mortality survey sample size. A sample size of 3323 was obtained. This

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<sup>4</sup> Kenya 2009 Population Census Report

<sup>5</sup> Measuring Mortality, Nutritional Status, and Food Security in Crisis Situations: SMART Methodology April 2006

<sup>7</sup> World Vision Kenya; 2005 survey findings

figure was then divided by 40 (the total number of clusters see section on selection of clusters) to determine the number of persons present per cluster. This resulted in 84 persons targeted per cluster for the mortality survey. The households based on the mortality calculation were lower therefore the household obtained based on the anthropometric calculation were used in planning this survey.

### **3.1.5 Selection of the Survey Team**

The survey comprised of five teams. Each team had three (3) members, the team leader and two enumerators. The team leaders were FHK staffs. The enumerators were students in the universities and civil servants drawn from Marsabit district. The enumerators and team leaders in each team took anthropometric measurements and asked questions on the questionnaires. Translation was done by the enumerators while the team leader recorded the data. The consultant together with Food for The Hungry Kenya staffs co-ordinated the teams.

### **3.1.6 Training of Team leaders, Measurers and Interviewers**

Training on the SMART survey methodology, anthropometric measurements and data collection tools was conducted in a three-day training workshop prior to the survey. This was done on the 18<sup>th</sup> to 20<sup>th</sup> May 2011 (Annex 3).

The training focused on the following:

- The purpose and objectives of the nutrition survey
- SMART methodology in selection of survey clusters and households
- Understanding the purpose for each question on the questionnaires
- Interviewing techniques and recording of accurate data
- Role-play was used to ensure that the interviewers knew how to ask the questions
- How to take anthropometric measurements. This was demonstrated stepwise by explaining how to weigh and measure height/length of a child.
- How to enter a cluster and select the household
- Roles of the team leaders and measurers
- Questions and clarification were done in a participatory manner

### **3.1.7 Selection of Clusters**

The sample size of (724) was divided by 17<sup>8</sup> to get 40 clusters. The 40 clusters at sub-location level were randomly assigned for assessment using ENA for SMART software. The villages were randomly selected when the team reached the sub-location (Annex 2 for sampled clusters).

### **3.1.8 Selection of Households**

The selection of the household where the survey child and the respondent were to be found was selected in the following manner. Each survey team moved to the centre of the assigned cluster. A random direction was determined by spinning a pencil to choose the direction of movement. The survey team moved in the selected direction up to the end of the cluster. At the edge of the cluster, a random direction was again selected by spinning a pencil. All households in that direction within a radius of 45° were counted and numbers assigned up to the end of the cluster. A random number was selected by writing on papers the number of households and choosing one. The household selected was the first sampled household. All other households in the same direction were subsequently selected. All children aged between 6 months and 59 months (height of 65-110cm) were measured from the selected household until about 15 children

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<sup>8</sup> Number of children aged 6-59 months that each team could comfortably measure per day

were measured. MUAC measurements were taken for caregivers. All households visited responded to the mortality questionnaire.

### **3.1.9 Selection of Children for Anthropometry**

A total of 724 children aged between 6-59 months of age staying in the sampled households were measured. The mother/primary caregiver of the child/children was the respondent. In cases where the child and/or the caregiver were temporarily out of the house, the survey team noted down the details and returned later to take the measurements.

### **3.1.10 Selection of Children for determining Infant and Young Child Feeding Practices**

For the Infant and Young Child Feeding Practices (IYCF), 3 infants less than 6 months of age and 6 children aged 6 -23 months were selected from the households in each of the clusters. A total of 349 children from Marsabit District of whom 149 were aged 0-<6months and 200 children aged 6-23 months participated in the infant and young child feeding practices. These children were 56.2% males while females were 43.8%.

### **3.1.11 Selection Households for the mortality survey**

All households visited during the survey participated in the mortality survey. A total of 676 households responded to the mortality questionnaire.

### **3.1.12 Duration**

The field data collection was held from 21<sup>st</sup> to 30<sup>th</sup> May 2011 inclusive of two days of travelling.

### **3.1.13 Ethical considerations**

Verbal consent for all caregivers of the sampled children was sought before administration of the questionnaire. All information collected during the survey were treated as confidential and used for the survey and programming purposes only. Children who were found as severely malnourished or with any other medical condition during the survey were referred to the nearest health facility for medical attention and appropriate treatment.

## **3.2 Variables Measured**

Data on anthropometric measurements, MUAC, morbidity, vitamin A supplementation and immunization coverage for the under fives was obtained by use of anthropometric questionnaire (see Annex 12).

**Age:** The exact age of the child was noted in months, based on information gathered from the caregiver by cards or recall. Verification of age by cards was done using health cards, birth certificates and baptismal cards. Most of the caregivers had birth notification and child health cards with children's birth dates. In the cases where children did not have the cards, mother's recall, based on a local calendar of events developed by survey team prior to the survey. The limit of 65cm to 110 cm in height was also used to determine the age. To ensure accurate age calculation, a chart for calculation of age in months was used (see Annex 8).

**Weight:** Weight measurements were taken using Salter scales (25kg with 0.1kg increments). Two measurers did the weighing. The reading was done by one of the measurers and verified by the team leader then recorded to the nearest 0.1kg. The weighing scales were checked each morning for accuracy using a standard weight. Each scale was calibrated together with the weight of the plastic pants before each measurement was taken and children weighed with no clothing.

**Height:** Height measurements were taken using calibrated height/length wooden board with a well fitting head/foot piece and measurements recorded to the nearest 0.1cm. Children less than 85cm were measured lying down and children over 85cm measured standing up. Children were measured bareheaded and barefooted. The reading was taken by one of the measurers, verified by the team leader and recorded immediately.

**MUAC:** Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder using an appropriate MUAC tape, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest 0.1cm. The right arm was to be used in case of disability of the left arm. For children, MUAC was taken for children aged 12-59 months.

**Bilateral edema:** This was diagnosed by placing both thumbs on the upper side of the feet and applying pressure for about 3 seconds. Edema was considered to be present if a skin depression remained after the pressure was released.

**Morbidity data:** Information on morbidity prevalence two (2) weeks prior to the survey were collected by asking the mothers/caregivers if the child had been ill in the two weeks preceding the survey. For those children who were reported ill, the mothers/caregivers were asked to state the illness and/or the symptoms of the illnesses and where they sought health care for the sick child.

**Enrollment in the Selective Feeding Programmes:** For all children 6-59 months of age, the caretakers/mothers were asked to state whether the child was enrolled in a supplementary feeding program (SFP) or an outpatient feeding program (OTP) at the time of the survey.

**Immunization Status:** Immunization for children 6-59 months on pentavalent 1/OPV 1 and pentavalent 3/OPV 3 (to ensure completion of dose) and measles vaccination was collected using child health cards or recall from mothers/caregivers in the absence of the cards. The coverage for measles was calculated as the proportion of children aged  $\geq 9$  months who had received measles vaccination.

**Vitamin A Supplementation Status:** For children 6-59 months of age information on Vitamin A supplementation in the last six (6) months prior to May 2011 was collected using health cards and recall from mothers/caregivers. A sample of the vitamin A supplements were provided to each team to ensure caregivers understood what it was.

**De-worming:** For children 12-59 months of age, information on de-worming in the last twelve (12) months prior to the survey was collected using health cards and recall from mothers/caregivers.

**Household Food Consumption:** The food consumption of the households was established using a weekly frequency and 24-hour recall. Information were gathered on: the number of meals normally eaten and the number of meals eaten on the day preceding the survey, family members who had missed a meal on the day preceding the survey as well as the reasons why the person/s missed the meals and coping strategies in times of food insecurity. (Annex10). Food security data were collected on 645 households in the population.

**Information on Infant and Young Child Feeding (IYCF) Practices:** Information on exclusive breastfeeding rates, initiation of breastfeeding within one hour of birth, time of introduction of complementary feeding, frequency of feeding and diversity of complementary feeds was solicited based on a 24-hour recall (see Annex 9).

**Dietary Diversity Score (DDS):** 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<sup>9</sup>. 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  $\geq 4$  food groups out of seven groups while for households it is out of 16 food groups<sup>10</sup>.

**Food Aid:** Information was sought on whether a household had received any food aid in the past six months, the source of food aid, what foods were received and the quantities, how the food ration was used and the duration each commodity lasted.

**Mosquito bednets:** Information on mosquito bednets was determined from each household by asking each respondent to state if they had mosquito nets, the source of the bed net, treatment of the bed net and who had slept under the bed net the night prior to the interview.

**De-worming** Each care giver was asked to state if a child aged  $\geq 24$  months had been de-wormed in the six (6) months prior to the day of the interview.

### **Water, Hygiene and Sanitation**

Each household was asked to give information on the source of water for household use and for drinking; time took to fetch water and the cost of water. In addition, caregivers were asked on: access to latrines, washing of hands and disposal of the stool (Annex 10).

### **Mothers Physiology and Nutrition Status**

All women in reproductive age 15-49 years were asked to state their physiology. MUAC measurements were taken to calculate the nutrition status of the women.

### **Iron Supplementation**

All women in reproductive age 15-49 years were asked to state if they had taken iron supplementation during their last pregnancy.

## **3.3 Procedure for Data Collection**

Questionnaires (Annexes), interviews and focus groups were employed to collect data

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<sup>9</sup> Ruel, M. T. (2002). *Is dietary diversity an indicator of poor food security or diversity quality? A review of measurement issues and research needs*. Food Consumption and Nutrition Division, International Food Policy.

<sup>10</sup> Swindale, A. and Bilinsky, P. (2006). Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide Version 2. Washnion D.C.: Food Assistance Nutrition technical assistance Project, academy for educational Development.

### **3.3.1 Pre-test**

The last day of the training, was allocated to standardization of taking anthropometric measurements and pre-testing of the questionnaires by all the teams under supervision of the consultant. Pretesting of questionnaires was done in three households by each team.

### **3.3.2 Focus group discussions**

Focus group discussions were held in five (5) villages. They were co-ordinated by the consultant and one of the supervisors in each village.

### **3.3.3 Supervision of the Survey**

The Nutrition Officer Food for the Hungry Marsabit, the Consultant and two FH Staff supervised the survey teams. Each team was supervised at least six times in the eight days of data collection (Annex 13)

**3.3.4 Data Quality Control:** Procedures to ensure quality data included: careful training of interviewers, close supervision of actual survey and daily check of all the questionnaires for consistency, completeness and clarity of the questionnaires by the consultant. Questionnaires obtained at the end of each day were checked. Any errors and omissions in data recording were sorted and corrected before production of questionnaires.

### **3.4 Data Analysis**

Data were cleaned, edited, processed and analyzed. Data cleaning was done before entry by thorough scrutiny of the questionnaires. Anthropometric and mortality data entry was entered in ENA for SMART data entry sheets and further cleaning conducted after data entry. Processing and analysis were carried out using ENA for SMART software 2010 and WHO 2006<sup>11</sup> standards were used to generate the results. SMART outliers were used for anthropometric data analyzed. Data on immunization, vitamin A, morbidity, de-worming, Infant and Young Child (IYCF), mosquito bednets, and household food security were entered into Excel spreadsheet computer soft wares and analyzed using SPSS 16.0 version.

To enhance ownership of the outcome of the survey results, the MOPHS, DHMT members and UNICEF field officer participated in the dissemination of the preliminary results in Marsabit.

#### **3.4.1 Nutritional Indices for Measuring Acute Malnutrition**

The nutritional indicators used were the Weight-for-Height (W/H) expressed in Z-scores and percent of the median of the reference population. Weight-for-height expresses the weight of the child in relation to the height and tells us about current nutritional status of the study population. Z-scores express a child's weight as a multiple of the standard deviation (a measure of the spread values round the mean) of the reference population, also known as standard deviation scores. Z-scores are a little more complicated to calculate than the percentages of the reference median weight-for- height but they are statistically more accurate. The percentage of median is the most useful index for screening and targeting vulnerable groups in emergencies. It is a useful indicator for admissions and discharge in and out of feeding programmes. The W/H indices are compared with NCHS reference data in combination with edema and with WHO Standards. Children with bilateral edema are regarded as being acutely malnourished irrespective of their weight for height status. Edema cases are separated from the rest of the respondents during analysis and treated as severe acute malnutrition. Global acute malnutrition (GAM) is defined as <-2 z scores weight-for-

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<sup>11</sup> WHO Anthro 2005, Beta version Feb 17<sup>th</sup>, 2006: software for assessing growth and development of the world's children. Geneva: WHO, 2006. ([http://www.who.int/child\\_growth/software/en/](http://www.who.int/child_growth/software/en/)).



height and/or edema and severe acute malnutrition is defined as  $<-3z$  scores weight-for-height and/or edema.

Mid Upper Arm Circumference (MUAC) is another anthropometric indicator that was used in this study<sup>12</sup>. MUAC measurements are a good predictor of immediate risk of death. It is used as an initial screening tool in feeding programmes. It is useful when access to the population is difficult; resources are limited or when W/H measurements are not possible. MUAC results provide indications for nutritional status and are less accurate than Z scores. Generally, in nutrition surveys, MUAC is taken for children 12 to 59 months old because for those 6-12 months, MUAC measurements tend to overestimate the rates of malnutrition.

### 3.4.2 Cut Off Points used to define Acute Malnutrition

The cut off points<sup>13</sup> used to define acute malnutrition for children 6-59 months are presented in Table 6.

**Table 6: Cut Off Points used to define Malnutrition of Children 6-59 months using z scores & MUAC**

| Description of Nutritional status | Weight for Height Index   | Edema   | MUAC:(Children 12-59 months) |
|-----------------------------------|---------------------------|---------|------------------------------|
|                                   | Z Score (SD)              |         | WHO                          |
| Severe Acute Malnutrition (SAM)   | $<-3$ Z scores            | Present | $<11.5$ cm                   |
| Moderate Acute Malnutrition       | $<-2Z$ to $\geq-3Z$ score | Absent  | $<12.5$ cm $>11.5$ cm        |
| Global Acute Malnutrition (GAM)   | $<-2$ Z scores            | Present |                              |
| Normal                            | $\geq Z$ scores           |         | $>13.5$ cm                   |
| At Risk                           |                           |         | $<13.5$ cm                   |

The following classifications for malnutrition established by WHO<sup>14</sup> as levels interpreting weight for height Z score in emergencies were used in this survey (Table 7).

**Table 7: WHO Classification of Malnutrition with Corrective Actions**

| GAM W/H Z score | Interpretation | Corrective Proposed Action   |
|-----------------|----------------|--|
| $<5$ %          | Acceptable     | -  |
| 5-9.9%          | Poor           | Supplementary Feeding  |
| 10-14.9%        | Serious        | Selective supplementary feeding of the malnourished population is high priority  |
| $\geq 15\%$     | Critical       | Selective supplementary feeding of the malnourished population is high priority.<br>Additional food to all children and vulnerable groups<br>Improve basic food supply |

### 3.4.3 Classification of Malnutrition using MUAC for Women

The cut offs for MUAC for women in reproductive age are given in Table 8.

**Table 8: MUAC Cut-offs for women in reproductive age<sup>15</sup>**

| Nutritional status | Pregnant & lactating | Non-pregnant   |
|--------------------|----------------------|----------------|
| Normal             | $\geq 23.0$ cm       | $\geq 21.0$ cm |
| GAM                | $< 23.0$ cm          | $< 21.0$ cm    |
| Severe wasting     | $< 20.7$ cm          | $< 18.5$ cm    |

<sup>12</sup> Kenya National Bureau of Statistics and Ministry of Public Health and Sanitation: Guidelines for Nutrition assessment in Kenya 2008

<sup>13</sup> FSAU, 2003 Nutrition: a guide to data collection, analysis, interpretation and use

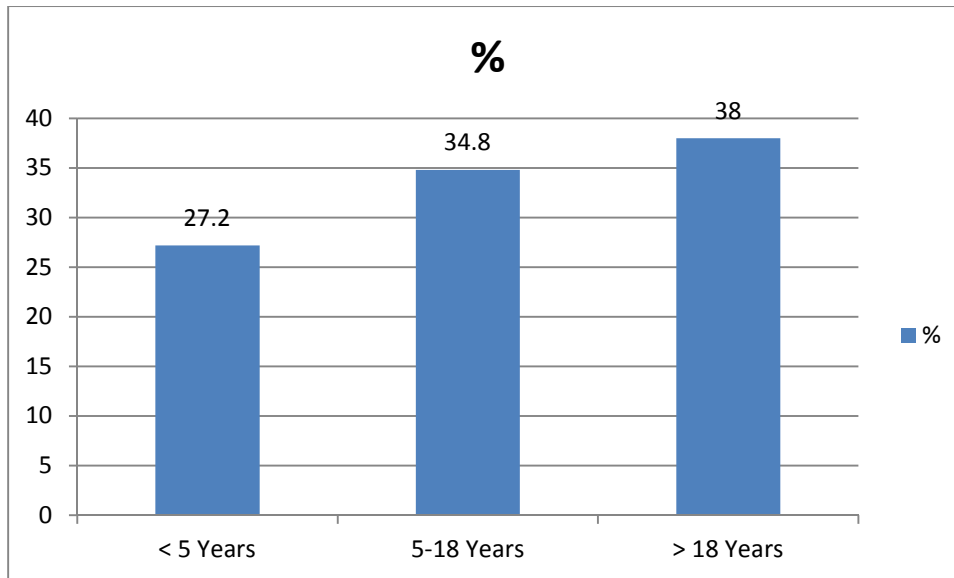
<sup>14</sup> WHO Classification of malnutrition and corrective actions

<sup>15</sup> Kenya National Bureau of Statistics and Ministry of Public Health and Sanitation: Guidelines for Nutrition assessment in Kenya 2008

## 4.0 RESULTS

### 4.1 Household Demographic Characteristics

The mean household size was  $5.3 \pm 1.9$ , ranging from 2 to 12 household members with a mode of 4 members and median of 5 members. The children aged under five years form 27.2% of the population, children aged 5 to 18 years are 34.8% while adults aged above 18 years are 38.0% of the total population (Figure 2). This indicates a high dependent population in the district. A total of 645 households participated in the survey.



**Figure 2: Age Categories of Population in Marsabit**

The demographic characteristics of school attendance, mean household size and maternal physiology are shown in Table 9. Among the age group 5 to 18 years, over two thirds (75.5%) were attending school. The reasons for not attending school was family labour by 31.0% while 39.0% were not enrolled (this is the same as in the 2010 survey) and 10.2% were engaged in social responsibilities and 10.2% were already married and 4.9% were where households did not see the value of education.

The mothers/caregivers were aged 16 to 53 years, with a mean age of  $28.3 \pm 7.0$ . The age was verified by national identity card for over half of the women, while 42.6 % stated their age through recall.

**Table 9: Household Demographic Characteristics**

| Characteristic                             |                |
|--|----------------|
| Mean Household size                        | 5.3+1.9        |
| <b>School Attendance</b>                   | 75.5%          |
| <b>Reasons for not attending school</b>    | <b>N = 364</b> |
| • Family labour responsibilities           | 113 (31.0%)    |
| • Not enrolled                             | 142 (39.0%)    |
| • Other social responsibilities            | 37 (10.2%)     |
| • Early marriage                           | 37 (10.2%)     |
| • Household doesn't see value of schooling | 18 (4.9%)      |
| • Too poor to buy school items             | 3 (0.8%)       |
| • No one to take children to school        | 5 (1.4%)       |
| • Sickness/poor health of child            | 4 (1.1%)       |
| • Work outside home/moved from school area | 2 (0.5%)       |
| • Others                                   | 3 (0.8%)       |
| <b>Maternal Physiology</b>                 | % n = 556      |
| • Currently pregnant                       | 31 (5.6%)      |
| • Breastfeeding < 6 months infant          | 125 (22.5%)    |
| • Breastfeeding 6-24 months                | 229 (41.2%)    |
| • Not pregnant not breastfeeding           | 124 (22.3%)    |
| • Breastfeeding Child>24 months            | 47 (8.4%)      |

## 4.2 Household Socioeconomic Characteristics

### 4.2.1 Occupation

The main occupation of adults aged over 18 years was housewife by 40.1% followed by livestock herding by 32.4%, wage labour was by 7.7% and salaried were 4.5%. and 3.5% was unemployed (Table 10).

**Table 10: Occupation of household members**

| Occupation of household members | 5-18 yrs<br>N= 1157 | Over 18 yrs<br>N= 1301 |
|---------------------------------|---------------------|------------------------|
| Student                         | 75.5%               | 2.5%                   |
| Livestock herding               | 18.7%               | 32.4%                  |
| Unemployed                      | 0.8%                | 3.5%                   |
| Domestic help                   | 1.6%                | 1.4%                   |
| Housewife                       | 1.7%                | 40.1%                  |
| Waged labour/Casual             | 0.6%                | 7.7%                   |
| Agricultural labour             | 0.6%                | 0.4%                   |
| Employed/salaried               | -----               | 4.5%                   |
| Petty trade                     | 0.1%                | 0.7%                   |
| Hunting/gathering               | 0.2%                | 0.3%                   |
| Merchant                        | -----               | 1.0%                   |
| Firewood/charcoal               | -----               | 0.1%                   |
| Own farm labour                 | -----               | 0.9%                   |
| Fishing                         | 1.0%                | 3.3%                   |
| Quarry                          | -----               | 0.1%                   |
| Very Old                        | -----               | 2.6%                   |

#### 4.2.2. Sources of Income

Sale of livestock was the main source of income by 57.6% followed by wage labour by 13.6 as the first source. The second main source of income was sale of livestock products by 12.6% of the households (Table 11).

**Table 11: Household members' sources of income**

| Source of Income           | 1 <sup>st</sup> Source | 2 <sup>nd</sup> Source | 3 <sup>rd</sup> Source |
|----------------------------|------------------------|------------------------|------------------------|
| Sale of livestock          | 57.6%                  | 1.3%                   | -----                  |
| Sale of livestock products | 1.1%                   | 12.6%                  | 0.2%                   |
| Sale food ration           | -----                  | 0.2%                   | -----                  |
| Wage labour                | 13.6%                  | 3.1%                   | -----                  |
| Remittance                 | 0.5%                   | 0.5%                   | 0.2%                   |
| Charcoal/firewood          | 2.6%                   | 1.7%                   | 0.2%                   |
| Weaving/basketry           | 0.2%                   | -----                  | -----                  |
| Petty trade                | 0.6%                   | 0.6%                   | 0.2%                   |
| Fishing                    | 3.7%                   | 4.4%                   | 0.5%                   |
| Brewing                    | 0.2%                   | -----                  | -----                  |
| Salary                     | 5.1%                   | 0.6%                   | 0.2%                   |
| Others                     | 1.7%                   | 0.5%                   | -----                  |

Income generation is important in the district as the main source of household food is purchased by households and apart from livestock production; crop production is minimal in the district due to the drought.

#### 4.2.1 Age and Gender Distribution of the Sampled Children

The ages of children were determined by cards and recall (Figure 2). Although verification of age was done by use of health cards, in some cases no exact date of birth was recorded on the card other than the date a child first seen at the health facility or just the month of birth. Majority 72.4% of the underfives had their age verified by health card, 20.9% by recall and 6.7% by birth notification (Figure 3).

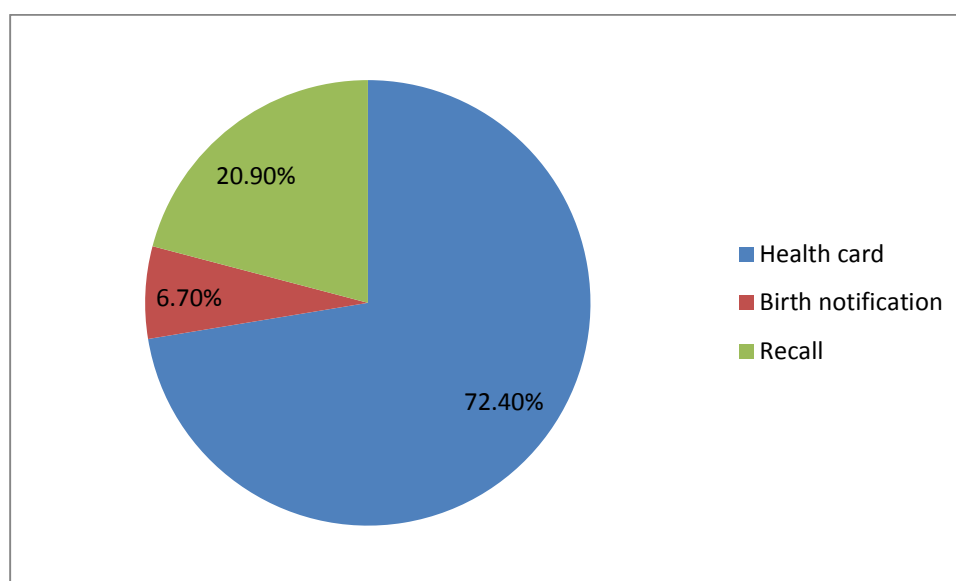
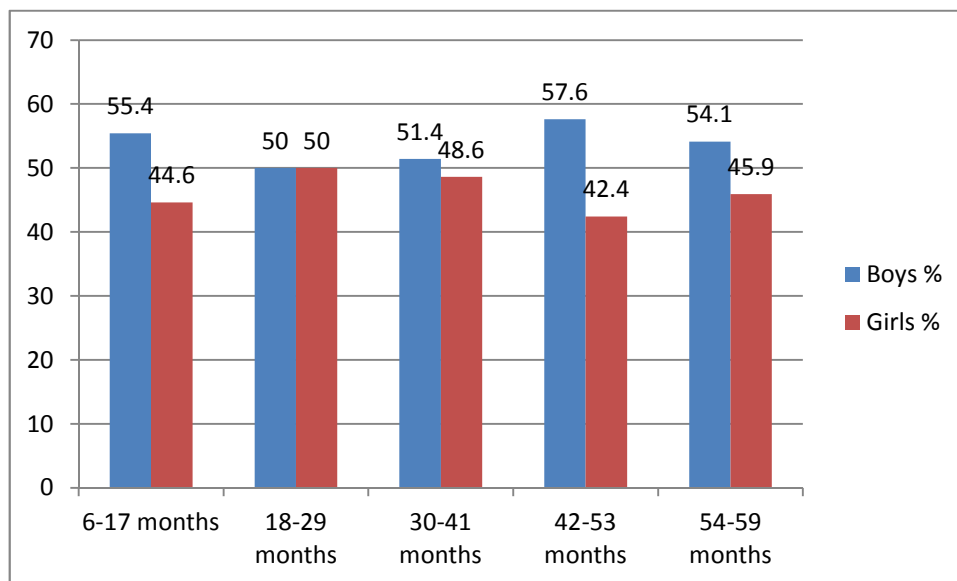


Figure 3: Age Verification

Recall bias may link to wrong age which then leads to wrong W/A and H/A indices. The overall ratio of boys to girls was 1.12 (Figure 4) which was within the recommended range of 0.8-1.2<sup>16</sup>, demonstrating an unbiased sample. There were slightly more boys in the sample than girls, across all the age brackets. The ratio of boys to girls is within acceptable range except for age group 42-53 months with a sex ratio of 1.4. This may be attributed to recall bias in the age of the children for this age group.



**Figure 4: Age and Sex of Children aged 6-59 months**

### 4.3 Nutritional Status

The nutritional status of children aged 6-59 months were assessed using anthropometric measurements and MUAC while that for women in reproductive age nutrition status was established using MUAC. WHO 2006 standards were used in analysis of the anthropometric data.

#### 4.3.1 Prevalence of Malnutrition Rates: Weight for Height expressed in Z scores

The malnutrition rates in this survey indicate rates considered “critical emergency” of GAM of 27.1% (21.6 - 33.3 95% CI) and SAM of 5.0% (3.5-7.2 95% CI) (Table 12). This rates show marked increase from the 2010 survey findings of GAM of 13.4 % (10.3 - 17.1 95% C.I.) and SAM of 1.3 % (0.7 - 2.5 95% C.I.)<sup>17</sup>. The results were also higher than the March 2011 results of GAM 22.7 and SAM of 4.0%. There was one oedema case in this survey. Acute malnutrition WHZ was higher among boys, 29.4% than girls 24.5% although the difference was not statistically significant.<sup>18</sup>

<sup>16</sup> Assessment and Treatment of Malnutrition in Emergency Situations, Claudine Prudhon, Action Contre la Faim (Action Against Hunger), 2002.

<sup>17</sup> MoPHS/UNICEF and FH Marsabit Nutrition Survey 2010

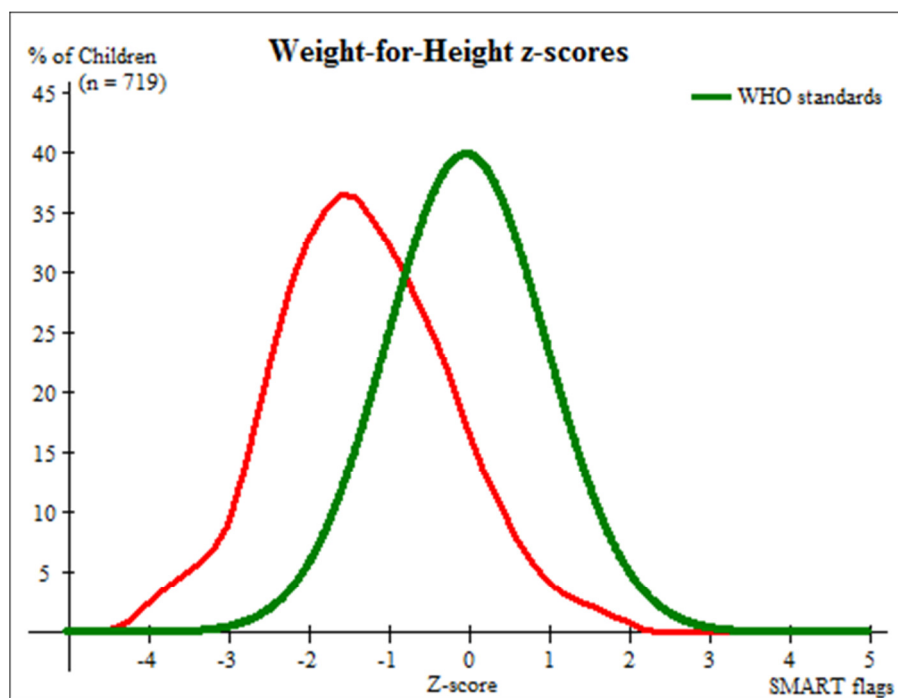
<sup>18</sup> UNICEF/Save the Children March 2011. High Impact Nutrition Intervention Baseline Surveillance Report for Marsabit, Samburu and Isiolo Districts

**Table 12: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex**

|   | All n = 720                            | Boys n = 381                           | Girls n = 339                         |
|---|--|--|---------------------------------------|
| Prevalence of GAM (<-2 z-score and/or oedema)               | (195) 27.1 %<br>(21.6 - 33.3 95% C.I.) | (112) 29.4 %<br>(23.5 - 36.1 95% C.I.) | (83) 24.5 %<br>(17.8 - 32.7 95% C.I.) |
| Prevalence of MAM (<-2 z-score and >=-3 z-score, no oedema) | (159) 22.1 %<br>(17.4 - 27.6 95% C.I.) | (90) 23.6 %<br>(18.4 - 29.7 95% C.I.)  | (69) 20.4 %<br>(14.2 - 28.3 95% C.I.) |
| Prevalence of SAM (<-3 z-score and/or oedema)               | (36) 5.0 %<br>(3.5 - 7.2 95% C.I.)     | (22) 5.8 %<br>(3.6 - 9.2 95% C.I.)     | (14) 4.1 %<br>(2.5 - 6.7 95% C.I.)    |

The prevalence of oedema is 0.1 %.

Figure 5: indicates a poor nutrition status of the sampled population because the curve is skewed to the left of that of the reference population.



**Figure 5: Weight for Height Z-scores Distribution.**

Although SMART methodology does not consider analysis of data by sub sets of the sample, analysis of WHZ by divisions is presented in table 13 to inform programming. Analysis of acute malnutrition by divisions revealed that global acute malnutrition was highest in Maikona and Dukana (36.1%) closely followed by North Horr Turbi (35.2%), Loiyangalani (33.7%) and Laisamis (25.2%). This indicates critical emergency nutrition situation in the area and requires immediate action.

**Table 13: Acute Malnutrition (wasting) weight-for-height based on Z scores by division**

| Nutritional Indicator | Maikona & Dukana n= 147 | Central n= 105 | Loiyangalani n= 98 | Laisamis & Korr n= 151 | North Horr & Turbi n= 162 | Gadamoja & Dirri n= 60 |
|-----------------------|-------------------------|----------------|--------------------|------------------------|---------------------------|------------------------|
| GAM -2Z               | 36.1% (53)              | 9.5% (10)      | 33.7% (33)         | 25.2% (38)             | 35.2% (57)                | 10.0% (6)              |
| SAM - 3 Z             | 5.4% (8)                | 2.9% (3)       | 6.1% (6)           | 4.6% (7)               | 6.8% (11)                 | 3.3% (2)               |

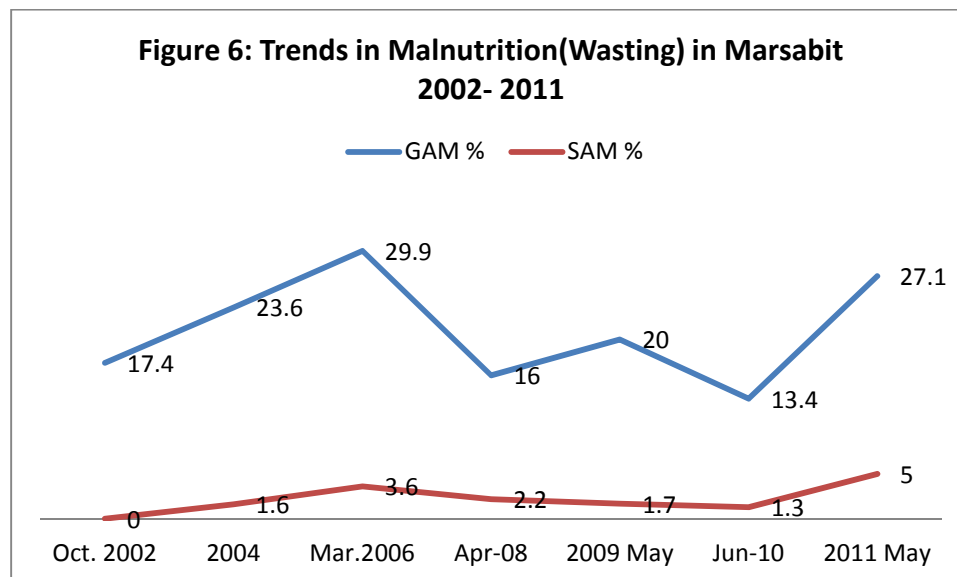
The prevalence of acute malnutrition (wasting) by age indicates that all children aged were critically malnourished (Table 14). This indicates a state of serious recent malnutrition situation among the children.

**Table 14: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or edema**

| Age (mths)   | N          | SAM <- 3 z-score |            | MAM >=-3 z--2 zscore |             | Oedema   |            |
|--------------|------------|------------------|------------|----------------------|-------------|----------|------------|
|              |            | n                | %          | n                    | %           | n        | %          |
| 6-17         | 157        | 3                | 1.9        | 26                   | 16.6        | 1        | 0.6        |
| 18-29        | 165        | 7                | 4.2        | 54                   | 32.7        | 0        | 0.0        |
| 30-41        | 186        | 5                | 2.7        | 50                   | 26.9        | 0        | 0.0        |
| 42-53        | 161        | 2                | 1.2        | 35                   | 21.7        | 0        | 0.0        |
| 54-59        | 52         | 0                | 0.0        | 12                   | 23.1        | 0        | 0.0        |
| <b>Total</b> | <b>721</b> | <b>17</b>        | <b>2.4</b> | <b>177</b>           | <b>24.5</b> | <b>1</b> | <b>0.1</b> |

#### 4.3.1.1 Trends of Malnutrition 2002 to 2011

Although seven nutrition surveys have been conducted in the Marsabit District, the trends of malnutrition should be analysed with caution. This is because, in 2002 and 2004, nutrition surveys were undertaken in only Loiyangalani and Maikona divisions. In 2006, the survey was conducted in Loiyangalani, Maikona, North Horr and Laisamis. In 2008, the survey was done in all the divisions in Marsabit whereas in 2009, it was done only in Laisamis. In the year 2010 the nutrition survey was undertaken in the whole of Marsabit district similar to the current 2011 survey. The trends in wasting are indicated in Figure 6 based on the 2008, 2009 nutrition reports<sup>19,20,21, 22</sup> and this survey for 2011.



<sup>19</sup> World Vision (2009). Intergraded Health and Nutrition Survey Laisamis District

<sup>20</sup> Ministry of Health and Arid Lands (2008).

<sup>21</sup> Marsabit Nutrition Survey 2010

<sup>22</sup> Marsabit Nutrition Survey 2011

The results in this survey are higher than the Nutrition Surveillance done in March 2011 for GAM 22.7 % (18.0 - 28.3 95% C.I.) and SAM of 4.0 % (2.3 - 6.6 95% C.I.)<sup>23</sup>. This shows a deterioration of the nutrition situation in Marsabit.

#### 4. 3.2 Prevalence of acute malnutrition based on the Percent of the Median (NHCS)

The weight for height percent of the median is commonly used to determine admission of children into selected feeding programmes. As expected, the GAM and SAM rates based on the Percent of the Median measurement, gave lower rates as compared to the Z-scores. The GAM level was 15.7% (11.6 - 21.2 95% C.I.) in this survey while the findings showed SAM of 0.4 % (0.1 - 1.3 95% C.I.) (Table 15). The GAM and SAM rates using percent of the median in this survey were markedly higher than those of 2010 in the district of 4.7 % (3.2 - 6.8 95% C.I.) and 0.1% (0.0 - 1.1 95% C.I.) respectively<sup>24</sup>.

**Table 15: Prevalence of Acute Malnutrition based on the % of the Median and/or edema**

| NHCS 1977                                      | n = 724                             |
|--|-------------------------------------|
| Prevalence of GAM (<80% and/or oedema)         | (114) 15.7 % (11.6 - 21.2 95% C.I.) |
| Prevalence of MAM (<80% and >= 70%, no oedema) | (111) 15.3 % (11.2 - 20.8 95% C.I.) |
| Prevalence of SAM (<70% and/or oedema)         | (3) 0.4 % (0.1 - 1.3 95% C.I.)      |

#### 4. 3.3 Prevalence of underweight based on weight-for-age z-scores

Underweight is a composite measure of low weight-for-age and height-for-age. Prevalence of underweight in this survey is 45.6 % (39.5 - 51.9 95% C.I.) and severe underweight is 11.5 % (8.6 - 15.3 95% C.I.) (Table 16). These are much higher than the 2010 rates of underweight of 25.4% (21.8-29.5CI) and severe underweight of 5.0% (3.5-7.1 CI). The prevalence of underweight is also above the underweight rate of 37.5 % (30.7 - 44.9 95% C.I.) for the March 2011 nutrition surveillance findings<sup>25</sup>. This indicates both acute and chronic nutrition situation in the area and that the situation of underweight is worsening in the district.

**Table 16: Prevalence of underweight based on weight-for-age z-scores by sex**

| WHO 2006  | All n = 719                            | Boys n = 381                           | Girls n = 338                          |
|---|--|--|--|
| Prevalence of underweight (<-2 z-score)                           | (328) 45.6 %<br>(39.5 - 51.9 95% C.I.) | (186) 48.8 %<br>(41.6 - 56.1 95% C.I.) | (142) 42.0 %<br>(35.7 - 48.6 95% C.I.) |
| Prevalence of moderate underweight (<-2 z-score and >=-3 z-score) | (245) 34.1 %<br>(30.1 - 38.2 95% C.I.) | (139) 36.5 %<br>(31.3 - 41.9 95% C.I.) | (106) 31.4 %<br>(26.7 - 36.5 95% C.I.) |
| Prevalence of severe underweight (<-3 z-score)                    | (83) 11.5 %<br>(8.6 - 15.3 95% C.I.)   | (47) 12.3 %<br>(9.0 - 16.8 95% C.I.)   | (36) 10.7 %<br>(7.3 - 15.3 95% C.I.)   |

Similar to acute malnutrition, underweight was higher among all age groups. This was 57.7% for age group 54-59 months followed by 52.2% for age group 30-41 months and closely by 51.5% for age group 18-29 months (Table 17).

<sup>23</sup> High Impact Nutrition Intervention Baseline Surveillance Report for Marsabit, Samburu and Isiolo Districts march 2011

<sup>24</sup> Marsabit Nutrition Survey 2010

<sup>25</sup> High Impact Nutrition Intervention Baseline Surveillance Report for Marsabit, Samburu and Isiolo Districts march 2011



**Table 17: Prevalence of underweight by age based on weight-for-height z-scores and edema**

| Age (mths)<br>N |            | Severe underweight<br>(<-3 z-score) |             | Moderate underweight<br>(>= -3 and <-2 z-score ) |             | Underweight <-<br>2z` Scores |             | Oedema   |            |
|-----------------|------------|-------------------------------------|-------------|--|-------------|------------------------------|-------------|----------|------------|
|                 |            | n                                   | %           | n  | %           | n                            | %           | n        | %          |
| 6-17            | 154        | 11                                  | 7.1         | 30   | 19.5        | 41                           | 26.6        | 1        | 0.6        |
| 18-29           | 165        | 24                                  | 14.5        | 61   | 37.0        | 85                           | 51.5        | 0        | 0.0        |
| 30-41           | 186        | 24                                  | 12.9        | 73   | 39.2        | 97                           | 52.2        | 0        | 0.0        |
| 42-53           | 162        | 18                                  | 11.1        | 57   | 35.2        | 75                           | 46.3        | 0        | 0.0        |
| 54-59           | 52         | 6                                   | 11.5        | 24   | 46.2        | 30                           | 57.7        | 0        | 0.0        |
| <b>Total</b>    | <b>719</b> | <b>83</b>                           | <b>11.5</b> | <b>245</b>                                       | <b>34.1</b> | <b>328</b>                   | <b>45.6</b> | <b>0</b> | <b>0.1</b> |

#### 4. 3.4 Prevalence of Stunting

Stunting is the indicator of chronic malnutrition which is mainly due to long-term food deprivation and is generally a sign of poor socioeconomic situations mainly poverty. Findings in this survey showed that stunting was 23.6 % (20.1 - 27.5 95% C.I.). Stunting was higher among boys 25.3 % (20.7 - 30.5 95% C.I.) than girls 21.7 % (17.6 - 26.4 95% C.I.) (Table 18). These stunting rates were lower than the stunting rates of 2010 survey of 30.1 % (26.4 - 34.1 95% C.I.)<sup>26</sup>. Unlike the March 2011 surveillance report, were stunting was 32.3 % (26.9 - 38.4 95% C.I.)<sup>27</sup>

**Table 18: Prevalence of stunting based on height-for-age z-scores and by sex**

| Stunting                       | All n = 704                            | Boys n = 372                          | Girls n = 332                         |
|--------------------------------|--|---------------------------------------|---------------------------------------|
| Stunting (<-2 z-score)         | (166) 23.6 %<br>(20.1 - 27.5 95% C.I.) | (94) 25.3 %<br>(20.7 - 30.5 95% C.I.) | (72) 21.7 %<br>(17.6 - 26.4 95% C.I.) |
| Moderate (<-2 z- >=-3 z-score) | (136) 19.3 %<br>(16.0 - 23.1 95% C.I.) | (79) 21.2 %<br>(16.8 - 26.5 95% C.I.) | (57) 17.2 %<br>(13.3 - 22.0 95% C.I.) |
| Severe Stunting (<-3 z-score)  | (30) 4.3 %<br>(2.8 - 6.4 95% C.I.)     | (15) 4.0 %<br>(2.2 - 7.2 95% C.I.)    | (15) 4.5 %<br>(2.5 - 8.0 95% C.I.)    |

Stunting was high among the children aged 54-59 months, 37.3%, followed by 28.8% for age group 42-53 months and 25.8% for age group 30-41 months as shown in Table 19.

**Table 19: Prevalence of stunting by age based on height-for-age z-scores**

| Age (months) | Total      | Severe stunting (<-3 z-score) |            | Moderate stunting (>= -3 and <-2 z-score ) |             | Stunting (-2 z score) |             |
|--------------|------------|-------------------------------|------------|--|-------------|-----------------------|-------------|
|              |            | n                             | %          | n  | %           | n                     | %           |
| 6-17         | 155        | 4                             | 2.6        | 16   | 10.3        | 20                    | 12.9        |
| 18-29        | 160        | 5                             | 3.1        | 30   | 18.8        | 30                    | 21.9        |
| 30-41        | 182        | 6                             | 3.3        | 41   | 22.5        | 47                    | 25.8        |
| 42-53        | 156        | 10                            | 6.4        | 35   | 22.4        | 45                    | 28.8        |
| 54-59        | 51         | 5                             | 9.8        | 14   | 27.5        | 19                    | 37.3        |
| <b>Total</b> | <b>704</b> | <b>30</b>                     | <b>4.3</b> | <b>136</b>                                 | <b>19.3</b> | <b>166</b>            | <b>23.6</b> |

<sup>26</sup> Marsabit Nutrition Survey 2010

<sup>27</sup> High Impact Nutrition Intervention Baseline Surveillance Report for Marsabit, Samburu and Isiolo Districts march 2011

#### 4. 3.5 Mean weight for height Z scores WHO Standards 2006

The mean weight-for-height Z scores was  $-1.39 \pm 0.92$  with a design effect of 3.22 whereas the weight-for-age mean Z scores  $-1.83 \pm 0.99$  with a design effect of 2.76 and the height-for-age was  $-1.17 \pm 1.10$  with a design effect of 1.30. There was 1 z score that was not available whereas 3 were out of range for weight-for-height and 4 for weight-for-age and 20 for height-for-age. (Table 20). The later could be due to challenges of caregivers' recall of age.

**Table 20: Mean z-scores, Design Effects and excluded subjects**

| Indicator         | n   | Mean z-scores $\pm$ SD | Design Effect (z-score < -2) | z-scores not available* | z-scores out of range |
|-------------------|-----|------------------------|------------------------------|-------------------------|-----------------------|
| Weight-for-Height | 720 | $-1.39 \pm 0.92$       | 3.22                         | 1                       | 3                     |
| Weight-for-Age    | 719 | $-1.83 \pm 0.99$       | 2.76                         | 1                       | 4                     |
| Height-for-Age    | 704 | $-1.17 \pm 1.10$       | 1.30                         | 0                       | 20                    |

\* contains for WHZ and WAZ the children with edema.

#### 4.3.6 Plausibility Checks

The plausibility checks for the anthropometric data are presented in Table 21.

**Table 21: Plausibility Checks for Anthropometric Data**

| Indicator                    | Survey       |
|------------------------------|--------------|
| Digit preference weight      | 0 (3)        |
| Digit preference height      | 4 (12)       |
| WHZ (Standard deviation)     | 0 (1.08)     |
| WHZ (Skewness)               | 0 (0.18)     |
| WHZ (Kurtosis)               | 5 (-0.01)    |
| Percentage of flags          | 0 (0.6%)     |
| Overall Sex ratio            | 4 (p= 0.119) |
| <b>Age distribution %</b>    |              |
| 6-17 months                  | 1.3          |
| 18-29 months                 | 1.0          |
| 30-41 months                 | 1.2          |
| 42-53 months                 | 1.0          |
| 54-59                        | 1.3          |
| Age ration: ages 6-29: 30-59 | 0.81         |

Overall sex ratio: 0 p = 0.119 (boys and girls equally represented)

Overall age distribution: 4 p = 0.009 (significant difference)

Overall age distribution for boys: 4 p = 0.152 (as expected)

Overall age distribution for girls: p = 0.062 (as expected)

Overall sex/age distribution: p = p= 0001 (significant difference)

Overall data quality of survey is 13%, which is acceptable.

#### 4. 3.7 Prevalence of Malnutrition of Children aged 12-59 months based on MUAC

MUAC is a rapid assessment indicator of mortality among children aged over one year old<sup>28</sup>. Children below one year are not sensitive to MUAC measurements. MUAC analysis was done on 636 children 12-59 months. Findings showed that a high proportion of children, 26.7% were at risk of being malnourished, 8.6% were moderately malnourished and 1.6% were severely malnourished (Table 24). Those who were malnourished (10.2%) and at risk of being malnourished (36.9%) using MUAC were higher in this survey than in previous surveys<sup>29</sup> (Table 22). However, those malnourished using MAUC in this survey

<sup>28</sup> Kenya National Bureau of Statistics and Ministry of Public Health and Sanitation: Guidelines for Nutrition assessment in Kenya 2008

<sup>29</sup> Marsabit Nutrition Survey report 2011

were comparable to those of the nutrition surveillance report of March 2011<sup>30</sup>. This indicates a worsening state of malnutrition in the district.

**Table 22 : Distribution of Malnutrition of Children aged 12-59 months using MUAC 2008, 2010 and 2011**

| Nutritional status                                     | Proportion 2011 | Proportion 2010 | Proportion 2008 |
|--|-----------------|-----------------|-----------------|
| Severe Acute Malnutrition <11.5cm                      | 10 (1.6%)       | 0 (0.0%)        | 0.5%            |
| Moderate Acute Malnutrition <12.5cm>11.5cm             | 55(8.6%)        | 14 (2.3%)       | 4.9%            |
| At risk of being malnourished 12.5cm-<13.5cm           | 170 (26.7%)     |                 |                 |
| Malnourished and at risk of being malnourished <13.5cm | 235 (36.9%)     | 124 (20.1%)     | 16.4%           |

#### 4.3.8 Maternal Nutrition Status and Women's Physiology

Nutritional status of the women was determined for all mothers/caregivers of children 6-59 months regardless of their physiological status (Table 23).

**Table 23: Malnutrition of women aged 15-53 years by physiological state using MUAC**

| Nutritional status | Pregnant n = 31 |            | Lactating women |             | Non-pregnant |            |
|--------------------|-----------------|------------|-----------------|-------------|--------------|------------|
|                    | ≥ 23.0cm        | 41.9% (13) | ≥ 23.0cm        |             | ≥ 21.0cm     |            |
| Normal             | < 23.0cm        | 58.1% (18) | < 23.0cm        | 45.9% (184) | < 21.0cm     | 14.5% (76) |
| GAM                | < 20.7cm        | 25.8% (8)  | < 20.7cm        | 11.7% (74)  | < 18.5cm     | 1.0% (5)   |
| Severe wasting     |                 |            |                 |             |              |            |

Of the non-pregnant women, 14.5% were malnourished with MUAC<21.0cm and 1.0% were severely wasted with MUAC <18.5cm. The GAM rate was 58.1% MUAC<23.0cm and severe wasting was 25.8% MUAC<20.7cm for pregnant women and GAM was 45.9% and severe wasting 11.7% for lactating women. This shows that the rate of malnutrition is very high among pregnant and lactating women in Marsabit and they are at very high risk of being malnourished which leads to their infants being at risk of being malnourished. The need for continued focus for improved nutrition for pregnant and lactating women therefore should continue to be promoted. Supplementary feeding for these women should be given priority.

#### 4.3.9 Iron Supplementation during Pregnancy

Of all the women, 57.7% had received iron supplementation during their last pregnancy. Of the pregnant women, 45.2% had received iron supplementation while a slightly higher proportion of lactating 58.2% women and 58.9% non-pregnant and not breastfeeding women had received iron supplementation in their last pregnancy. There is a need to step up measures to improve iron supplementation during pregnancy as majority of the pregnant women were also malnourished using MUAC.

#### 4. 4 Mortality

Crude mortality rate (CMR) is considered a single most important indicator of severe stress in a population due to poor nutrition or sicknesses. The mortality data had a recall period of 3 months/90 days prior to the interview. The mortality results taken in retrospective over 3 months/ 90 days prior to interview are given in Table 24. Current household members were 3543. A total of 51 persons had joined the households and 140 had left during the recall period. There were 69 births during the same period.

**Table 24: Mortality rates for Marsabit May 2011**

|  |
|--|
| CMR (total deaths/10,000 people / day): 0.19 (0.09-0.41 CI)                                |
| U5MR (deaths in children under five/10,000 children under five / day): 0.13 (0.02-0.96 CI) |

<sup>30</sup> High Impact Nutrition Intervention Baseline Surveillance Report for Marsabit, Samburu and Isiolo Districts march 2011

The crude mortality rate (CMR) was 0.19 (0.09-0.41 CI) per 10,000 people/day with a design effect of 1.00 while the under five mortality rate (U5MR) was 0.13 (0.02-0.96 CI) per 10,000 children under five/day with a design effect of 1.01. The reported causes of death were cancer, lower respiratory tract infection, accident and malaria. The mortality rates were lower than those reported in 2010 of crude mortality of 0.26 deaths /10,000/day and U5MR of 0.24 deaths/10,000/day for Marsabit District<sup>31</sup>. Both crude and under five mortality rates are within the acceptable levels in the district. However, with the high levels of both severe and moderate acute malnutrition, these levels could increase if the prevailing conditions do not improve. If the poor nutrition and food security and nutrition situation is not corrected now, deaths are likely to escalate in the near future.

#### 4. 5 Children's Morbidity

The effects of malnutrition on susceptibility to infectious are reinforcing elements of the same vicious circle<sup>32</sup>. Prevalence of common illnesses was determined based on a two-week recall period. Of the children aged 6-59 months, 30.2% were sick during the two weeks prior to the survey. This was higher than 27.0% children who were sick in the 2010 survey. This indicates a worsening state of morbidity as this survey was done during the dry spell unlike in 2010 when the survey was undertaken just after the rains. The children who were sick suffered from symptoms as indicated in Table 25.

**Table 25: Sickness breakdown of illness in children 6-59 months two weeks prior to survey**

| Illness   | 2011 Survey |                        | 2010 Survey |                        |
|---|-------------|------------------------|-------------|------------------------|
|   |             | Proportion of the sick |             | Proportion of the sick |
|   | n= 724      | n = 219 (30.2%)        | n = 699     | n=189 (27.0 %)         |
| Sick  | 219 (30.2%) | -----                  | 189 (27.0%) | -----                  |
| Diarrhoea   | 67 (9.3%)   | 67(30.3%)              | 17 (2.4%)   | 17 (9.0%)              |
| Vomiting  | 39 (5.3%)   | 39 (17.9%)             | 4 (0.6%)    | 4 (2.1%)               |
| Fever with chills like malaria                    | 50 (6.9%)   | 50 (22.9%)             | 58 (8.3%)   | 58 (30.7%)             |
| Fever, cough, cold, difficulty in breathing (ARI) | 79 (11.1%)  | 79 (36.2%)             | 89 (12.7%)  | 89 (47.1%)             |
| Intestinal parasites                              | ---         | ---                    | 4 (0.6%)    | 4 (2.1%)               |
| Eye infections                                    | 7 (1.1%)    | 7 (3.2%)               | 5 (0.7%)    | 5 (2.6%)               |
| Skin infections                                   | 11 (1.5%)   | 11 (5.0%)              | 8 (1.1%)    | 8 (4.2%)               |
| Others  | 11 (1.5%)   | 11 (5.0%)              | 8 (1.1%)    | 8 (4.2%)               |

The most common causes of morbidity were fever accompanied by coughs, colds and difficulty in breathing (ARIs) for 36.2% of the sick, followed by diarrhoea for 30.3% and fever with chills like malaria for 22.9% of the sick children. Other common illnesses included vomiting, skin and eye infections, and vomiting.

Chi-square test showed that 29.4% of the sick were malnourished. Likelihood ratio was 0.058 while Odds ratio was 0.970 indicating that those who were sick were at risk of being malnourished. This was significant with  $p < 0.05$ .

<sup>31</sup> MoPHS/UNICEF/FHK (2010). Nutrition Report 2010, Marsabit District, Kenya

<sup>32</sup> WHO (2001).. Water related diseases. Geneva: WHO

#### 4.5.1 Health seeking behaviour by mothers/caregivers for the sick children

A large proportion of the mothers/caregivers, 62.4%, sought health care services from public clinics, however still, a large proportion, 40.9%, did not seek any assistance for their sick children (Table 26). Some caregivers sought health care for one ailment and not another when the child suffered more than one illness. This indicates the need to promote health seeking behaviour through appropriate health education in the district.

**Table 26: Health Seeking behavior by mothers/caretakers for their sick children**

| Source               | 2011 |      |
|----------------------|------|------|
|                      | n    | %    |
| Traditional          | 5    | 2.3  |
| Private Clinic       | 24   | 10.6 |
| Shop/kiosk           | 2    | 0.9  |
| Public Clinic        | 137  | 62.4 |
| Mobile Clinic        | 4    | 0.6  |
| No assistance sought | 90   | 40.9 |

#### 4.5.2 Diarrhoea Management

Among the children who had diarrhoea, the caregivers sought its management as shown in table 27. The results show that less than one third, 23.2% sought the recommended management of using zinc supplementation for diarrhoea as promoted by the Ministries of Health<sup>33</sup>.

**Table 27: Diarrhoea Management by Caregivers**

|   | N=69 | Percent |
|---|------|---------|
| Fluid made from a special packet ORS                      | 20   | 29.0    |
| Home made sugar-salt solution                             | 8    | 11.6    |
| Another home made liquid e.g. porridge, soup, yoghurt etc | 18   | 26.1    |
| Zinc  | 16   | 23.2    |
| Others  | 7    | 10.1    |

#### 4.6 Immunization Coverage

The immunization coverage met the Kenya Expanded Programme on Immunization (KEPI) recommendation of above 80%<sup>34</sup>. Coverage rates were within the SPHERE Standards 2004 acceptable levels for all the vaccinations. As shown in Table 29, immunization coverage was similar to that of 2010; this was for OPV1 was 93.9%, OPV3 was 86.6% and measles (children  $\geq$ 9 months) was 86.9%.

Majority of the cases were verified by card compared to those based on recall. These coverage rates were high, above the recommended EPI coverage cut-off points of 80.0% which is commendable (Table 28). These coverage rates are slightly higher than the 2010. These efforts should be maintained and improved upon. Odds ratio indicated that 10.2% of the children who had not received OPV1 vaccination were malnourished and were 7.158 times more likely to be malnourished; 21.3% of children who had not received OPV3 vaccination were malnourished and they were 13.546 times likely to be malnourished while 14.6% of children who had not received measles vaccination were malnourished and they were 0.013 times likely to be malnourished. This indicates the importance of ensuring all children are vaccinated in Marsabit.

<sup>33</sup> Diarrhoea Management

<sup>34</sup> Kenya Expanded Programme on Immunization (KEPI) Kenya

**Table 28: Immunization Coverage for OPV1, OPV3 and Measles 2010 and 2011**

| Vaccination                                   | 2011          | 2010         |
|---|---------------|--------------|
|   | %             | %            |
| OPV1  | 93.9%         | 93.2%        |
| OPV3  | 86.6%         | 86.4%        |
| Measles (Age>=9 months)                       | 86.9%         | 85.7%        |
| <b>OPV1</b>                                   | <b>N= 724</b> | <b>N=699</b> |
| Yes by card                                   | 83.7%         | 72.4%        |
| Yes by recall                                 | 10.2%         | 14.2%        |
| No  | 4.4%          | 6.4%         |
| Do not know                                   | 1.2%          | 0.4%         |
| <b>OPV3</b>                                   | <b>N=724</b>  | <b>N=699</b> |
| Yes by card                                   | 76.0%         | 72.4%        |
| Yes by recall                                 | 10.6%         | 14.0%        |
| No  | 11.7%         | 13.3%        |
| Do not know                                   | 1.7%          | 0.3%         |
| <b>Measles Children &gt;= 9 months of Age</b> | <b>N= 666</b> | <b>N=654</b> |
| Yes by card                                   | 74.0%         | 70.6%        |
| Yes by recall                                 | 12.9%         | 15.1%        |
| No  | 11.9%         | 13.9%        |
| Do not know                                   | 1.2%          | 0.3%         |

The trends of immunization are shown in figure 7. These rates were are slightly above those of 2010 survey<sup>35</sup>

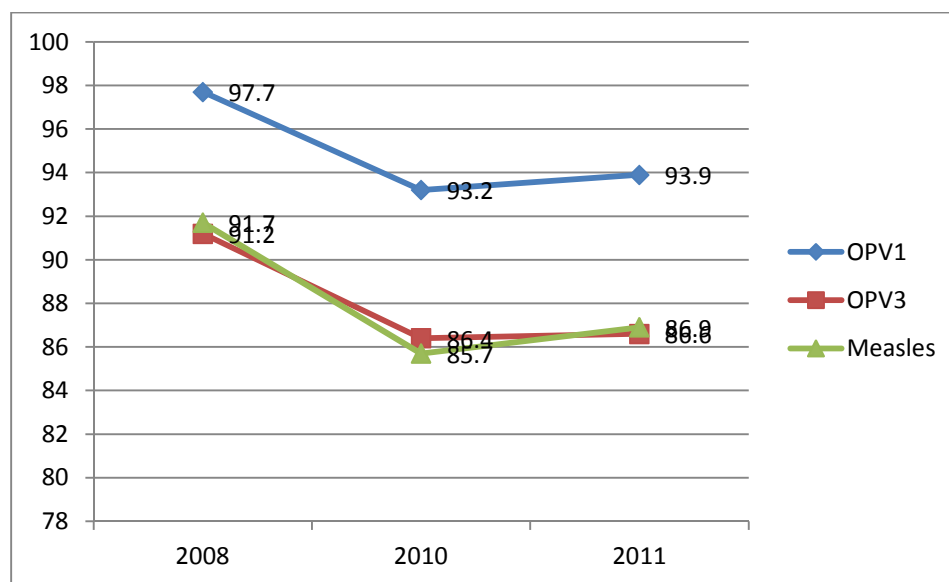


Figure 7: Trends of Vaccination Coverage 2008, 2010 and 2011

<sup>35</sup> Marsabit Nutrition Survey 2011

#### 4.7 Vitamin A Supplementation Coverage of U5s

A six (6) months period was used to determine vitamin A supplementation coverage for children aged 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<sup>36</sup>. In this survey, vitamin A supplementation was very low. For the age group 12-59 months the recommended supplementation is twice per year. The coverage was extremely low, 56.8% taken once and 14.2% taken twice for this age group and for children 6-11 months, coverage was 69.3% which is below the recommended coverage (Table 29). About one third of children aged 0-11 and 12-59 months had not taken any vitamin A supplementation. The slightly better coverage for the younger children could be due to the fact that these children attend the child health clinic and hence can easily access this service.

**Table 29: Vitamin A supplementation coverage for children 6-59 months**

| Vitamin A Supplementation | Children 0-11 months N=88 | Children 12-59 months N=636 |
|---------------------------|---------------------------|-----------------------------|
| Not taken                 | 30.7% (27)                | 29.1% (185)                 |
| Taken once                | 69.3% (61)                | 56.8% (361)                 |
| Taken twice               | ---                       | 14.2% (90)                  |

These coverage rates are way below the recommended 80% acceptable levels recommended by WHO<sup>37</sup> and Kenya Nutrition Guidelines by MoPHS, Kenya<sup>38</sup>. Among children aged 0-11 months' odds ratio showed that 33.3% of those who had not taken vitamin A supplementation were malnourished with a likelihood ratio of 0.029, while of those aged 12-59 months, 35.8% of those who had not taken vitamin A were malnourished. The likelihood ratio was 5.042, for this age group indicating that children who had not taken vitamin A supplementation were 5.042 times more likely to be malnourished than those who had taken the supplement.

#### 4.8 De-worming Coverage for children ≥24 months

Only 40.3% of the children aged ≥ 24 months were de-wormed in the previous 6 months as shown in Table 30.

**Table 30: De-worming coverage for children ≥24 months 2010 and 2011**

|               | 2011 N= 493 | 2010 N=475 |
|---------------|-------------|------------|
| Yes by Card   | 2.3%        | 2.1%       |
| Yes by Recall | 38.0%       | 41.1%      |
| No            | 57.8%       | 57.3%      |
| Do not know   | 1.9%        | 1.7%       |

This was 2.3% by card and 38.0% by recall. This is of much concern especially when hygiene and sanitation situation in the area is analysed. This calls for educating the community on the importance of de-worming and also ensuring that health facilities are enabled to supply de-worming drugs. The current de-worming rates are not significantly different from those of the 2010 nutrition survey<sup>39</sup>. Odds ratio showed that 60.9% of those who had not been de-wormed were malnourished and the likelihood ratio was 0.368.

<sup>36</sup> WHO

<sup>37</sup> WHO

<sup>38</sup> MoPHS and Kenya National Bureau of Statistics (2008). Guidelines for Nutrition Assessment in Kenya

<sup>39</sup> MoH//UNICEF/Food for the Hungry (2011). Nutrition Survey Report, Marsabit District, Kenya

#### 4.9 Coverage of Selective Feeding Programmes

Coverage of SFP and OTP were determined using percent of the median. The coverage used the following formula<sup>40</sup> to determine the coverage of the selective feeding programme.

$$\frac{\text{Number of respondents attending the feeding programme} \times 100}{\text{No. of cases NOT attending the feeding programme} + \text{No. of respondents attending the feeding programme}}$$

##### **Supplementary Feeding programme (SFP)**

The number of moderately malnourished MAM <80% and >=70% using % of the median were 111 while the number of children admitted in the programme were 109. The number of cases NOT admitted to the feeding programme were 103.

$$\frac{109 \times 100}{103 + 109}$$

$$= \frac{109 \times 100}{212}$$
$$= 51.4\%$$

##### **Outpatient Therapeutic Programme**

The number of severely malnourished SAM <70% using % of the median were 3 while the number of children admitted in the programme were 30. All the 3 cases were NOT admitted to the feeding programme

$$\frac{30 \times 100}{3 + 30}$$

$$= \frac{30 \times 100}{33}$$
$$= 90.9\%$$

The coverage of supplementary feeding programme was 51.4% while Outpatient Therapeutic programme was also low at 90.9%. The SFP and OTP coverage rates were a big improvement from the 2010 rates and they were also above the recommended coverage of the SPHERE Standards 2004 (>50%)<sup>41</sup>. Chi-square test of GAM and feeding programme gave a likelihood ratio of 7.458 with p<0.05, indicating that those children in a feeding programme are seven times more likely not to be malnourished.

#### 4.10 Food Aid

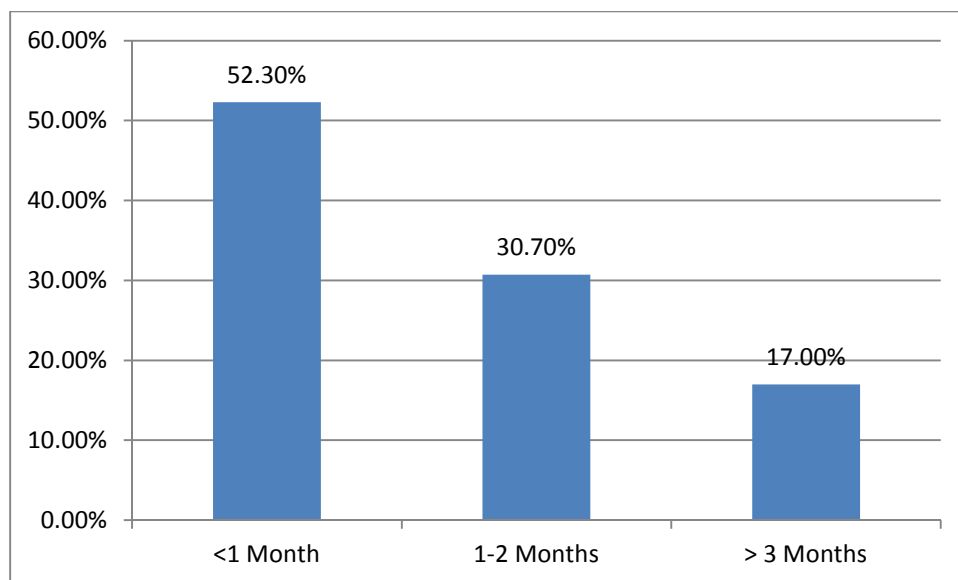
Food Aid had been received by 65.7% of the households. Of these, 28.2% had received from GoK through the Provincial Administration and 65.6% had received from WFP/Food for the Hungry and 6.2% had received from both GoK and WFP/Food for the Hungry. Of these, slightly over half of the households, 52.3%, had received food commodities in the last month, 30.7% in the last 1-2 months and 17% over three months as at May 2011 (Figure 8).

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<sup>40</sup> Myatt, M., Feleke, T., Sadler, K. and Collins, S. (2005). *A field trial of a survey method for estimating the coverage of selective feeding programmes*. Geneva: WHO

<sup>41</sup> SPHERE 2004 Standards





**Figure 8: Period households received food aid in the previous 3 months in Marsabit May 2011**

The households received food aid commodities as shown in Table 31. The variation of amounts that households received was large in some cases. Majority of the households that received food aid got beans, 74.4% followed by vegetable oil by 65.8 and maize 46.5%. The disparities in quantities that households received (as shown by the mean and range in Table 31) suggests that quantities of items given to households need to be revisited in the district to avoid some getting very large amounts and others not. Some of those who got large amounts, obtained food aid from both the provincial administration and WFP/FH. The mean number of days the commodities lasted ranged from  $5.7 \pm 4.6$  to  $14.5 \pm 13.3$  days.

**Table 31: Food Aid Received in Marsabit as at May 2011**

| Food Aid Commodity | Proportion of HHs N= 645 | Mean amount Received | Mean Consumed | Mean Days commodity last |
|--------------------|--------------------------|----------------------|---------------|--------------------------|
| Maize              | 46.5% (265)              | 13.0+14.5            | 12.9+ 1.3     | 14.5+ 13.3               |
| Beans              | 74.4% (398)              | 4.0+ 4.3             | 3.9+ 4.3      | 7.5+ 6.4                 |
| Peas               | 5.7% (31)                | 1.9+ 1.4             | 5.7+4.6       | 5.7+4.6                  |
| Vegetable oil      | 65.8% (428)              | 1.2+ 1.2             | 1.1+0.8       | 6.2+ 4.4                 |
| CSB                | 27.0% (174)              | 7.8+5.6              | 6.5+6.5       | 10.5+9.0                 |

#### 4.10.1 Utilization of Food Aid

Among the households that received Food Aid, none of them stated that they resold, bartered or saved the food commodities as seed. However, households indicated that they shared the commodities that they were given. Maize was the item shared most by 12.1% of the households followed by beans with 8.5%, vegetable oil 5.4%, peas by 5.0% and CSB by 3.3% of the households.

#### 4. 11 Availability and Utilization of Mosquito bed-nets

Of the sampled households, 40.1% owned mosquito bed-nets and of these, 51.1% obtained them from the Ministries of Medical Services/Public Health and Sanitation, 16.4% from agencies and 32.1% bought them (Table 32).

**Table 32: Ownership and Source of Mosquito bed-nets by households in 2011**

| Ownership/Source | n   | %    |
|------------------|-----|------|
| Ownership        | 262 | 40.1 |
| <b>Source</b>    |     |      |
| Shop             | 84  | 32.1 |
| Agency           | 43  | 16.4 |
| MoMS/MoPHS       | 134 | 51.1 |
| Others           | 1   | 0.2  |

Treatment of mosquito bednets by those who acquired them from the shops was by 32.1 % of those households and of these 18.8% had done so in less than one month and 43.8% in the last 1-6 months while 21.9% had treated mosquito bed nets more than six months back.

Most of those who used the mosquito bed-nets the night before the survey were children aged below 5 years (76.0%) followed by mothers, 60.3%, pregnant women 25.8% (Table 33). It is regretted that only a quarter of the pregnant women slept under mosquito bed nets. It is also noted that 11.1% of the households did not use mosquito bed nets although they owned them. During the focus group discussions, one respondent stated “*since it is hot, there are no mosquitoes, so there is no need to sleep under a mosquito net*” This calls for education and awareness of utilization and treatment of mosquito bed-nets.

**Table 33: Sleeping under the mosquito bed nets by household members the previous night**

| Category of persons        | N        | %    |
|----------------------------|----------|------|
| Children less than 5 years | 199      | 76.0 |
| Children over 5 years      | 3        | 1.1  |
| Pregnant woman             | 8 (n=31) | 25.8 |
| Mother                     | 158      | 60.3 |
| Father                     | 39       | 14.9 |
| Nobody used                | 29       | 11.1 |

#### 4. 12 Infant and Young Child Feeding Practices

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

##### 4. 12.1 Breastfeeding Practices

A large proportion, 99.4% of the children had been breastfed (ever breastfed) with 75.9% of the children having been put on the breast within 1 hour of birth (Table 34). Similarly, majority of the children, 89.1% had received colostrum. These breastfeeding practices are commendable because they impart immunity to the infant. Unfortunately, 25.2% of the children had been given pre-lacteal feeds. Plain water had been given to 18.3% of the children and powdered/fresh milk to 6.3%. During the FGDs, one of the participants stated “*I gave water because this place is very hot*”. The practice of giving pre-lacteals needs to be discouraged through appropriate education as it interferes with proper establishment of breastfeeding.

Exclusive breastfeeding rates for children below six months showed that just over a third 36.9% of this age group were exclusively breastfed as per the WHO policy guidelines<sup>42</sup>. This rate is higher than the Kenya national exclusive breastfeeding rate of 32.0%<sup>43</sup>.

<sup>42</sup> Kenya Guidelines on Infant and Young Child Feeding Practices

<sup>43</sup> Kenya Demographic Health Survey 2008-2009

**Table 34: Infant and Young Child Feeding Practices May 2011**

| <b>Child Practice</b>  | <b>N=349</b>      |
|--|-------------------|
| Early breastfeeding practices  |                   |
| • Ever breastfeed  | 99.4% (347)       |
| • Put to breast within one hour  | 75.9% (265)       |
| Given colostrum  | 89.1% (311)       |
| Pre-lacteals given:  | 25.2%             |
| • Plain water  | 18.3% (64)        |
| • Sweetened water  | 0.3% (1)          |
| • Infant formula   | 0.3% (1)          |
| • Powdered/fresh milk  | 6.3% (22)         |
| • Others   | 0.3% (1)          |
| Exclusive breastfeeding for children <6 months                                       | 36.9% (45) n=149  |
| Currently breastfeeding  | 95.1% (333)       |
| Maintenance of breastfeeding:  |                   |
| • Age 6-11 months  | 95.0% (76) n=80   |
| • Age 12-17 months   | 96.8% (60) n=62   |
| • Age 18-23 months   | 93.1% (54) n=58   |
| Age 6-23 months  | 95.0% (190) n=200 |
| Complementary Feeding rate for children 6-9 months of age N=66                       | 75.4% (40)        |
| Minimum dietary diversity (children (>= 6 months receiving >=four food groups) N=192 | 34.9% (67)        |
| Frequency of feeding:  |                   |
| • Children 6 – 8 months mean number of times /day (N=51)                             | 1.29± 1.12        |
| • Children 9 – 23 months old mean number of times /day (N=141)                       | 2.06±1.09         |
| • Children 6 – 8 months receiving 2 or more meals including snacks /day (N=51)       | 19 (37.35)        |
| • Children 9 – 23 months receiving 3 or more meals including snacks /day (N=141)     | 39 (27.6%)        |
| Mean Dietary Diversity Score   |                   |
| • Children 6-8 months (N=51)   | 1.39± 1.46        |
| • Children 9-23 months (N=141)   | 3.18± 2.06        |

Majority of the children, 95.1% were still breastfeeding which is commendable as per WHO and Kenya recommendations of continued breastfeeding up to 2 years or more. Maintenance of breastfeeding at different ages was also investigated. Results show that most of the children at all age groups were breastfeeding. Those still breastfeeding were 95.0% of the children aged 6 – 23 months. About 95.0% of those aged 6-11 months, 96.8% of children aged 12-17 months, and 93.1% of children aged 18-23 months were still breastfeeding. Promotion of breastfeeding up to two years should continue to be done so that under five children do not miss out on the health benefits of breastfeeding as per WHO and Kenya recommendations on infant feeding.

#### **4.12.2 Complementary Feeding Practices**

The complementary feeding practices were calculated for 192 children 6-23 months of age.

##### **4.12.2.1 Dietary Diversity of Complementary Foods**

The minimum dietary diversity for children 6-23 months is considered to be  $\geq 4$  food groups out of the nine food groups<sup>44</sup>. The understanding is that the more diverse the diets the more likely is one receiving adequate levels of a range of nutrients. The minimum dietary diversity for children aged 6 to 23 months revealed that 34.9% of the children consumed four (4) or more food groups (Table 34). This gives an indication of inadequate diversity of foods among the children. This implies that there is limited dietary diversity among children in the area. This is likely due to the limited variety of foods in Marsabit District.

##### **4.12.2.2 Mean Minimum Dietary Diversity Score and Frequency of Feeding**

Mean dietary diversity score is obtained for children aged 6-8 months and 9 - 23 months (Table 34). Mean minimum dietary diversity score for children 6-8 months was  $1.39 \pm 1.46$  and for age group 9-23 months was  $3.18 \pm 2.06$ . . The minimum dietary diversity (consumption of foods from  $\geq 4$  groups) was by only one third (34.9%) of the children. This shows that complementary feeding in Marsabit for children is limited in the variety of foods given. The mean frequency of feeding children was low being  $1.29 \pm 1.13$  for children aged 6-8 months and  $2.06 \pm 2.06$  for children aged 9 – 23 months. Children 6-8 months who were fed at least 2 times or more were 37.3%, and those 9-23 months old who were fed 3 times or more per day were 27.6%. This was low noting that WHO recommends that children 6-8 months be fed at least 2 times, and those 9-23 months old be fed 3 times per day inclusive of snacks.

##### **4.12.2.3. Complementary Feeding Rate**

Complementary feeding rate was calculated for children aged 6-9 months. Complementary feeding is based on the number of children this age receiving semi solid and solid foods the day preceding the survey. It is calculated as the number of children receiving the foods and denominator is the number of all children of this age group. The complementary feeding rate for children 6-9 months was 75.4% which is low in relation to the last year's rate of 80.0% and also low in line with WHO and Kenyan recommendations.

#### **4.12 Household Food Security**

Indicators used to investigate household food security were frequency of meals consumed, dietary diversity, main sources of food, food aid and coping strategies during times of food shortage.

##### **4.13.1 Food Consumption**

###### **Frequency of meals, persons who missed meals and reasons for missing meals**

To assess the current household food security situation compared to other times was by asking households to indicate the number of meals they normally ate and the meals they consumed the day preceding the survey (Table 35).

Slightly fewer households, 31.4%, were currently consuming three meals compared to 33.3% who normally consumed three meals. Although the difference was not significant, this may suggest that the food situation in Marsabit is getting worse. This is because households where some family members missed meals the previous day was 8.5%. The persons who missed meals were fathers' 50.9%, followed by mothers 28.8%. The main reason for missing meals was being away from home 50.9% followed by inadequate food 39.6%.

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**Table 35: Number of Meals eaten and persons who missed meals and reasons for Missing meals**

|   |                             |                              |
|---|-----------------------------|------------------------------|
| • Mean meals household normally eats                |                             | 2.18 $\pm$ 0.75              |
| • Mean meals household ate day before the interview |                             | 2.12 $\pm$ 0.73              |
| <b>Number of Meals</b>                              | <b>Meals normally eaten</b> | <b>Meals eaten yesterday</b> |
| >=3 meals   | 33.3% (213)                 | 31.4% (200)                  |
| 2 meals   | 49.2% (314)                 | 48.2% (311)                  |
| 1 meal  | 17.4% (111)                 | 19.4% (125)                  |
| <b>Households where meals were missed</b>           | <b>n</b>                    | <b>%</b>                     |
|   | 54                          | 8.5                          |
| <b>Persons who missed meals</b>                     | <b>N =73</b>                | <b>%</b>                     |
|   | < 5 years                   | 4                            |
| 5-12 years  | 10                          | 13.7                         |
| 13-19 years   | 10                          | 13.7                         |
| Mother  | 21                          | 28.8                         |
| Father  | 25                          | 34.2                         |
| >19 years   | 3                           | 4.1                          |
| <b>Reasons for missing meals</b>                    |                             |                              |
| Food not enough                                     | 21                          | 39.6                         |
| Sickness  | 2                           | 3.8                          |
| Away from home                                      | 24                          | 50.9                         |
| Other   | 5                           | 5.7                          |

#### 4.13.2 Household Dietary Diversity Score

In this survey, the 7-days food frequency and 24 hour dietary diversity scores were calculated. This was to determine the households' capacity to consume a variety of foods in addition to the nutrient adequacy of these foods. The household dietary diversity score among the 15 food groups based on the seven days prior to the survey was 6.60 $\pm$  2.48 which was lower than the HDDS in the 2010 survey of 7.5 $\pm$  2.2. On the other hand, the household dietary diversity score based on the 24 hour recall was 5.4 $\pm$  2.1 compared to 6.1 $\pm$  2.0 found in the 2010 survey (Table 36). These results indicate a lower diversity of foods consumed in households in the area.

**Table 36: Dietary diversity score based on the 7-day and 24-hour recall**

|  | Mean and std  |
|--|---------------|
| <b>7-day dietary diversity score</b>   | 6.6 $\pm$ 2.5 |
| <b>24-hour dietary diversity score</b> | 5.4 $\pm$ 2.1 |

#### 4. 13.3 Variety of Foods consumed

The variety of foods consumed in the 7 days prior to the survey and the 24 hours prior the survey is shown in Table 37. Foods that were most frequently consumed on a weekly basis were cereals and cereal products (97.4%), milk and milk products (88.2%), oils/fats (88.5%), sugar sweetened beverages (93.2%) and pulses 82.0%. The day before the survey the foods consumed were slightly below those consumed weekly. These were cereals and cereal products (93.3%), milk and milk products (83.4%), oils/fats (86.7%), sugar sweetened beverages (88.4%) and pulses 83.4. In general, fruits and vegetables are rarely consumed indicating overall inadequate micronutrients in the diets. Consumption of milk was lower in this survey than in 2010 probably due to the severe drought which has caused most livestock to be moved to areas where they can get pasture.

**Table 37: Foods Consumed in the past 7 days and in the last 24 hours prior to the interview**

|  | Last 7 days |      | Mean no. of days/wk |      | 24Hrs |      |
|--|-------------|------|---------------------|------|-------|------|
|  | N           | %    | mean                | sd   | N     | %    |
| Cereals and cereal products                | 628         | 97.4 | 5.05                | 2.35 | 602   | 93.3 |
| Vitamin A rich vegetables & tubers         | 82          | 12.7 | 0.35                | 1.23 | 78    | 12.1 |
| White tubers and roots                     | 111         | 17.2 | 0.61                | 1.70 | 100   | 15.5 |
| Dark green leafy vegetables                | 120         | 18.6 | 0.64                | 1.64 | 92    | 14.3 |
| Other vegetables                           | 167         | 25.9 | 0.96                | 2.08 | 136   | 21.1 |
| Vitamin A rich fruits                      | 25          | 3.9  | 0.15                | 0.91 | 22    | 3.4  |
| Organ meat (Iron rich)                     | 155         | 24.0 | 0.52                | 1.27 | 126   | 19.5 |
| Flesh meat and offal's:                    | 309         | 47.9 | 0.96                | 1.40 | 180   | 27.9 |
| Eggs                                       | 63          | 9.8  | 0.30                | 1.17 | 42    | 6.5  |
| Fish                                       | 84          | 13.0 | 0.58                | 1.67 | 74    | 11.5 |
| Pulses legumes or nuts                     | 529         | 82.0 | 3.11                | 2.40 | 448   | 69.5 |
| Milk and milk products                     | 571         | 88.2 | 4.52                | 2.81 | 538   | 83.4 |
| Oils/ fats                                 | 591         | 88.5 | 5.00                | 2.69 | 559   | 86.7 |
| Sweets: Sugar, honey, sweetened juice etc. | 601         | 93.2 | 5.07                | 2.66 | 570   | 88.4 |
| Condiments, spices & beverages             | 252         | 39.1 | 1.56                | 2.53 | 223   | 34.6 |

**4. 13. 4 Main Sources of Household Food**

The main source of food for the households was purchase by 98.8% of the households in comparison to 73.3% in the 2010 survey<sup>45</sup>. The other sources of such as food aid and own production were minimal while none of the households' main source of food was gifts or borrowing and trading or barter unlike in 2010 where some households depended on these sources (Table 38). These findings imply the need for income generating activities for the households especially for women if they have to access adequate food for the families. In addition programmes that focus on having money in the hands of the households' is necessary.

**Table 38: Main Source of Household Food**

| Main Source    | n   | %    |
|----------------|-----|------|
| Purchases      | 637 | 98.8 |
| Own Production | 6   | 0.9  |
| Food Aid       | 2   | 0.3  |

**4. 13. 5 Coping strategies**

Strategies that households used in times of food scarcity are depicted in Table 39. Results show that a large proportion, 75.3% reduced the size of meals, while 64.7% reduced the number of meals while 45.9% skipped food consumption for a day. Purchasing of food on credit was by 39.8% of the households unlike in 2010 when more households, 75.5% purchased food on credit. This may indicate low economic situation among households. This suggests reduced ability of people to acquire food noting that most households purchased food for consumption.

<sup>45</sup> 2010 Marsabit Nutrition Survey

**Table 39: Coping Strategies in Marsabit May 2011**

|   | Never % | Once per week % | Twice per week % | 3-6 times per week % | All the time/ Every day % | Once per month % | Once per month % |
|---|---------|-----------------|------------------|----------------------|---------------------------|------------------|------------------|
| Reduction of no. of meals                                 | 35.3    | 14.0            | 9.0              | 3.1                  | 37.9                      | 0.5              | 0.2              |
| Skip food consumption for a day                           | 54.1    | 11.5            | 9.5              | 17.8                 | 0.9                       | 0.9              | 0.7              |
| Reduction in size of meals                                | 24.7    | 20.8            | 13.4             | 5.2                  | 35.7                      | 0.2              | -----            |
| Restrict consumption of adults to allow more for children | 52.6    | 10.5            | 10.6             | 6.8                  | 18.0                      | 1.1              | 0.4              |
| Feed working members at expense of non-working            | 82.0    | 0.5             | 0.7              | 0.5                  | 16.2                      | -----            | -----            |
| Swapped consumption to less preferred or cheaper foods    | 73.2    | 7.6             | 0.7              | 0.9                  | 16.9                      | 0.7              | -----            |
| Borrow food from a friend or relative                     | 63.5    | 18.2            | 8.3              | 3.6                  | 2.3                       | 3.6              | 0.4              |
| Purchase food on credit                                   | 60.2    | 8.5             | 12.6             | 6.8                  | 6.8                       | 4.1              | 0.9              |
| Consume wild foods  | 99.3    | ---             | 0.2              | 0.4                  | ---                       | 0.2              | ---              |
| Consume immature crop                                     | 99.1    | 0.2             | 0.2              | 0.2                  | 0.4                       | ---              | ---              |
| Consume decomposed fish                                   | 99.8    | 0.2             | ---              | ---                  | ---                       | ---              | ---              |
| Consume toxic/taboo foods                                 | 99.8    | 0.2             | ---              | ---                  | ---                       | ---              | ---              |
| Consume seed stock as food                                | 98.2    | 0.4             | ---              | 0.2                  | 1.1                       | 0.2              | ---              |
| Send HH members to eat elsewhere                          | 99.1    | -----           | 0.2              | 0.5                  | 0.2                       | -----            | -----            |
| Withdraw/ send child(ren) from school                     | 99.5    | 0.4             | -----            | 0.2                  | ---                       | ---              | -----            |
| Begging or engaging in degrading jobs                     | 99.4    | ---             | ---              | 0.4                  | 0.2                       | ---              | -----            |
| Individual migration out of the area                      | 99.6    | ---             | ---              | ---                  | 0.2                       | 0.2              | ---              |
| Household migration out of the area                       | 99.6    | ---             | ---              | ---                  | ---                       | 0.2              | 0.2              |
| Sale of farm implements                                   | 99.8    | ---             | ---              | ---                  | ---                       | 0.2              | ---              |
| Sale of milking livestock                                 | 96.2    | -----           | 0.9              | 0.9                  | 0.2                       | 1.3              | 0.5              |
| Sale of household goods                                   | 100     | -----           | -----            | -----                | ---                       | ---              | -----            |
| Disintegration of families                                | 99.8    | -----           | -----            | -----                | ---                       | 0.2              | -----            |
| Abandonment of children or elderly                        | 100     | -----           | -----            | -----                | ---                       | -----            | -----            |
| Sell of charcoal and/or fire wood                         | 97.3    | 0.4             | 1.3              | 0.9                  | 0.2                       | ---              | -----            |
| Part of family migrating with animals to look for grazing | 84.2    | ---             | 0.5              | 0.7                  | 11.9                      | 2.5              | 0.2              |

#### 4.14 Water, Sanitation and Hygiene

Water sources and treatment, disposal of stool and hygiene at the household level are important to health and were investigated in this survey.

##### 4.14.1 Main Source of Household and Drinking Water

There was no major difference between source of household water and source of drinking water. According to WHO/UNICEF (2010)<sup>46</sup>, improved drinking water sources include; piped water, tap water, borehole, protected well/spring and rain water collection. The sources of water and treatment of drinking water are presented in Table 40.

<sup>46</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water: 2010 update. Geneva:WHO

**Table 40: Main Source of Household and Drinking Water and Treatment of Drinking Water**

| <b>Main Source of household water</b>   | <b>N = 685</b> | <b>%</b>    |
|---|----------------|-------------|
| River                                   | 5              | 0.7         |
| Dam                                     | 65             | 9.5         |
| Water tap                               | 44             | 6.4         |
| Borehole                                | 203            | 29.6        |
| Unprotected well                        | 117            | 25.8        |
| Protected well                          | 85             | 12.4        |
| Public pan                              | 28             | 4.1         |
| Water tanks                             | 33             | 4.8         |
| Laga                                    | 41             | 6.0         |
| <b>Main Source of drinking water</b>    | <b>N = 685</b> | <b>%</b>    |
| <b>Improved drinking water source</b>   |                |             |
| Water tap                               | 47             | 6.9         |
| Protected well                          | 88             | 12.8        |
| Borehole                                | 198            | 28.9        |
| Water tanks                             | 32             | 4.7         |
| <b>Sub-total</b>                        | <b>365</b>     | <b>53.3</b> |
| <b>Unimproved drinking water source</b> |                |             |
| Unprotected well                        | 179            | 26.1        |
| Public pan                              | 23             | 3.4         |
| Laga                                    | 40             | 5.8         |
| River                                   | 3              | 0.4         |
| Lake                                    | 1              | 0.1         |
| Dam                                     | 65             | 9.5         |
| Others                                  | 9              | 1.1         |
| <b>Sub-total</b>                        | <b>320</b>     | <b>46.7</b> |
| <b>Treatment of drinking water</b>      | <b>N = 685</b> | <b>%</b>    |
| Boiling                                 | 40             | 5.8         |
| Traditional herbs                       | 6              | 0.9         |
| Use chemicals                           | 80             | 11.7        |
| Filter/sieves                           | 1              | 0.1         |
| Decant                                  | 4              | 0.6         |
| Nothing                                 | 557            | 81.3        |

WHO/UNICEF (2010) states that, unimproved water sources are: unprotected well/spring, surface water, piped water in shared premises and other unprotected sources<sup>47</sup>. The findings of this survey indicate that less than a half; 46.7% of the households used improved drinking water sources and 53.3% of the households used unimproved drinking water sources as depicted in Table 40. These rates are similar to the 2010 rates of 2010 where 46.5% of the households used safe water and 53.4% used unimproved drinking water sources<sup>48</sup>.

#### 4.14.1.2 Time taken to collect water

A large proportion of the households, 61.8%, took over 30 minutes to collect water while only 38.2% used 30 minutes or less. These findings are far higher than WHO report that notes that in East Africa, more than a quarter of the population spends more than 30 minutes round trip to collect water<sup>49</sup>. Research has shown

<sup>47</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water: 2010 update. Geneva:WHO

<sup>48</sup> MoH/Ministry of Arid Land/UNICEF (2008). Integrated Nutrition Survey Report, Marsabit District, Kenya

<sup>49</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water:2010 update. Geneva: WHO.



that households' who spend more than 30 minutes per round trip to collect water, collect less water and fail to meet the minimum daily drinking water needs<sup>50</sup>. Additionally, economic costs of having to make multiple trips per day to collect drinking water are enormous<sup>51</sup>. When it takes long distance and/or time to collect water, there is a high risk of poor hygiene and water consumption needs being compromised.

#### **4.14.1.3 Treatment of water**

Majority of households, 81.3% did not treat their drinking water. There is need to sensitize the households in Marsabit on appropriate water treatment for drinking water to avoid/minimise water borne diseases in the district.

#### **4.14.1.4 Cost of water**

The cost of water was also varied. Most households 64.7% did not pay for water. However, for those that purchased water the cost varied from 1 to 50 Kenya shillings per 20 litre jericin. The highest cost of water was around township areas with Marsabit town having the highest cost.

#### **4.14.2 Sanitation**

Sanitation and hygiene, given their direct impact on infectious disease, especially diarrhoea, are important for preventing of malnutrition<sup>52</sup>. According to WHO/UNICEF (2010)<sup>53</sup>, improved sanitation include use of flush toilet, ventilated pit latrine, pit latrine with slab and composting toilet whereas unimproved pit latrine are shared toilet facilities, no facilities, pit latrine without a slab and bucket. Access to toilet/latrine facility was by 48.3% of the households (Table 41). Of the 51.7% who did not access a toilet facility, they used the bush, open land, laga or near a river as shown in Table 42. These results are not significantly different from the 2010 findings where 44.6% of the households had access to toilet facilities<sup>54</sup>.

Of the caregivers, less than half, 42.6% disposed of the child's stool immediately and hygienically while 38.7% disposed the child's stool in the bush and 18.7% did not dispose the child's stool. The unhygienic practices of stool disposal predispose children to diseases such as diarrhoea.

#### **4.14.3 Hygiene**

Clean hands protect against infection<sup>55</sup>. The practice of washing of hands before eating was done by 54.5% and before feeding the child by 27.5% of the caregivers (table 41). Caregivers also washed hands after defecation by 53.2% and before handling food by 68.8% of the caregivers. A moderate proportion of the caregivers, 30.1% did not practice hygienic practices of cleaning of hands hence predisposing them to being agents of transmitting infections. The above results indicate the need for promotion of appropriate sanitation and hygiene practices using health education in Marsabit district.

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<sup>50</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water:2010 update Geneva: WHO.

<sup>51</sup> Howard, G. and Bartam ,J. (2003). Domestic water quantity, service level and health. Geneva: WHO.

<sup>52</sup> WHO (2001). Water related diseases (Geneva: WHO

<sup>53</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water:2010 update. Geneva: WHO

<sup>54</sup> MoPHS/ /UNICEF/Food for the Hungry(2010). Nutrition Report, Marsabit District, Kenya

<sup>55</sup> WHO/UNICEF (2010). Progress on sanitation and drinking water:2010 update. Geneva: WHO

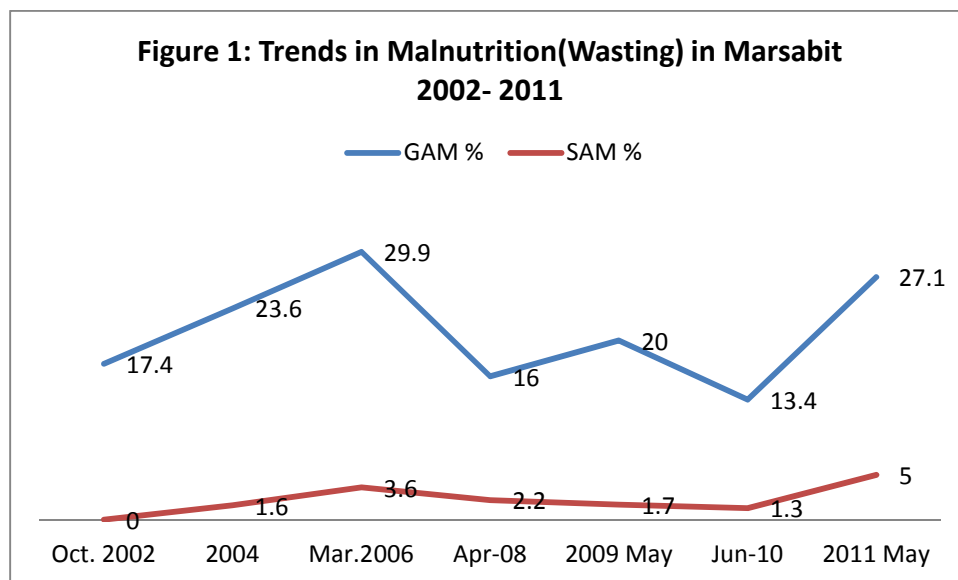
**Table 41: Hygiene and Sanitation Practices of Households**

|  |                |              |
|--|----------------|--------------|
| <b>Households with access to toilet facilities</b> | <b>N= 331</b>  | <b>48.3%</b> |
| <b>Toilet facility/where defecate</b>              |                |              |
| Ventilated pit latrine                             | 53             | 16.1%        |
| Traditional pit latrine                            | 163            | 49.5%        |
| Bucket   | 111            | 33.7%        |
| <b>No Toilet Facility</b>                          | <b>N= 354</b>  | <b>51.7%</b> |
| Bush   | 311            | 88.6%        |
| Open land  | 20             | 10.7%        |
| Laga   | 21             | 10.9%        |
| Near the river                                     | 1              | 0.2%         |
| <b>Disposal of child's stool</b>                   | <b>N</b>       | <b>666</b>   |
| Immediately and hygienically                       | 284            | 42.6%        |
| In nearby bushes                                   | 258            | 38.7%        |
| Not disposed                                       | 124            | 18.7%        |
| <b>Washing hands by caregivers</b>                 | <b>N = 688</b> | <b>%</b>     |
| After defecation                                   | 366            | 53.2         |
| Before handling food                               | 473            | 68.8         |
| After eating                                       | 375            | 54.5         |
| Before feeding child                               | 189            | 27.5         |
| After cleaning child's bottom                      | 67             | 9.7          |
| None of above                                      | 9              | 1.3          |

## 5. DISCUSSIONS

### 5.1 Nutrition Situation in Marsabit 2011

The nutrition situation in larger Marsabit has deteriorated significantly from 2010 (Figure 1). The results indicate critical levels of acute malnutrition in Marsabit far above the WHO emergency thresholds of 15%. Similarly the levels of chronic malnutrition and underweight are also quite high. Both the crude and under five mortality rates are below the emergency and alert levels. However, with the high levels of both severe and moderate acute malnutrition, these levels could increase if immediate action is not taken to address the situation.



The relatively high rate of GAM may be attributed, the prolonged drought, poor infrastructure and insecurity in some the areas.

Chronic food insecurity has been reported to be the major cause of malnutrition making Marsabit to be targeted with other ASAL districts in Kenya. The improvement in the nutrition situation in 2010 may be attributed first, to the rains received in before the nutrition survey in June 2010. The significant deterioration in this survey 2011 is due to the drought that has led to poor environmental poor household food security. There were low milk and livestock products due to the drought this year that has worsened the food security situation of the households.

The community acknowledged the fact that the nutrition situation of the children and women had deteriorated in the recent months before the survey according to findings of the FGDs. The reasons for this were reported to be delay in receiving GFD, SFP and OTP due to the transporters failing to deliver food aid in February to April due to high fuel prices. Most households purchased food; however there was lower purchasing power for most households. There was also low variety of foods for the family. The food security situation could be better if; poor infrastructure and prolonged drought; long distances to markets in addition to the high food prices were addressed.

### 5.2 Immunization Coverage

Immunization coverage for OPV1, OPV3 and measles were similar to those of 2010 and were above the 80% recommended level based on the Kenya Nutrition Guidelines. Coverage rates were within the SPHERE Standards 2004 acceptable levels for all the vaccinations. The high coverage implies commendable strategies

by MoPHS & MMS and collaborating agencies in the district in the provision of immunization considering the conditions in this arid/semi- arid district. However, there are pockets in the district where there was very low immunization coverage. These areas need to be identified and mobile services provided to ensure that children under five years are fully immunized.

### **5.3 Vitamin A Supplementation and De-worming Coverage**

Vitamin A supplementation coverage for underfives is very low especially for children over one year. This is likely because these children no longer go to health facilities for immunization. De-worming coverage for children  $\geq 24$  months was very low. This is of major concern considering the poor water, hygiene and sanitation situation in Marsabit that predisposes children to helminthes infestation that negatively imparts on nutrition. This survey was done during the dry spell and as such the impact of poor hygiene and sanitation on nutrition would have been worse if there were rains. There is need to promote mobile clinics in the community to be able to reach out to the population far from health facilities with these services.

### **5.4 Child Morbidity and Health seeking Behaviour**

Morbidity two weeks prior to the survey was affected by 30.2% of the children. Of concern was that over one third (40.9%) of the caregivers did not seek any health services for their sick children. The importance of seeking medical attention from health professionals should be re-emphasized in the health education messages in the district. Noting that for many people in Marsabit, health services are not easily accessible because of the poor infrastructure and the few health facilities. Some communities were far removed from health facilities and consequently, there is need for NGOs working in Marsabit to provide mobile services.

### **5.5 Iron Supplementation for pregnant women**

Iron supplementation for pregnant mothers is very low in the district. This is partly due to lack of the iron/folate supplements as voiced during the discussions. The MoPHS and MMS should ensure supplies of the supplements and efforts made to ensure pregnant mothers access this service. The low iron supplementation contributes significantly to poor nutrition situation as nutritional anaemia is common among women of reproductive age.

### **5.6 Infant and Young Child Feeding Practices (IYCF)**

#### **5.6.1 Breastfeeding Practices**

Breastfeeding practices established in this survey are commendable in terms of initiation of breastfeeding which was universal as breastfeeding is the cultural norm; the giving of colostrum and duration of breastfeeding. However, the exception was giving of pre-lacteals to children. Exclusive breastfeeding of 36.9% was higher than the national level of 32.0% although it is still below the WHO recommendation. There is need to continue to promote exclusive breastfeeding for the first six months and discourage the giving of pre-lacteals through appropriate education messages to mothers through CHWs, mothers clinics and women support groups. Information on appropriate breastfeeding may also be relayed in the schools since girls marry at an early age.

#### **5.6.2 Complementary Feeding Practices**

There is limited dietary diversity with majority of the children consuming less than 4 food groups. This is mainly due to the limited variety of foods in the district as revealed during the focus group discussions. Complementary feeding rate for children 6-9 months was 75.4%. It is important that complementary feeding be introduced at 6 months because breast milk is insufficient to provide the required nutrients for the child's optimal growth and development. The minimum dietary diversity (consumption of foods from  $\geq 4$  groups) was by only one third (34.9%) of the children. In this survey, children 6-8 months who were fed at least 2 times or more were 37.3%,

and those 9-23 months old who were fed 3 times or more per day were 27.6%. This was low noting that WHO recommends that children 6-8 months be fed at least 2 times, and those 9-23 months old 3 times per day inclusive of snacks. The mean frequency of feeding was 1.3 times for children aged 6-8 months and 2.1 times for children aged 9-23 months. Education to enhance complementary feeding practices in terms of variety, frequency of feeding and food preparation need to be promoted through educating CHWs and appropriate follow-ups mechanisms.

### **5.7 Coverage of Selective Feeding Programmes**

The coverage of supplementary feeding programme was 51.4% while Outpatient Therapeutic programme was also low at 90.9%. The SFP and OTP coverage rates were a big improvement from the 2010 rates and they were also above the recommended coverage of the SPHERE Standards 2004 (>50%).

### **5.8 Availability and Utilization of Mosquito bed nets**

These findings suggest some households do not access mosquito bednets, a larger proportion do not treat the mosquito bednets while still households with mosquito bednets do not always use them. The most vulnerable, under fives and women were the groups that used mosquito bednets. There is need to promote access, treatment and use of mosquito bed nets by the vulnerable groups noting that malaria is still a health priority concern in the area.

### **5.9 Water, Sanitation and Hygiene Practices**

#### **5.9.1 Water**

Large proportion of households spent over the WHO recommended time of 30 minutes to fetch water. This contributes to caregivers having less time for child care and other economic activities thereby impacting negatively to nutrition. About half of the households, 46.7% used improved drinking water sources while majority of the households, 81.3% did not treat their drinking water. Many of the households, 64.7% did not purchase water, however for the remaining that paid for water, the cost was very high in and around the towns and this may limit access to adequate amounts by the households. These findings indicate the need to sensitize households on appropriate water treatment and the need for agencies working in the district to continue efforts to make water accessible to the population.

#### **5.9.2 Sanitation and Hygiene**

Less than half of the households, 48.3% accessed toilet facilities with the rest using the bush/open land for defecation and disposal of children's stool. The unhygienic practice of stool disposal predisposes vulnerable groups to infections and diseases. The practice of hand washing using soap was low. This could be constrained partly, by the scarcity of water. Clean hands protect against infection. The findings show the need to continue efforts to make latrines accessible to households and to promote hygiene through health education in the district.

### **5.10 Maternal Nutrition**

These findings show that pregnant women with GAM of 58.1%, are at high risk of malnutrition that is likely to lead to their children being born with low birth weight and at risk of poor nutrition and general health. The rate of wasting was lower among non-pregnant women (14.5%). This therefore calls for increased strategies to target pregnant and lactating mothers. There is therefore need for BSFP to be provided to this group as a matter of urgency.

## **5.12 Household Food Security**

The mean number of meals the family ate the day before the interview and the mean number of meals the family normally ate is low. Reasons why some family members did not eat the day prior to the interview included lack of food and being away from home. There is food insecurity situation for the population in Marsabit as they normally consume less than the recommended three meals per day. The dietary diversity based on the 24 hour recall and the 7 days is also low.

The main source of food was purchasing for the households in Marsabit. This indicates the need for increased incomes for households through appropriate development income generation activities in the community in addition; programmes that enable households to get money to purchase food may be more sustainable in the long run.

### **5.12.1 Food Aid**

Food aid was received by 65.7% of the households. This contributes significantly to the food security situation in the district. There were wide disparities on the quantities of commodities given to various households while some households obtained food aid from more than one source. There were also delays in getting food to the households. The transportation of food aid was hampered by high fuel prices but the situation had been normalised at the time of the survey.

## **6.0 Conclusion**

### **Nutrition status**

The malnutrition rates in this survey indicate rates considered “critical emergency” of GAM of 27.1 % (21.6 - 33.3 95% C.I.) and SAM of 5.0 % (3.5 - 7.2 95% C.I.). These rates show a marked increase from the 2010 survey of GAM of 13.4% (10.3-17.2 CI) and SAM of 1.3% (0.7-2.5 CI). Acute malnutrition WHZ was higher among boys, 29.4% than girls 24.5%. Malnutrition rates were high among all the age groups being considered “critical” emergency situation. Malnutrition rate among children was also high using MUAC with 41.4% of children being at risk with MUAC <13.5cm. The nutrition situation of women in reproductive age was worse among pregnant and lactating women with GAM: MUAC <23.0cm for 58.1 % of pregnant women and 45.9% for lactating women, while for non pregnant women GAM: MUAC <21.0cm was for only 14.5% of these women. Severe wasting, MAUC <20.7cm, was high, for 25.8% for pregnant women and 11.7% for lactating women.

### **Factors that contribute to children and maternal malnutrition**

Factors that contribute to the poor nutrition situation include low ownership, utilization and treatment of mosquito bednets; long distances to collect and high cost of water plus lack of treatment of water and poor hygiene and sanitation.

Only 40.1% of the households owned mosquito bednets with half, 51.1% obtaining them from MoPHS and 32.1% purchasing them. Of those who purchased them, only 32.1 % had treated them. Most under fives 76.0% and mothers 60.3% slept under mosquito bednets while 11.1% of the households did not use mosquito bednets although they owned them.

About 53.3% of the households obtained water from improved water sources and a larger proportion, 61.8% took over 30 minutes to collect water contrary to WHO recommendations. This indicates that caregivers end up collecting less water and this compromises childcare practices and economic activities of caregivers that contributes to poor nutrition. Among those who purchased water, the cost ranged from 1 to 50 Ksh per 20 liter jerican with the townships charging highest amounts. The high cost means most of

these households will purchase less water for household you thereby compromising water consumption needs. Additionally, a large proportion of households, 81.3% did not treat drinking water which predisposes family members to water borne diseases.

Less than half of the households, 48.3% accessed toilet facilities while a large proportion, 51.7%, used the bush or open land. Similarly, only 42.6% of the caregivers disposed the child's stool immediately and hygienically. This practice predisposes children to diseases such as diarrhoea that contribute to malnutrition.

The practice of washing hands before eating was done by 54.5% and before feeding the child by 27.5% of the caregivers. Caregivers also washed hands after defecation by 53.2% and before handling food by 68.8% of the caregivers. A moderate proportion of the caregivers, 30.1% did not practice hygienic practices of cleaning of hands hence predisposing them to being agents of transmitting infections which then contributes to malnutrition.

### **Crude and under five mortality rate**

The crude and under five mortality rates were low in this survey. The crude mortality rate (CMR) was 0.19 (0.09-0.41 CI) per 10,000 people/day while the under five mortality rate (U5MR) was 0.13 (0.02-0.96 CI) per 10,000 children under five/day.

### **Coverage of Food aid, SFP and OTP**

Food Aid had been received by 65.7% of the households. Of these, 28.2% had received from GoK through the Provincial Administration and 65.6% had received from WFP/Food for the Hungry and 6.2% had received from both GoK and WFP/Food for the Hungry with slightly over half of the households, 52.3%, having received food commodities in the last month, 30.7% in the last 1-2 months and 17% over three months as at May 2011. This was due to transporters failing to deliver food due to high cost of fuel in March April, however the situation has improved will normal delivery. Commodities lasted 5-14 days.

### **Morbidity and Health seeking behaviour**

Morbidity status two weeks prior to the survey for children was for about a third 30.2% of the under-fives. Over half of the sick suffered from fever, 59.1%, ARIs was for 36.2%, diarrhea for 30.3% and malaria for 22.9% of the sick children. This is likely due to the dry weather in which diseases such as diarrhea is low. The morbidity rates were slightly higher than in the 2011 nutrition survey, but this was not significant. Odds ratio showed that 29.4% of those who were sick were malnourished. The likelihood ratio was 0.058 while Odds ratio was 0.970 indicating that those who were sick were at risk of being malnourished. This was significant with  $p < 0.05$ .

A large proportion of the mothers/caregivers, 62.4%, sought health care services from public clinics, however still, a large proportion, 40.9%, did not seek any assistance for their sick children and a small proportion, 0.6% used mobile services. There is need to promote utilization of mobile services to make health care access within reach of family far from existing health care facilities.

### **Food Security**

The food security situation is worse than in 2010 as evidenced by households consuming fewer meals the day before the interview than what they normally ate. Additionally, the dietary diversity score of 6.6 for households and of 3.2 for children aged 9-23 months is low indicating limited variety of foods consumed.

Majority of the households, 98.8%, purchased food. This suggests the need to get money into the hands of caregivers to purchase food. Coping strategies to food insecurity show that a large proportion, 75.3% reduced the size of meals, while 64.7% reduced the number of meals while 45.9% skipped food consumption for a day. Purchasing of food on credit was by 39.8% of the households. This may suggest low economic situation among households.

### **Coverage of SFP and OTP**

The coverage of supplementary feeding programme was 51.4% while Outpatient Therapeutic programme was 90.9%. The SFP and OTP coverage rates were a big improvement from the 2010 rates and they were also above the recommended coverage of the SPHERE Standards 2004 (>50%).

### **Coverage of Immunization, Vitamin A supplementation and De-worming for children < 5 years**

The immunization coverage was above the 80% recommended for all the vaccinations; OPV1 was 93.9%, OPV3 was 86.6% and measles was 86.9%, however, these coverage rates were slightly higher than the same vaccinations in the 2010 nutrition survey. Odds ratio indicated that 10.2% of the children who had not received OPV1 vaccination were malnourished and were 7.158 times more likely to be malnourished; 21.3% of children who had not received OPV3 vaccination were malnourished and they were 13.546 times likely to be malnourished while 14.6% of children who had not received measles vaccination were malnourished and they were 0.013 times likely to be malnourished. This indicates the importance of ensuring all children are vaccinated in Marsabit.

Vitamin A supplementation coverage was very low. This was 69.3% for the children aged 6-11 months 69.3% (taken once) and 14.2% (taken twice), 56.8% (taken once) for children aged 12-59 months. Odds ration indicated that children aged 12-59 months who had not taken vitamin A supplementation were 5.042 times more likely to be malnourished. Similarly, the de-worming coverage of children aged  $\geq 24$  months was low at 40.3% but this was an improvement from the 2010 coverage of 27.6%. Odds ratio showed that 60.9% of those who had not been de-wormed were malnourished and the likelihood ratio was 0.368.

### **Coverage of iron supplementation for pregnant women**

Iron supplementation during pregnancy among women was also low. This was 57.7% for non-pregnant women and 45.2% for pregnant women. There is need to promote vitamin A supplementation and de-worming among under five children and iron supplementation among women in reproductive age in Marsabit.

Infant and young child feeding practices are satisfactory in terms of initiation of breast feeding, feeding colostrum and currently breastfeeding and complementary feeding rate. However pre-lacteals are used by 25.2% and 63.1% of the children aged 0-6 months are not exclusively breastfed. The dietary diversity of complementary foods is low being less than 4 groups of foods. The mean dietary diversity score was  $1.4 \pm 1.1$  for children aged 6-8 months and  $3.2 \pm 2.1$  for children aged 9-23 months. Frequency of feeding was also very low at  $1.3 \pm 1.1$  for children aged 6-8 months and  $2.1 \pm 1.1$  for children aged 9-23 months.



## 7.0 Recommendations

- **Mobile clinics** should be promoted (by MoPHS and FHK) in the area to ensure areas that are not in close proximity receive health and nutrition services such as vitamin A and iron supplementation and de-worming.
- **BSFP:** BSFP programme should be undertaken by NGOs and partners such as Food for the Hungry as a stop gap measure to ensure improvement in the nutrition and food security situation in Marsabit for children under five years and lactating and pregnant women due to the high rates of malnutrition among these groups in the area. This should be done until the situation improves.
- **GFD:** Transportation of food aid should be re-analyzed to ensure that food reaches the vulnerable in time. Since Food Aid is shared, there is need to cater for this so that vulnerable families get appropriate amounts. Follow-up mechanisms should be put in place to ensure food gets to the intended users and that beneficiaries receive food aid from one source.
- **OTP and SFP:** The transportation of therapeutic foods should be re-analyzed to ensure it reaches the health facilities regularly in time. Identification of malnourished children at the community level should be stepped up to ensure that children who are moderately and severely malnourished are attended to in time. Appropriate mobile clinics may be one of the avenues in addition to the CHWs.
- **Immunization:** Immunization coverage needs to be sustained or improved and be recorded in the health cards even during vaccination campaigns.
- **Vitamin A Supplementation, Iron Supplementation and De-worming:** Vitamin A supplementation, iron supplementation and De-worming should be given priority and recording of issue indicated on the health cards by NGOs working in the area by MoPHS and MMS and NGO partner FHK. The coverage could be increased through use of ECD centres, mother support groups and the CHWs. Feedback should be given to health facilities to bolster coverage. Recording of these should be indicated on the health cards even during campaigns to assist in follow-up activities.
- **Health education** focusing on: **IYCF** especially exclusive breastfeeding and continued breastfeeding, complementary feeding; use of **hygiene and sanitation** (use of latrines and hand washing using soap), treatment and boiling of drinking water need to be given a major attention by MoPHS, MMS and NGO partner agencies in Marsabit.
- **Incomes:** Since most families purchase food, income generating activities and food vouchers should be incorporated in the NGOs agenda to help households in Marsabit acquire more resources to purchase food and non-food items.
- **Water:** Strategies to improve water in those divisions that are not within 30 minutes collection time is necessary. The cost of water in the townships should also be monitored by the government to make sure the cost is within the purchasing power of the residents. The communities and partners should strengthen the conservation of water and improve accessibility by the community for household use and livestock which is the main livelihood of the people of Marsabit district. More boreholes need to be drilled closer to the communities in order to improve access and protection of wells continued.
- **Mosquito bed nets:** Continued provision of mosquito bed nets and promotion of their use and treatment should be given priority by MoPHS, FHK and other NGOs in the district as a way to prevent malaria.
- **Follow-ups:** Feedback to health facilities on performance of nutrition and food security programmes should be enhanced by the FHK and other NGOs through the CHWs in-order to monitor nutrition and food security services in Marsabit.

**Annex 1: Household enumeration data collection form for a death rate calculation survey  
(One sheet per household)**

Survey district: \_\_\_\_\_ Village: \_\_\_\_\_ Cluster number: \_\_\_\_\_

HH number: \_\_\_\_\_ Date: \_\_\_\_\_ Team number: \_\_\_\_\_ Supervisor \_\_\_\_\_

|    | 1         | 2           | 3   | 4                 | 5   | 6                          | 7                             | 8                                   |
|----|-----------|-------------|---|-------------------|---|----------------------------|-------------------------------|-------------------------------------|
| ID | HH member | Present now | Present at beginning of recall (include those not present now and indicate which members were not present at the start of the recall period ) | Sex<br>1=M<br>2=F | Date of birth/or age in years<br>(Enter months for children under 5 years and years for over 5's) | Born during recall period? | Died during the recall period | Cause of death<br>(see codes below) |
| 1  |           |             |   |                   |   |                            |                               |                                     |
| 2  |           |             |   |                   |   |                            |                               |                                     |
| 3  |           |             |   |                   |   |                            |                               |                                     |
| 4  |           |             |   |                   |   |                            |                               |                                     |
| 5  |           |             |   |                   |   |                            |                               |                                     |
| 6  |           |             |   |                   |   |                            |                               |                                     |
| 7  |           |             |   |                   |   |                            |                               |                                     |
| 8  |           |             |   |                   |   |                            |                               |                                     |
| 9  |           |             |   |                   |   |                            |                               |                                     |
| 10 |           |             |   |                   |   |                            |                               |                                     |
| 11 |           |             |   |                   |   |                            |                               |                                     |

**Tally (these data are entered into Nutrisurvey for each household):**

|   |  |  |
|---|--|--|
| Current HH members – total                                    |  |  |
| Current HH members - < 5                                      |  |  |
| Current HH members who arrived during recall (exclude births) |  |  |
| Current HH members who arrived during recall - <5             |  |  |
| Past HH members who left during recall (exclude deaths)       |  |  |
| Past HH members who left during recall - < 5                  |  |  |
| Births during recall  |  |  |
| Total deaths  |  |  |
| Deaths < 5  |  |  |

**Causes of death:**

1= Diarrhoea (minimum of 3 watery stools/24hrs)    2= Bloody Diarrhoea;    3= Measles (fever with rash);  
 4= Fever;    5= Lower respiratory tract infection (fever, productive cough, chest pain, difficulty breathing)  
 6= Malnutrition; 7= injury 8= Unknown 9= Cancer 10= others specify: \_\_\_\_\_

**Annex 2: Clusters Marsabit 2011 based on 2009 Census**

| Division                | Location      | Sub-Location | Population    | Assigned Cluster | Randomly selected Village        |
|-------------------------|---------------|--------------|---------------|------------------|----------------------------------|
| <b>MARSABIT</b>         |               |              |               |                  |                                  |
| <b>Central</b>          | Nagayo        | Nyayo Road   | 2,328         |                  |                                  |
|                         |               | Majengo      | 5,645         | 1,2              | Dalacha Kiti; Dokata Ali         |
|                         | Dakabaricha   | Mataarba     | 1,167         |                  |                                  |
|                         |               | Dakabaricha  | 3,053         | 3                | Siko Hirbo                       |
|                         | Mountain      | Township     | 2,447         |                  |                                  |
|                         |               | Wabera       | 4,204         | 4                | Shauri Yako                      |
|                         | Jirime        | Milima Tatu  | 1,606         | 5                | Milima Tatu                      |
|                         |               | Jirime       | 188           |                  |                                  |
|                         | Karare        | Scheme       | 1,246         |                  |                                  |
|                         |               | Karare       | 2,119         |                  |                                  |
|                         | Songa         | Songa        | 1,447         |                  |                                  |
|                         |               | Kituruni     | 1,268         |                  |                                  |
|                         |               | Leyyai       | 364           |                  |                                  |
|                         | Hula Hula     | Hula Hula    | 1,835         | 6                | Nauda                            |
|                         |               | Ogicho       | 1,045         |                  |                                  |
| <b>Dirri</b>            | Sagante       | Sagante      | 1,363         |                  |                                  |
|                         |               | Rukesa       | 2,857         | 7                | Huga Odhi                        |
|                         | Qilta         | Gar-Qarsa    | 1,156         |                  |                                  |
|                         |               | Qilta        | 2,829         | 8                | Ali-Raso                         |
| <b>Gadamoji</b>         | Dirib Gombo   | Qachacha     | 2,501         | 9                | Boruharo                         |
|                         |               | Dirib Gombo  | 2,236         |                  |                                  |
|                         | Jaldesa       | Badasa       | 1,850         | 10               | Tadisa                           |
|                         |               | Jaldessa     | 1,602         |                  |                                  |
| <b>Marsabit G. R.</b>   | M.G. Reserve  | Marsabit     | 126           |                  |                                  |
| <b>Total Population</b> |               |              | <b>46,502</b> |                  |                                  |
| <b>CHALBI</b>           |               |              |               |                  |                                  |
| <b>Dukana</b>           | Balesa Ririba | Balesa       | 3,796         | 11               | Sausi                            |
|                         |               | El-Hadi      | 2,485         |                  |                                  |
|                         | Balesa Saru   | Sabarei      | 4,350         |                  |                                  |
|                         | Dukana        | Dukana       | 7,997         | 14               | Husa Gombe                       |
| <b>Maikona</b>          | Hurri Hills   | Elle Borr    | 61            |                  |                                  |
|                         |               | Forolle      | 1,526         | 15               | Forolle                          |
|                         |               | Hurri Hills  | 2,421         |                  |                                  |
|                         | Kalacha       | El-Gade      | 1,972         | 16               | Hursa                            |
|                         |               | Kalacha      | 5,992         | 13; 17           | Dibu Kutura; Sairu               |
|                         | Maikona       | Maikona      | 6,324         | 18; 19           | Mathore; Barbate                 |
|                         |               | Medate Kuro  | 929           |                  |                                  |
| <b>North Horr</b>       | Galas         | Chari Gollo  | 1,580         |                  |                                  |
|                         |               | Galas        | 3,480         | 12               | Galas                            |
|                         | Illeret       | Illeret      | 9,790         | 20; 21;<br>22    | Elbokoch; Teles Gaye;<br>Ikimire |
|                         | North Horr    | Darate       | 1,995         |                  |                                  |

| Division                                     | Location     | Sub-Location   | Population     | Assigned Cluster | Randomly selected Village |
|--|--------------|----------------|----------------|------------------|---------------------------|
|  |              | Malabot        | 1,757          | 23               | Ruchi                     |
|  |              | North Horr     | 8,405          | 24; 25           | Sora Bonaya; daramu Dima  |
| <b>Turbi</b>                                 | Bubisa       | Bubisa         | 4,811          | 26               | Harolle                   |
|  | Shura        | Shura          | 1,204          |                  |                           |
|  | Turbi        | Burgabo        | 2,287          | 27               | Burgabo                   |
|  |              | Turbi          | 2,034          |                  |                           |
| <b>Total population</b>                      |              |                | <b>75, 196</b> |                  |                           |
| <b>LAISAMIS</b>                              |              |                |                |                  |                           |
| <b>Laisamis</b>                              | Laisamis     | Laisamis       | 5,709          | 28               | Kula Pesa                 |
|  |              | Koya           | 714            |                  |                           |
|  | Merille      | Merille        | 2,990          |                  |                           |
|  |              | Irir           | 1,273          | 29               | Kamatonyi                 |
|  | Logologo     | Logologo       | 3,334          |                  |                           |
|  |              | Gudas Soriadi  | 749            | 30               | Tuu East                  |
|  |              | Kamboe         | 1,061          |                  |                           |
|  | Lontolio     | Lontolio       | 884            |                  |                           |
|  |              | Ndikir         | 1,539          |                  |                           |
| <b>Korr</b>                                  | Korr         | Korr           | 3,910          |                  |                           |
|  |              | Halisurwa      | 2,009          | 31               | Ong'eli                   |
|  |              | Hafare         | 7,093          | 32; 33           | Martarba; Kijiji          |
|  | Ngurun It    | Illaut         | 2,645          |                  |                           |
|  |              | Ngutun It      | 3,036          | 34               | Lolari                    |
|  |              | Lonyori Pichau | 2,612          | 35               | Harugura                  |
| <b>Loiyangalani</b>                          | Mt Kulal     | Olturot        | 859            |                  |                           |
|  |              | Arapal         | 975            |                  |                           |
|  |              | Larachi        | 360            |                  |                           |
|  |              | Mt Kulal       | 2,595          | 36               | Gatab                     |
|  | South Horr   | South Horr     | 1,456          |                  |                           |
|  |              | Kurungu        | 1,177          |                  |                           |
|  |              | Arge           | 1,062          | 37               | Lapukutuk                 |
|  | Kargi        | Kargi          | 3,325          |                  |                           |
|  |              | Kurkum         | 454            |                  |                           |
|  |              | Kambinye       | 2,279          | 38               | Salehgabana               |
|  | Loiyangalani | Loiyangalani   | 7,251          | 39               | Kilimambogi               |
|  |              | Moite          | 1,861          |                  |                           |
|  |              | Gas            | 482            |                  |                           |
|  |              | El-Molo bay    | 1,975          | 40               | Komote                    |
| <b>Total Population</b>                      |              |                | <b>65, 669</b> |                  |                           |
| <b>Total population for greater Marsabit</b> |              |                | <b>187,367</b> |                  |                           |

Total Population: 187,367

Total Households: 40,333

Household size: 4.65

Household size: Marsabit= 4.65; Chalbi = 4.82; Laisamis = 4.45

### Annex 3: Enumerator Training Programme 18<sup>th</sup> 20<sup>th</sup> May 2011 at Marsabit

| Time             | Activity   | Responsible person(s) |
|------------------|--|-----------------------|
| <b>Day One</b>   |  |                       |
| 8:00-10:30am     | Registration   | FH                    |
|                  | Opening Prayer   | FH                    |
|                  | Introductions  | FH                    |
|                  | Expectations & Responsibilities during training                            | FH                    |
|                  | Purpose of the Survey-UNICEF Conceptual framework                          | Consultant            |
|                  | Role of Enumerators and Supervisors  | Consultant            |
| 10:30-11:00am    | Tea Break  | FH                    |
| 11:00-1:00pm     | Questionnaires: Household data   | Consultant            |
|                  | Anthropometry, immunization, Vit. A supplementation, Morbidity & Diarrhoea | Consultant            |
| 1:00-2:00pm      | Lunch  | FH                    |
| 2:00-4:30 pm     | HH water consumption, Hygiene & sanitation                                 | Consultant            |
|                  | Food Consumption and Dietary Diversity, Food aid                           | Consultant            |
|                  | Coping Strategies  | Consultant            |
|                  | Mosquito bednets, Sources of Incomes & Maternal Nutrition                  | Consultant            |
|                  | Announcements  | FH- Naomi             |
| <b>Day Two</b>   |  |                       |
| 8:00-10:30 am    | Recap  |                       |
|                  | IYCF Questionnaire   | Consultant            |
|                  | Mortality Questionnaire  | Consultant            |
|                  | SMART Methodology: Sample size Calculation                                 | Consultant            |
| 10:30-11:00 am   | Tea  | FH                    |
| 11:00-1:00pm     | Sampling-Sub-location-village-Households                                   | Consultant            |
|                  | Children 6-59 months; 0-23 months; Mothers/caregivers                      | Consultant            |
|                  | Instruments for each group   | Consultant            |
|                  | Anthropometric measurements & Planning for Standardization (Teams)         | Consultant            |
| 1:00-2:00pm      | Lunch  | FH                    |
| 2:00-4:30pm      | Pre-test planning and its role   | Consultant            |
|                  | Ethical Issues   | Consultant            |
|                  | FGDs (Supervisors)   | Consultant            |
|                  | Development of Calendar of Events  | Naomi/ALL             |
| 4:30pm           | Summary  |                       |
|                  | Announcements  | FH                    |
| <b>Day Three</b> |  |                       |
| 8:00-1:00pm      | Recap  |                       |
|                  | Standardization of Measurements  | Consultant            |
|                  | Pre-testing  | Consultant            |
| 1:00-2:00pm      | Lunch  | FH                    |
| 2:00-3:00pm      | Analysis of pre-test & Standardization                                     | Consultant            |
|                  | Development of Calendar of events  | Consultant            |
| 3:00-4:00pm      | Planning for fieldwork   | Consultant/FH         |
| 4:00-5:00pm      | Logistics  | FH                    |

**Annex 2: CHART FOR CALCULATING AGE IN MONTHS**

Accurate as at May 2011

Cross check against date of birth and date of survey to establish actual age

| <b>DATE OF BIRTH</b> | <b>AGE IN MONTHS</b> | <b>DATE OF BIRTH</b> | <b>AGE IN MONTHS</b> |
|----------------------|----------------------|----------------------|----------------------|
|                      |                      | June – 2009          | 23                   |
| <b>June 2006</b>     | <b>59</b>            | July – 2009          | 22                   |
| July – 2006          | 58                   | August– 2009         | 21                   |
| August – 2006        | 57                   | September – 2009     | 20                   |
| September – 2006     | 56                   | October – 2009       | 19                   |
| October – 2006       | 55                   | November – 2009      | 18                   |
| November– 2006       | 54                   | December– 2009       | 17                   |
| December – 2006      | 53                   | January – 20 10      | 16                   |
| January – 2007       | 52                   | February - 2010      | 15                   |
| February – 2007      | 51                   | March – 2010         | 14                   |
| March– 2007          | 50                   | April – 2010         | 13                   |
| April– 2007          | 49                   | May– 2010            | 12                   |
| May– 2007            | 48                   | June – 2010          | 11                   |
| June - 2007          | 47                   | July – 2010          | 10                   |
| July- 2007           | 46                   | August– 2010         | 9                    |
| August - 2007        | 45                   | September – 2010     | 8                    |
| September - 2007     | 44                   | October – 2010       | 7                    |
| October– 2007        | 43                   | November – 2010      | 6                    |
| November – 2007      | 42                   | December– 2010       | 5                    |
| December – 2007      | 41                   | January – 2011       | 4                    |
| January– 2008        | 40                   | February – 2011      | 3                    |
| February - 2008      | 39                   | March - 2011         | 2                    |
| March– 2008          | 38                   | April– 2011          | 1                    |
| April – 2008         | 37                   | May – 2011           | 0                    |
| May- 2008            | 36                   |                      |                      |
| June– 2008           | 35                   |                      |                      |
| July – 2008          | 34                   |                      |                      |
| August– 2008         | 33                   |                      |                      |
| September – 2008     | 32                   |                      |                      |
| October – 2008       | 31                   |                      |                      |
| November– 2008       | 30                   |                      |                      |
| December – 2008      | 29                   |                      |                      |
| January – 2009       | 28                   |                      |                      |
| February – 200       | 27                   |                      |                      |
| March - 2009         | 26                   |                      |                      |
| April – 2009         | 25                   |                      |                      |
| May – 2009           | 24                   |                      |                      |



**Annex 3: MARSABIT DISTRICT NUTRITION AND FOOD SECURITY SURVEY QUESTIONNAIRE; MAY 2011**



| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

**1 Household data**

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

| 1.1<br>Age group | 1.2<br>Person ID and Name |      | 1.3<br>Approx.* Age<br>Enter months<br>for children<br>under 5 years<br>and years for<br>over 5's |      | 1.4<br>Childs age<br>verified by | 1.5<br>Sex | 1.6<br>Main Occupation (enter code from list)<br><i>(Ask this question to the respondent/ caregiver.<br/>The responses can be more than one)</i> | 1.7<br>If over 5 and<br>under 18 Is child<br>attending<br>school? | 1.8<br>Reason for not attending School if<br>(1.7 = No)<br>(enter code from list) |
|------------------|---------------------------|------|---|------|----------------------------------|------------|--|---|---|
|                  | ID                        | NAME | Yrs   | Mths |                                  |            |  |   |   |
| Under 5          |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |
| 5 to 18          |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |
| Over 18          |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |
|                  |                           |      |   |      |                                  |            |  |   |   |

| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ___/___/___                  |                     |                     |

## 2. Children aged 6 - 59 months data (anthropometry; immunization & Vitamin A Supplementation) May 2011

| HH No | 2.0 Child ID | 2.1 Sex. | 2.2 Date of birth | 2.3 Age In mths | 2.4 Weight to nearest 100 gm | 2.5 Height to nearest 0.1 cm | 2.6 Oedema in both feet? (U5 only)<br>1=Yes<br>2=No | 2.7 MUAC To the nearest 0.1 cm | 2.8 Is the child currently enrolled in a feeding program?<br>(Confirm by a card if the child is currently enrolled)<br>1=yes(OTP)<br>2=yes (SFP)<br>3=No<br>4=Don't know | 2.9 Has the child received measles immunization? (enter code) (U5 only)<br>1=Yes (by card)<br>2=Yes (by recall)<br>3=No<br>4=Don't know | 2.10 Has child received pentavalent 1/OPV1?<br>( Preferably use the MOH road to health card)<br>1=Yes (by card)<br>2=Yes (by recall)<br>3=No<br>4=Don't know | 2.11 Has child received pentavalent 3/OPV3?<br>1=Yes (by card)<br>2=Yes (by recall)<br>3=No<br>4=Don't know | 2.12 How many times did the child receive Vitamin A the last six months? (U5 only)<br>(Show the mother the capsule so that she recalls) <b>Indicate the number of times the child has received</b><br>0=Not taken<br>1= Once<br>2= Twice |
|-------|--------------|----------|-------------------|-----------------|------------------------------|------------------------------|---|--------------------------------|--|---|--|---|--|
|       | 1.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 2.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 3.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 4.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 5.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 6.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 7.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 8.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 9.           |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 10.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 11.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 12.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 13.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 14.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 15.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 16.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |
|       | 17.          |          |                   |                 |                              |                              |   |                                |  |   |  |   |  |



| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ___/___/___                  |                     |                     |

2. (Contd) Children aged 6 – 59 months (MorbiDiarhoea- Zinc supplementation and intestinal worms data) Marsabit May 2011

| HH No. | Child ID | 2.13<br>Sick-ness in the last 2 weeks (Enter code)<br>(More than one response possible)<br>1=Not applicable, not sick<br>2= Diarrhea<br>3=Vomiting<br>4=Fever with chills like malaria<br>5=Fever, cough, cold, difficulty in breathing<br>6=Intestinal Parasite<br>7= Measles<br>8=Eye infections<br>9=Skin infections 10=Others (specify) | 2.14<br>When the child was sick did you seek assistance? (enter code) (U5 only) If YES, where<br>(More than one response possible)<br>1=Traditional healer<br>2=CHWS<br>3=Private clinic/ pharmacy<br>4=Shop/kiosk<br>5=Public clinic<br>6=Mobile clinic<br>7=Relative or friend : 9= Others (specify)<br>8=No assistance sought | 2.15<br>If diarrhoea is yes in the morbidity question.<br>Was he/she given any of the following to drink at any time since he/she started having the diarrhoea?<br>1=A fluid made from a special packet called ORS?<br>2=A home-made sugar-salt solution?<br>3=Another home-made liquid such as porridge, soup, yoghurt, coconut water, fresh fruit juice, tea, milk, or rice water?<br>4=Zinc 5.Others (specify) | 2.16<br>Has the child taken any drug for intestinal worms in the last six months?<br>(Enter Code)<br>=Yes (by card)<br>2=Yes (by recall)<br>3=No<br>4=Don't know |
|--------|----------|---|--|---|--|
|        | 1.       |   |  |   |  |
|        | 2.       |   |  |   |  |
|        | 3.       |   |  |   |  |
|        | 4.       |   |  |   |  |
|        | 5.       |   |  |   |  |
|        | 6.       |   |  |   |  |
|        | 7.       |   |  |   |  |
|        | 8.       |   |  |   |  |
|        | 9.       |   |  |   |  |
|        | 10.      |   |  |   |  |
|        | 11.      |   |  |   |  |
|        | 12.      |   |  |   |  |
|        | 13.      |   |  |   |  |
|        | 14.      |   |  |   |  |
|        | 15.      |   |  |   |  |
|        | 16.      |   |  |   |  |
|        | 17.      |   |  |   |  |

| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

### 3. Household water consumption

| 3.1.<br>What is your MAIN current water source for HOUSEHOLD use?<br>1=River<br>2=Lake<br>3=Water tap<br>4=Borehole<br>5=Unprotected well<br>6=Protected well<br>7=Public pan<br>8=Water tanks<br>9=Dam<br>10=Laga<br>11=Other _____ | 3.2<br>How long does it take to go to the main source of water and come back (in minutes) | 3.3<br>On average, how many LITRES of water does the household use per day? | 3.4.<br>How much do you pay for a 20lt jerrican (enter zero if water is free) | 3.5.<br>What is your MAIN source of DRINKING water?<br>1=River<br>2=Lake<br>3=Water tap<br>4=Borehole<br>5=Unprotect ed well<br>6=Protected well<br>7=Public pan<br>8=Water tanks<br>9=Dam<br>10=Laga<br>11=Other _____ | 3.6.<br>What do you do to the water before drinking it?<br>1=Boiling<br>2=Use traditional herbs<br>3=Use chemicals<br>4=Filters/Sieves<br>5=Decant<br>6=Nothing<br>7= Other |
|--|---|---|---|---|---|
|  |   |   |   |   |   |

### 4. Hygiene and Sanitation

| 4.1.<br>Does your household have access to a toilet/ latrine facility?<br>1=Yes<br>2=No | 4.2.<br>If yes, what type of toilet facility do you have?<br>1=Bucket<br>2=Traditional pit latrines<br>3=Ventilated improved pit latrine<br>4=Flush toilet<br>5=Other Specify _____ | 4.3.<br>If No, where do you go/use? (probe further)<br>1= Bush<br>2=Open field<br>3.=Near the river<br>4.=Behind the house<br>5.=Other ( specify)_____ | 4.4.<br>How is children's faeces disposed (Probe and OBSERVE)<br>1= Disposed of immediately and hygienically<br>2= Disposed of immediately in the nearby bushes<br>3= Not disposed (scattered in the compound)<br>4= Others specify | 4.5.<br>When do you normally wash your hands? (Indicate all responses)<br>1= After defecation<br>2= Before handling food<br>3= After eating<br>4= Before feeding the child<br>5= After cleaning child's bottom<br>6= None of above<br>7= Others specify | 4.6 What do you use to clean (wash) your hands?<br><br>(Indicate all responses)<br><br>1. Water only<br>2. Water and soap<br>3. Water and ash<br>4. Other (specify) |
|---|---|--|---|---|---|
|   |   |  |   |   |   |

| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

## 5. Food Consumption and diet diversity

Twenty four hour and seven day recall for food consumption in the households. The interviewers should establish whether the previous day and night; seven days and nights were usual or normal for the households. If unusual feasts, funerals or most members absent, then another day should be selected

| 5.1. Food group consumed   | 5.2. Did any member of your household consume any food from the groups in the last 7 days<br>1= Yes 0= No | 5.3. If yes how many days was the food consumed in the last 7 days? | 5.4. Did a member of your household consume food from any of these groups in the last 24 hours (from this time yesterday to now)? Include any snacks consumed<br>1= Yes 0= No | 5.5 What is the main source of the dominant food item consumed<br>(Please insert the appropriate code)<br>1=Own production 2= purchases<br>3=gifts from friends/ family<br>4= food aid 5= traded or bartered<br>6=borrowed 7= Gathering /wild<br>8= Others specify |
|--|---|---|---|--|
| <b>Type of food</b>  |   |   |   |  |
| 1. Cereals and cereal products (e.g. sorghum, maize, spaghetti, pasta, <i>anjera</i> , rice, bulga wheat, bread)   |   |   |   |  |
| 2. Vitamin A rich vegetables and tubers: Pumpkin, carrots, yellow fleshed sweet potatoes   |   |   |   |  |
| 3. White tubers and roots: White tubers, white potatoes, white yams , cassava or foods from roots, white sweet potatoes  |   |   |   |  |
| 4. Dark green leafy vegetables: Dark green leafy vegetables including wild ones + locally available vitamin A rich leaves such as cassava leaves, pumpkin leaves, cowpeas leaves, sukuma wiki, spinach |   |   |   |  |
| 5. Other vegetables (e.g. tomatoes, egg plant, onions, cabbages)   |   |   |   |  |
| 6. Vitamin A rich fruits: Ripe mangoes , papayas + others locally available like watermelon  |   |   |   |  |
| 7. Organ meat (Iron rich): Liver, kidney, heart or other organ meats or blood based foods , spleen   |   |   |   |  |
| 8. Flesh meat and offal's: Meat, poultry, offal ( goat, beef, poultry)   |   |   |   |  |
| 9. Eggs  |   |   |   |  |
| 10. Fish: Fresh or dried fish or shell fish or smoked , salted, fried  |   |   |   |  |
| 11. Pulses legumes or nuts (e.g. beans , lentils, green grams, cowpeas, dried peas.)   |   |   |   |  |
| 12. Milk and milk products (e.g. goat , camel, fermented milk , powdered milk )  |   |   |   |  |
| 13. Oils/ fats ( e.g. cooking fat or oil, butter , ghee, margarine)  |   |   |   |  |
| 14. Sweets: Sugar, honey, sweetened juice, soda/sugary foods like sweets, glucose  |   |   |   |  |
| 15. Condiments, spices and beverages like royco, garlic, dhania, <i>tangawizi</i> ,  |   |   |   |  |
| <b>In general what is the main source of food in the households? (* Use codes above)</b>   |   |   |   |  |
| <b>Total number of food groups consumed ( Filled by the enumerator) :</b>  |   |   |   |  |

| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

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

|  |  |   |  |   |
|--|--|---|--|---|
| <p><b>5.6.</b><br/>Including food eaten in the morning, how many meals does your family normally eat per day?</p> <p><i>( Please indicate the number of meals consumed e.g. 1, 2, 3, 4, 5 ,6 )</i></p> | <p><b>5.7.</b><br/>Including food eaten in the morning, how many meals did your family eat <b><u>YESTERDAY?</u></b></p> <p><i>(Please indicate the number of meals consumed e.g. 0, 1, 2, 3, 4, 5,6)</i></p> | <p><b>5.8.</b><br/>Did all the members of your family eat yesterday?</p> <p><i>(Please record all responses)</i></p> <p>1.Yes<br/>2.No <b><i>(If no, Go to 5.8)</i></b></p> | <p><b>5.9.</b><br/>If some household members did not eat, Who did not eat yesterday?</p> <p><i>( Please record all the responses)</i></p> <p>1=Child under 5<br/>2= 5-12 years old<br/>3=13-19 years old<br/>4= Mother<br/>5= Father<br/>6= Above 19 years</p> | <p><b>5.10.</b><br/>Why did the person/s not eat?</p> <p><i>( Please record all the responses for not eating)</i></p> <p>1= Food not enough<br/>2= Sickness<br/>3= Away from home<br/>4=Other specify</p> |
|  |  |   |  |   |

## 6. Food Aid

6.1. Have you received **FOOD AID** in the last **three (3)** months? (Please circle) 1 = Yes 2 = No (If no go to section 7)

6.1b. If yes, what was your source of food aid? 1. = Government (Provisional Administration (DC, DO, Chiefs) 2. = WFP/FH)

6.2. If Yes when? (Please circle) 1= less than 1 month ago 2= 1 and 2 months 3= Over 2 months

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

| 6.3<br>FOOD AID<br>COMMODITY | 6.4 QUANTITY<br>(KGS)<br>verify by using<br>distribution<br>cards) | 6.5<br>Of the food aid received what proportion was used for each of these purposes?<br>(Please INSERT QUANTITIES IN KGS where appropriate) |                            |                         |                        |                                  | 6.6<br>How many days did each food<br>commodity last? |
|------------------------------|--|---|----------------------------|-------------------------|------------------------|----------------------------------|---|
|                              |  | Resold in the<br>market   | Bartered for other<br>item | Shared<br>kin/Relatives | with<br>Saved for seed | Consumed by household<br>members |   |
| Miaize                       |  |   |                            |                         |                        |                                  |   |
| Beans                        |  |   |                            |                         |                        |                                  |   |
| Peas                         |  |   |                            |                         |                        |                                  |   |
| Vegetable oil                |  |   |                            |                         |                        |                                  |   |
| CSB                          |  |   |                            |                         |                        |                                  |   |
| Rice                         |  |   |                            |                         |                        |                                  |   |

| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

## 7. Coping Strategies

|      | In the previous month, has the household done any of the following? Tick as appropriate | Relative Frequency |               |                |                    |                         |                |                 |
|------|---|--------------------|---------------|----------------|--------------------|-------------------------|----------------|-----------------|
|      |   | Never              | Once per week | Twice per week | 3-6 times per week | All the time? Every day | Once per month | Twice per month |
| 7.1  | Reduction in the number of meals per day  |                    |               |                |                    |                         |                |                 |
| 7.2  | Skip food consumption for an entire day   |                    |               |                |                    |                         |                |                 |
| 7.3  | Reduction in size of meals  |                    |               |                |                    |                         |                |                 |
| 7.4  | Restrict consumption of adults to allow more for children                               |                    |               |                |                    |                         |                |                 |
| 7.5  | Feed working members at expense of non-working  |                    |               |                |                    |                         |                |                 |
| 7.6  | Swapped consumption to less preferred or cheaper foods                                  |                    |               |                |                    |                         |                |                 |
| 7.7  | Borrow food from a friend or relative   |                    |               |                |                    |                         |                |                 |
| 7.8  | Purchase food on credit   |                    |               |                |                    |                         |                |                 |
| 7.9  | Consume wild foods (normal wild food)   |                    |               |                |                    |                         |                |                 |
| 7.10 | Consume immature crop   |                    |               |                |                    |                         |                |                 |
| 7.11 | Consume decomposed fish   |                    |               |                |                    |                         |                |                 |
| 7.12 | Consume toxic/taboo foods (acacia pod/bitter fruit)                                     |                    |               |                |                    |                         |                |                 |
| 7.13 | Food consumption of seed stock  |                    |               |                |                    |                         |                |                 |
| 7.14 | Send household members to eat elsewhere   |                    |               |                |                    |                         |                |                 |
| 7.15 | Withdraw or send child(ren) from school   |                    |               |                |                    |                         |                |                 |
| 7.16 | Begging or engaging in degrading jobs   |                    |               |                |                    |                         |                |                 |
| 7.17 | Individual migration out of the area  |                    |               |                |                    |                         |                |                 |
| 7.18 | Household migration out of the area   |                    |               |                |                    |                         |                |                 |
| 7.19 | Sale of farm implements   |                    |               |                |                    |                         |                |                 |
| 7.20 | Sale of milking livestock   |                    |               |                |                    |                         |                |                 |
| 7.21 | Sale of household goods   |                    |               |                |                    |                         |                |                 |
| 7.22 | Disintegration of families  |                    |               |                |                    |                         |                |                 |
| 7.23 | Abandonment of children or elderly  |                    |               |                |                    |                         |                |                 |
| 7.24 | Sell of charcoal and/or fire wood   |                    |               |                |                    |                         |                |                 |
| 7.25 | Part of family migrating with animals to look for grazing                               |                    |               |                |                    |                         |                |                 |
| 7.26 | Others  |                    |               |                |                    |                         |                |                 |

| District | Division | Sub location | Village | Cluster No. | Team No. | Household No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|---------------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          |               | ___/___/___                  |                     |                     |

### 8. Mosquito and bed net use/ treatment

| 8.1.<br>Does this household have a mosquito net?<br>1 = Yes<br>2 = No<br>(IF NO, GO TO 9) | 8.2.<br>Where did you get it from:<br>1 = A Shop<br>2 = An agency<br>3 = Ministry of Health<br>4= Others (specify)_____ | 8.3.<br>If you got it from the shop, have you ever treated your net (soaked or dipped it in dawa or chemical to repel mosquito or insects)?<br>1 = Yes<br>2= No<br>3= N/A | 8.4.<br>If YES, When did you last treat it? (Enter the appropriate code)<br><br>1. Less than one month ago<br>2. Between one and six months ago<br>3. More than six months ago<br>4. Cannot remember | 8.5.<br>Who slept under the mosquito net last night? (Probe and enter all responses mentioned)<br>1. Children less than 5 years<br>2. Children over 5 years<br>3. Pregnant woman<br>4. Mother<br>5. Father<br>6. Nobody uses |
|---|---|---|--|--|
|   |   |   |  |  |

### 9. Source of income

| 9.. SOURCE OF INCOME  | 1 | 2 | 3 |
|---|---|---|---|
| What were your sources of income in the last three months (please indicate the three most important in order of priority)<br>1=sale of live stock, 2=sale of livestock product, 3= sale of ration food, 4 =sale of own crop, 5 =wage labor, 6 =Remittance<br>7= charcoal/firewood sale, 8=basket weaving, 9=petty trade, 10=Fishing, 11= Brewing 12= salary 13= Others(specify) |   |   |   |

| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ____/____/____               |                     |                     |

## 10. Maternal nutritional status

| HHold number | Serial No. | <b>QUESTIONS TO BE ANSWERED IF CARE GIVER IS A FEMALE:</b> <ul style="list-style-type: none"> <li>Measure MUAC of caregiver only if a child from her household was measured in <u>SECTION 2</u> <ul style="list-style-type: none"> <li>Caregiver must be female between 15 and 49 years of age</li> <li>If there are multiple caregivers, interview only the one who is a primary caregiver</li> </ul> </li> </ul> |   |  |  |  |
|--------------|------------|--|---|--|--|--|
|              |            | <b>10.1. How old are you?</b><br><i>( Identity cards can be used to verify ages in this case)</i><br><br><i>In Years</i>   | <b>10.2. Age of the caregiver was verified by</b><br><br>1= ID<br>2= Recall | <b>10.3. What is the woman's current physiological status?</b><br><br>1. = Currently pregnant<br>2. = Breastfeeding (<6months infant)<br>3. = Breastfeeding (6-24months)<br>4. = Pregnant and breastfeeding<br>5. = Not pregnant/not breastfeeding | <b>10.4. MUAC (cm), left arm (To the nearest 0.1 cm), do not round up</b><br><br>. ____ cm | <b>10.5 In your last pregnancy, did you take iron pills, , or iron syrup?</b><br><br>1.Yes<br>2.No<br>3.Don't know |
|              |            |  |   |  |  |  |
|              |            |  |   |  |  |  |
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| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
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|          |          |              |         |             |          | __/__/__                     |                     |                     |

**Annex 4: Questionnaire for Mortality Rate Calculation (One Sheet per cluster)**

| HH No | Total people in HH | Total Under 5's in HH | No of births since RECALL DATE | Total number of those who joined household | Total number of under5's who joined household | Total number of those who left household | Total number of under fives who left household | Total number of deaths since RECALL DATE | Total number of deaths of Under 5's since RECALL DATE | Causes of death |
|-------|--------------------|-----------------------|--------------------------------|--|---|--|--|--|---|-----------------|
| 1.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 2.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 3.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 4.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 5.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 6.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 7.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 8.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 9.    |                    |                       |                                |  |   |  |  |  |   |                 |
| 10.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 11.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 12.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 13.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 14.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 15.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 16.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 17.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 18.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 19.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 20.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 21.   |                    |                       |                                |  |   |  |  |  |   |                 |
| 22.   |                    |                       |                                |  |   |  |  |  |   |                 |



| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ___/___/___                  |                     |                     |

**TARGET GROUP: INFANTS AGED 0<24 MONTHS**

**Annex 5: MARSABIT MAY 2011 COMPLEMENTARY FEEDING QUESTIONNAIRE CHILDREN 0-23 MONTHS**

Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child.  
Take child No from anthropometry QUESTIONNAIRE. **For every question use the child [Name]**

| HH No | CH No | Background Information                        |   |                               |   | Infant Feeding information   |   |   |   |  |   |
|-------|-------|---|---|-------------------------------|---|--|---|---|---|--|---|
|       |       | F.11.1  | F.11.2  | F.11.3                        | F.11.4                                  | F.11.5   | F.11.6  | F.11.7  | F.11.8  | F.11.9   | F.11.10   |
|       |       | <b>Child's date of Birth:</b><br><br>dd/mm/yy | <b>Source of birth date</b><br>(Record the appropriate code)<br><br>1 = CARD<br>2= Mother<br>3= DNK | <b>Age of child in months</b> | <b>Sex of child</b><br><br>1= M<br>2= F | <b>Did you ever breastfeed [Name]?</b><br><br>1= Yes<br>2= No<br>3= DNK<br>If No, go to <b>9.6</b><br>If yes, go to <b>9.7</b> | <b>If No, why</b><br><br>See code below for the answers<br><br>Go to G 10.2 | <b>If yes, How soon after birth did you put [Name] on the breast?</b><br><br>See code below for the answers | <b>During the first 3 days after delivery, did you give [Name] the fluid/liquid that came from your breasts?</b><br><br>1= Yes,<br>2= No,<br>3= DNK | <b>In the first 3 days after delivery, was [Name] given anything to drink other than breast milk?</b><br>See Codes below | <b>Are you still breastfeeding [Name]?</b><br><br>1= Yes<br>2= No |
|       |       |   |   |                               |   |  |   |   |   |  |   |
|       |       |   |   |                               |   |  |   |   |   |  |   |
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|       |       |   |   |                               |   |  |   |   |   |  |   |

**Question 11.6:** 1= No milk; 2= did not want to breast feed;3=traditional beliefs ( child will die) 4= other;

**Question 11.7:** If less than an hour record **00**; if less than 24 hours record **number of Hours**; IF more than 24 hours record **number of Days**; If mother does not know, record: **88**

**Question 11.9:** 1= Plain water; 2= Sugar water or glucose water; 3= powdered milk or fresh milk; 4= infant formula (*Mamex, Nan*), 5= Gripe water; 6= not given; 7= Other (specify)

| District | Division | Sub-Location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ___/___/___                  |                     |                     |

**Annex 5: MARSABIT-MAY 2011 COMPLEMENTARY FEEDING QUESTIONNAIRE CHILDREN 0-23 MONTHS**

*Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of [Name].*

Now, I will ask you about what [Name] ate and drank YESTERDAY during the day and the night. During the day and the night, did [Name] receive any of the following fluids? Refer to the name of the child for each question.

Kindly probe the mother for responses and record the codes/responses as the mother names the fluids and liquids in their appropriate category

| HH NO | CH No | G.12.1   | G.12.2  | G.12.3   | G.12.4  | G.12.5                                      | G.12.6   | G.12.7  | G.12.8  |
|-------|-------|--|---|--|---|---|--|---|---|
|       |       | <b>Breast milk</b><br><br>Only one answer coded as below:<br>1. Yes<br>2. No<br>3. DNK | <b>Infant formula</b><br>( <i>Mamex, Nan</i> )<br><br>1. Yes<br>2. No<br>3. DNK | <b>Other milks: animal milk, reconstituted powdered milk,</b><br>( <i>Halwa, Hayat, Coast</i> )<br>- Sour milk.<br><br>1. Yes<br>2. No<br>3. DNK | <b>Sweetened flavored juices</b> ( <i>Zeitun, Altuza, Mushakil, vimto, Ananas, savannah,</i> ) <i>Soda</i><br><br>1. Yes<br>2. No<br>3. DNK | <b>ORS</b><br><br>1. Yes<br>2. No<br>3. DNK | <b>Tea/Coffee</b><br><br>1. Yes<br>2. No<br>3. DNK | <b>Plain water</b><br><br>1. Yes<br>2. No<br>3. DNK | <b>Thin porridge</b><br><br>1. Yes<br>2. No<br>3. DNK |
|       |       |  |   |  |   |   |  |   |   |
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| District | Division | Sub location | Village | Cluster No. | Team No. | Date of Interview (dd/mm/yy) | Name of Interviewer | Name of Team Leader |
|----------|----------|--------------|---------|-------------|----------|------------------------------|---------------------|---------------------|
|          |          |              |         |             |          | ___/___/___                  |                     |                     |

**Annex 5: MARSABIT-MAY 2011 COMPLEMENTARY FEEDING QUESTIONNAIRE CHILDREN 0-23 MONTHS**

Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child

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

| HH No | CH No | H.13.1                                       | H.13.2   | H.13.3   | H.13.4   | H.13.5   | H.13.6   | H.13.7   | H.13.8  | H.13.9   | H.13.10  |
|-------|-------|--|--|--|--|--|--|--|---|--|--|
|       |       | <b>Eggs</b><br><br>1. Yes<br>2. No<br>3. DNK | <b>Porridge made from CSB /Unimix</b><br><br><i>(Use the correct code. Only one answer)</i><br>1. Yes<br>2. No<br>3. DNK | <b>Flesh Meats</b><br>(Chicken, Beef, Goat, Kidney, Liver, Mutton, Camel, Fish)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Legumes and Nuts</b><br>(Beans, Groundnuts, Cowpeas, Lentils, Green Grams)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Dairy Products</b><br>(Milk, cheese, ghee)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Grains, Roots &amp; Tubers</b><br>(Pasta, rice, bread, potatoes, biscuits, mandazi, chapatti, anjera, ugali)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Vitamin A Rich fruits &amp; Vegetables</b><br>(Pawpaw, melon, sukuma wiki, carrots, cowpea leaves, spinach, avocado)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Other Fruits and Vegetables</b><br>( Onions, tomatoes, cabbage, oranges, bananas, Okra)<br><br>1. Yes<br>2. No<br>3. DNK | <b>Oil, fats,</b><br>(Zeitun, sim sim, camel fat)<br><br>1= Yes<br>2= No<br>3= DNK | <b>Yesterday (During the day and at night). How many times did you feed [Name] solid and semi-solid foods?</b><br><br>No. of times child was given food to make it full. |
|       |       |  |  |  |  |  |  |  |   |  |  |
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