INTEGRATED HEALTH AND NUTRITION SURVEY

GREATER SAMBURU DISTRICT

By

WORLD VISION KENYA
HUMANITARIAN EMERGENCY AFFAIRS
&
INTERNATIONAL MEDICAL CORPS (IMC)

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ACRONYMS AND ABBREVIATIONS

AFLC	- Acute Food and Livelihood Crises
ARI	- Acute Respiratory Infection
BFI	- Borderline Food Insecurity
CED	- Chronic Energy Deficiency
CI	- Confidence Interval
CMR	- Crude Mortality Rate
CSB	- Corn Soya Blend
EMOP	- Emergency Operation Programme
ENA	- Emergency Nutrition Assessment
FAO	- Food and Agriculture Organization
FGD	- Focus Group Discussion
GCM	- Global Chronic Malnutrition
GFD	- General Food Distribution
GAM	- Global Acute Malnutrition
GOK	- Government of Kenya
GS	- Growth Standards
HFA	- Height-for-Age
IMAM	- Integrated management of Acute Malnutrition
IMC	- International Medical Corps
ITN	- Insecticide Treated Nets
KCO	- Kenya Country office
KEPI	- Kenya Expanded Programme on Immunization
MCG	- Mother Care Groups
MOH	- Ministry of Health
MUAC	- Mid-Upper Arm Circumference
NCHS	- National Centre for Health Statistics
NPLC	- Northern Pastoral Livelihood Cluster
OPV	- Oral Polio Vaccine
PPS	- Probability Proportional to Population Size
SAM	- Severe Acute Malnutrition
SD	- Standard Deviation
SFP	- Supplementary Feeding Programme
SMART	- Standardized Monitoring and Assessment of Relief and Transitions
SPSS	- Statistical Package for Social Scientists
TBA	- Traditional Birth Attendant
UFMR	- Underfive Mortality Rate
UNICEF	- United Nations Children's Fund
USAID	- United States of America International Aid
WFA	- Weight-for-Age
WFH	- Weight-for-Height
WFP	- World Food Programme
WHO	- World Health Organization
WVK	- World Vision Kenya

EXECUTIVE SUMMARY

The Greater Samburu district is in the Rift Valley province of Kenya and falls within the Northern Pastoral Livelihood Cluster (NPLC), which is generally considered Borderline Food Insecure (BFI), where moderate malnutrition risk easily deteriorates into Acute Food and Livelihood Crises (AFLC). The Greater Samburu district has three main livelihood zones: the Pastoral-all species zone, the Agro-pastoral zone and the Formal employment/business/petty trade livelihood zone. In 2007, three new administrative districts (Samburu Central, Samburu North and Samburu East) were carved off the greater Samburu district. The district has been on Emergency Operation Programme (EMOP) implemented through General Food Distribution (GFD) since September 2004 following a severe drought that affected the entire district. The International Medical Corps is currently implementing supplementary and therapeutic feeding programmes targeting malnourished children under the age of five years, pregnant and lactating mothers in 23 health facilities in Samburu North and East districts. World vision in partnership with UNICEF is implementing high impact nutrition interventions in Samburu Central district. Other interventions in the district include water tankering to schools and communities in all divisions except Kirisia; provision of fuel subsidy to community boreholes; district-wide livestock disease surveillance and livestock quarantine. A blanket food aid distribution for the underfives and pregnant women was implemented in the district between January and April 2010. Currently, International Medical Corps is implementing the mother care group project in Samburu North and Samburu East districts. Likewise, the government nutritionists are implementing Mother Support Groups (MCGs) in Samburu Central and Samburu North districts among populations included in programme catchment areas. For purposes of informing stakeholders/partners in the district as well as the planning of appropriate response to the current nutritional situation in the greater Samburu district, this nutrition/health survey was imperative. Consequently, a nutrition/health survey was conducted by the Ministry of Health (MOH), World Vision and the International Medical Corps in the greater Samburu district with support from UNICEF KCO, USAID and MOH between 12th and 18th September 2010 with the purpose of establishing the current health and nutritional situation and recommend appropriate interventions.

The survey utilized the Standardized Monitoring of Relief and Transitions (SMART) methodology and also in accordance with both the National Guidelines for Nutrition and Mortality assessments in Kenya and recommended nutritional survey UNICEF key indicators. Both anthropometric and mortality data were collected simultaneously during the survey. A two-stage cluster sampling with probability proportional to size (PPS) design was employed for the integrated nutrition survey. Sample size was determined on the basis of estimated prevalence rates of malnutrition (GAM), desired precision and design effect) using the ENA for SMART software.

With a mean household size of 5.8 (SD 2.3) persons, the surveyed households yielded a total of 904 eligible children aged 6-59 months with an overall sex ratio of 1.0. The prevalence of GAM (WFH <-2 z-scores or oedema) by the World Health Organization growth standards (WHO-GS) was 15.7% (13.0-18.9 CI) while severe acute malnutrition (SAM) i.e. z-scores below -3 or oedema stood at 3.3% (2.3-4.6 CI). The prevalence of GAM by NCHS references of 15.1% (12.8-17.6 CI) was lower than that (22.0%) reported in a survey conducted in the district in May 2009 immediately after the long rains. The findings indicate that Samburu North district was most affected by acute malnutrition out of the 3 new administrative units. This was collaborated by observations on the ground that showed the district was the driest compared to the other two. The prevalence of GAM by MUAC was 6.3% (4.9-8.2 CI) and SAM 0.4% (0.1-1.2 CI) with slightly more than one fifth (21.6% 19.0-24.4 CI) of the children being at risk of malnutrition. The prevalence of underweight (WFA <-2 Z-scores or oedema) was 30.6% (26.8-34.6 CI) while 8.3% (6.3-10.8 CI) of the children were severely underweight (WFA <-3 Z-scores or oedema). The global chronic malnutrition (GCM) rate (WFA <-2 Z-scores) was 33.7% (29.4-38.3 CI) while severe GCM rate was 10.5% (7.7-14.2 CI). The prevalence of chronic energy deficiency (CED) among

pregnant mothers (50.0% 39.1-60.9 CI) was significantly higher (P<0.01) than that of their non-pregnant counterparts (12.7% 10.1-16.0 CI). Overall, the level of awareness of the mother care groups (MCG) project by mothers was low at only about a quarter (25.7%) in the Greater Samburu district where, as expected, the levels of awareness were higher in Samburu North and East districts where the project had been operational. Nearly three quarters (74.5%) of expectant mothers in the Greater Samburu district reported having attended antenatal clinics (ANC) during pregnancy. However, the potential gains accruing from the relatively high ANC attendance could easily have been diminished by the fact that only about one tenth (12.6%) of the mothers delivered in a medical facility, with the majority (62.5%) delivering at home where 60.0% of these were assisted by traditional birth attendants (TBAs). The majority of mothers who delivered at home were those from Samburu North (70.0%) followed by Samburu Central (63.1%) and Samburu East (54.5%). Out of the children born at home, only half (50.5%) of them were taken to a health facility within the recommended 2-week period for the administration of polio antigen dose zero.

Only 37.5% of the children below 6 months were breastfed for the recommended 12 or more times per day. Another major setback to IYCF was the fact that all the infants had been given pre-lacteals, which means that the 30.6% of the 0-<6 months old children reportedly not on other food and drinks were technically not exclusively breastfed. The maintenance of breastfeeding stood at more than three quarters (78.1%) for children aged 6-23 months. However, the feeding frequency for close to two thirds (30.8%) of the underfives was less than 3 times per day, with only 17.0% of them fed 4 or more times in a day, which suggests that children were not fed on demand, which may be depictive of a food-deficit situation. Only 27.9% of the children took food groups that constituted a high dietary diversity (4 or more food groups), with the rest (72.1%) taking low diversity diets (less than four food groups). The meals taken were largely lacking in micronutrient-rich ingredients (fruits and vegetables). Early child weaning is commonly practised in the district, with the mean child weaning age being 2.9 (SD 2.4) months where a paltry 19.3% of the children were weaned at 6 months as per the WHO recommendation. Overall, child immunization coverage for polio (88.8%) was above the KEPI recommendation of 80% while that of measles (79.6%) had also almost attained the KEPI recommendation. Nearly half 43.9% of the children were reported to have been sick during the 2-week period prior to the survey, with the main causes of illness being acute respiratory infections (ARI) affecting 25.3% of the children, diarrhoea (6.2%) and malaria (6.2%). The coverage for SFP by WFH Z-scores was 8.3% while OTP coverage was 3.3%. That of SFP by MUAC stood at 18.8%. Both the proportion of households possessing mosquito nets (25.0%) and utilization rates by various population sub-groups was below the 20% mark. Although 59.8% of the households had received general food aid during the 3-month preceding period, a majority (92.7%) of the households reported having received it more than 2 months previously. The absence of agricultural-related activities as a source of household income is suggestive of poor economic diversification with overdependence on livestock as a source of livelihood, which could easily plunge the community into food insecurity crisis whenever conditions that adversely affect livestock farming prevail. Both the underfive mortality rate (UFMR) of 0.76 deaths/10,000/day (CI 0.54-1.07) and the crude mortality rate (CMR) of 0.96 deaths/10,000/day CI 00.51-1.81) were relatively low.

In conclusion, although the level of GAM both by WHO-GS (15.7% 13.0-18.9 CI) and by NCHS references (15.1% 12.8-17.6 CI) is less than that (22.0%) reported in a survey conducted in the district in May 2009 immediately after the long rains using the 30x30 cluster sampling, it is still unacceptably high which is reflective of prevailing nutritional inadequacy. On the other hand, the findings of this survey also indicate that the level of stunting among the underfives was also high at 33.7% (29.4-38.3 CI), which is suggestive of long-term nutritional inadequacy. However, both the UFMR (0.76 deaths/10,000/day 0.54-1.07 CI) and CMR (0.96 deaths/10,000/day 0.51-1.81 CI) are below the emergency threshold for sub-Saharan Africa where the expected mortality is 1.14 deaths/10,000 per

day. A number of aggravating factors that militated against optimal child nutrition were evident from the findings of this survey and included the following:

- a relatively high morbidity load that affected almost half (43.9%)of the underfives;
- poor infant and young child feeding and care practices (early weaning, low maintenance of breast feeding and poor feeding);
- general food scarcity in the community due to poor agricultural production, over-reliance on food purchase as a main source of food in a poor socio-economic set up, prevailing drought particularly in Samburu North and low livelihood diversification;
- low vitamin A supplementation and deworming coverage;
- poor water, sanitation and hygiene practices;
- limitations inherent in the implementation of SFP and OTP programmes (minimal active case-finding in the community, resource limitations including inadequate field staff, logistical and capacity limitations that hindered optimal implementation and achievement of high programme coverage); and
- poor maternal nutritional status mainly affecting pregnant women.

The high prevalence of GAM in conjunction with these aggravating factors, therefore, rates the situation in Greater Samburu district 'critical' by WHO benchmarks. This makes the following recommendations imperative to avoid further deterioration of the situation:

1. An immediate up scaling of both SFP and OTP interventions modelled on the community-based IMAM with a strong outreach component (beyond and in addition to health-facility based approach) to cover all areas of the Greater Samburu district accompanied by a strong active case-finding at the community level;
2. Upscale the EMOP to universally cover all households with pregnant and lactating mothers to bring malnutrition among pregnant mothers to acceptable levels;
3. Mount public health campaigns to address the following:
    - Improve vitamin A supplementation coverage among underfives and newly-delivered mothers
    - Improve deworming coverage among the underfives
    - Promote the holding rate and utilization of ITNs
    - High morbidity load among the underfives through medical outreach camps to improve access by the largely nomadic Samburu population
    - Improve motherhood practices including ANC attendance and promote optimal infant and young child feeding and care
    - Improve water and environmental sanitation and hygiene practices in the community;
4. Together with other partners promote livelihood diversification specifically focussing on small-scale agricultural activities to reduce over-reliance on livestock as a source of livelihood for the Samburu population to ultimately improve the population's nutrition security and dietary profiles
5. Provision of adequate resources for full implementation of the Government's Community Strategy in all parts of the Greater district; and
6. Up-scaling of the MCG project in Samburu North and Samburu East districts to realise its full potential and initiation of the project in Samburu Central district.

1.0 INTRODUCTION

1.1 Background and Rationale

The Greater Samburu district is in the Rift Valley province of Kenya and falls within the Northern Pastoral Livelihood Cluster (NPLC) where pastoralism is the main livelihood activity. It borders Marsabit to the north-east, Isiolo to the east, Laikipia to the south, Baringo to the south west and Turkana district to the north-west. It covers approximately 21,126.5 square kilometres, out of which 75% is an arid and semi-arid (ASAL) rangeland receiving an average annual rainfall ranging between 250mm and 600mm, with the remaining 25% comprising of a medium to high potential land receiving an annual rainfall ranging between 600mm and 900mm. Overall, the former district's population is currently estimated at 175,922 persons[1] comprising of two main ethnic groups (Samburu and Turkana). It has three main livelihood zones: the Pastoral-all species zone covering Wamba, Waso, Nyiro, Baragoi and the low-lands of Kirisia and Lorroki divisions; the Agro-pastoral zone located in the highland areas of Lorroki and kirisia divisions; and the Formal employment/business/petty trade livelihood zone found in Maralal, Wamba and Baragoi towns. In 2007, three new administrative districts (Samburu Central, Samburu North and Samburu East) were carved off the greater Samburu district.

The NPLC is generally considered Borderline Food Insecure (BFI), where moderate malnutrition risk easily deteriorates into Acute Food and Livelihood Crises (AFLC). Following the relatively good 2009 short rains and apparent one-month early onset of 2010 long rains, the food security situation improved from the AFLC to BFI. The short rains recharged most of the water sources within the cluster. However, the general quality of water was poor as it was sourced mainly from semi or fully unprotected sources. A cholera outbreak was reported in Samburu district with a total of 49 confirmed cases including 2 deaths. An upsurge of diarrhoea mainly attributed to poor childcare practices, poor dietary diversities, low feeding frequencies, poor hygiene and sanitation and general food insecurity was also reported in the cluster. During the period after the sort rains, the proportion of children at risk of malnutrition (as depicted by mid-upper arm circumference (MUAC)) indicated insignificant improvements.

The greater Samburu district has been on Emergency Operation Programme (EMOP) implemented through the General Food Distribution (GFD) since September 2004 following a severe drought that affected the entire district. The Ministries of Medical Services and Public Health and Sanitation in collaboration with International Medical Corps are currently implementing supplementary and therapeutic feeding programmes targeting malnourished children under the age of five years, pregnant and lactating mothers in 13 out of 23 health facilities in Samburu North and East districts. The current beneficiary in supplementary feeding programme (SFP) stands at 6,279 children while outpatient therapeutic feeding programme (OTP) has 35 children. World Vision is also implementing community-based management of acute malnutrition in Lorroki division with a current beneficiary level of 691. The current drought in most parts of the district has also necessitated some non-food interventions including water tankering to schools and communities in all divisions except Kirisia; provision of fuel subsidy to community boreholes; district-wide livestock disease surveillance and livestock quarantine. A blanket food aid distribution for the underfives and pregnant women was implemented in the district between January and April 2010. Currently, the International Medical Corps is implementing the mother care group project in Samburu North and Samburu East districts. For purposes of informing stakeholders/partners in the district as well as the planning of appropriate response to the current nutritional situation in the greater Samburu district, the conduct of a nutrition/health survey was imperative. Consequently, a nutrition/health survey was conducted by the Ministry of Health (MOH), World Vision and the International Medical Corps in the greater Samburu district with support from UNICEF KCO and USAID between 12th and 18th September 2010 with the purpose of establishing the current health and nutritional situation and recommend appropriate food sand non-food interventions.

[1] International Medical Corps, Maralal Office (September 2010).

1.2 Objectives

The objectives of the survey were:

1. To estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months or with height/length of 65-109.5 cm
2. To estimate the level of malnutrition among adult women aged 15-49 years
3. To identify factors likely to have influenced malnutrition in young children
4. To estimate the prevalence of some common diseases (measles, diarrhoea, malaria, and ARI)
5. To estimate measles, polio vaccination and Vitamin A supplementation coverage amongst children
6. To estimate crude and under-five mortality rates
7. To assess child and infant care and feeding practices
8. To estimate the impact and coverage of general food distribution and feeding programs
9. To describe the current household food security situation
10. To describe the situation of water and sanitation
11. To assess the impact of the Mother care groups (MCG) project as a health/Nutrition education medium.

2.0 METHODOLOGY

2.1 Geographic Target Area and Population Group

This survey covered the greater Samburu district which currently is divided into three administrative districts (Samburu Central, Samburu North and Samburu South). The target population comprised of children 6-59 months old for anthropometric measurements and their mothers/primary caregivers as the primary respondents to the household and child questionnaires. The nutritional status of mothers or primary child caregivers aged 15-49 years was also assessed.

2.2 Type of Survey

The survey utilized the Standardized Monitoring of Relief and Transitions (SMART) methodology and was guided by both the National Guidelines for Nutrition and Mortality assessments in Kenya and the recommended UNICEF nutritional survey key indicators. Both anthropometric and mortality data were collected simultaneously during the survey. Qualitative data (focus group discussions (FGDs), key informant interviews and general observations) were also collected to complement the quantitative findings.

2.3 Sampling Methodology and Sample Size

In order to adequately cover each of the three new administrative districts, three sampling frames were utilized, each representing the population for the respective administrative unit. A two-stage cluster sampling with probability proportional to size (PPS) design was employed for the survey. The Emergency Nutrition Assessment (ENA) for SMART software was used to determine the sample size using village-level population data.

At the first stage, survey sample size was determined by entering relevant information (respective estimated village/sub-location populations, estimated prevalence rates of malnutrition (GAM), desired precision and design effect) into the ENA for SMART software. Use of an estimated malnutrition prevalence of 22.4%, desired precision of 5%, a design effect of 1.5 and an estimated household size of 6 persons and non-response rate of 5% resulted in a sample size of 391 children (6-59 months) and a household sample of 391 households for each administrative unit. A total of 45 clusters, 15 from each administrative unit and 20 households per cluster were covered. Mortality assessment was carried out in each of the households visited.

The second sampling stage involved village and household selection for each of the three new districts. The village-level population was entered into the SMART software and the list of the actual villages to visit generated. Using the EPI method, the survey teams (with the assistance of a cluster guide selected in collaboration with the Chief or Assistant Chief) first went to the centre of the village where they spun a pen to select a random direction to walk to the edge of the village. While at the edge of the village, the pen was spun again and the team walked along this second line counting and assigning numbers to the first 5 households within a 45^0 radius and writing them on pieces of paper. The first household to be visited was then selected at random and all subsequent households in the selected direction visited to implement the questionnaires in a total of 20 households.

All children aged 6-59 months in every household visited were included in the anthropometric survey. A household was defined as a group of people who shared a common cooking pot. In polygamous families with several structures within the same compound but with different wives having their own cooking pots, the structures were regarded as separate households and assessed separately. In cases where there was no eligible child, a household was still considered part of the sample, where only household and mortality data were collected. If a respondent was absent during the time of household visit, the teams left a message and re-visited later to collect data for the missing person, with no substitution of households. The teams visited the nearest adjacent village (not among those sampled)

to make up for the required number of households if the selected village yielded a number below 20 households, following the methodology described above.

2.4 Data collection Tools and Variables Measured

Each of the districts had a survey coordinator (two of them experienced government nutritionists from the MOH and one a project officer with World Vision) who together with the 9 survey teams worked under the overall supervision of the Samburu district International Medical Corps manager, acting Samburu World Vision nutrition manager and the survey consultant during field data collection. In addition to household, anthropometric and mortality data, each of the teams implemented focus group discussions for women and men in one cluster, selected from the targeted villages in a manner that ensured adequate representation of socio-economic and ecological differentials among the clusters.

Five sets of questionnaires were used for data collection. These included four sets of structured questionnaires (household, 6-59 months old child and maternal/primary child caregiver, 0-<6 months child and mortality questionnaires) and a focus group discussion (FGD) guide to collect qualitative data.

2.4.1 The household questionnaire

This elicited general household information (demographic data, household water sources and consumption, mother care groups (MCG) information, maternal dietary diversity, sanitation, food insecurity mitigation strategies, possession and utilization of insecticide-treated mosquito nets and socio-economic status indicators.

2.4.2 Child (6-59 months old) and maternal questionnaire

The following data were collected using this questionnaire:

Child age: documents such as vaccination cards, birth certificates and baptism cards, where available, were first used to determine the date of birth and the age of children in months. In cases where such documents were not available, child caregivers' recall and a calendar of local events (developed in collaboration with the survey team) were used to estimate child age.

Child sex: whether male or female.

Bilateral oedema: normal thumb pressure was applied on the top part of both feet for 3 seconds. If pitting occurred on both feet upon release of the fingers, the child was recorded as having nutritional oedema.

Child weight: the weights of children were taken in the nude (or with minimal light clothing on) using Salter Scales with a threshold of 25kgs and recorded to the nearest 0.1kg.

Child length/height: children were measured bareheaded and barefooted using wooden height boards. Children under the age of two years were measured while lying down (recumbent height) and those over two years while standing upright (stature). If child age could not be accurately determined, proxy heights were used to determine cases where height would be taken in a supine position (between 65cm-<85cm) or in an upright position (heights greater ≥85cm) for analysis using WHO standards and NCHS references.

Child and maternal MUAC: the MUAC of children and child caregivers were taken using child and adult tapes, respectively, and recorded to the nearest 0.1cm.

Morbidity: a 2-week morbidity recall was conducted for all index children (6-59 months) to assess the prevalence of common diseases (malaria, acute respiratory infections (ARI), diarrhoea, measles, stomach-ache, eye and skin infections).

Child feeding: information on breastfeeding, weaning and child feeding were collected. Dietary diversity information based on a 24-hour food intake recall was collected for the children.

Child immunization and Vitamin A supplementation: data on vitamin A supplementation, deworming, and immunization for measles and polio were collected to estimate their coverage.

Feeding programme enrolment: it was established if a child was enrolled in a supplementary feeding programme or therapeutic feeding programme.

2.4.3 Under 6 months old child questionnaire
This was used to collect infant and young child feeding (IYCF) practices data in the households visited.

2.4.4 Mortality questionnaire
This elicited 3-month (90-day) retrospective mortality recall information (i.e. since 15th June 2010) on whether there had been any deaths in households and the probable causes of death through verbal autopsy.

2.4.5 Focus group discussion (FGD) guide
A FGD guide was used to collect qualitative data to complement quantitative data.

2.5 Training and Supervision
A consultant nutritionist recruited by World Vision trained the survey team for four days (7th to 10th September 2010) at the Le-Shangirilai Inn conference room. The survey team had been selected by World Vision and International Medical Corps in collaboration with the Ministry of Public Health and Sanitation on the basis of previous survey experience, education and knowledge of communities being surveyed. Training included a pre-test of the survey tools on 11th September followed by a feedback session and logistical preparations before the teams were sent to their respective clusters later in the day to start data collection on 12th September. The following topics were covered in the training:

- survey objectives
- types and causes of malnutrition
- SMART survey and sampling methodologies
- household, child and mortality questionnaires interviewing techniques
- anthropometric measurement training
- practical on household interviewing and anthropometric measurements
- duties and responsibilities
- research ethics
- community entry behaviour
- logistics

2.6 Data Entry and Analysis
Anthropometric and mortality data entry and processing was done using the SMART/ENA software where the WHO and NCHS data cleaning and flagging procedures were used to identify outliers which enabled data cleaning as well as exclusion of discordant measurements from anthropometric analysis. The SMART/ENA software generated weight-for-height, height-for-age and weight-for-age Z scores to classify them into various nutritional status categories using WHO[2] standards and NCHS references and cut-off points and exported back to SPSS for further analysis. Weight-for-height percentages of the median indicators were generated using the EPINUT software, which the SMART/ENA software does not generate. All the other quantitative data were entered and analysed in the SPSS (Version 17.0) computer package.

2.7 Nutritional Status Cut-off Points
The following nutritional indices and cut-off points were used in this survey:

2.7.1 Weight-for-height (WFH) and MUAC – Wasting for Children

[2] WHO (2005): Anthro 2005 Version 2.02 Standards

The prevalence of wasting (a reflection of the current health/nutritional status of an individual) are presented as global acute malnutrition (GAM) and severe acute malnutrition (SAM) using weight-for-height (WFH) Z scores, WFH percentage of median and MUAC indices. The results on wasting are presented as Global acute malnutrition (GAM) and severe acute malnutrition (SAM):

- Children whose WFH Z scores fell below -2 standard deviations from the median of the WHO standards (WHO-GS)/NCHS reference population or had bilateral oedema were classified as wasted (to reflect GAM)
- Children whose WFH Z scores fell below -3 standard deviations from the median of the WHO-GS/NCHS reference population or had bilateral oedema were classified as severely wasted (to reflect SAM)
- A cut-off point of <12.5cm MUAC was used to signify GAM among the underfives.

2.7.2 Weight-for-age (WFA) – Underweight

The measure of underweight gives a mixed reflection of both the current and past nutritional experience by a population and is very useful in growth monitoring.

- Children whose WFA Z scores fell below -2 standard deviations from the median of the WHO-GS or had bilateral oedema were classified as underweight
- Children whose WFA Z scores fell below -3 standard deviations from the median of the WHO-GS or had bilateral oedema were classified as severely underweight.

2.7.3 Height-for-age (HFA) – Stunting

Height-for-age is a measure of linear growth and therefore an unequivocal reflection of cumulative past nutritional inadequacy.

- Children whose HFA Z scores fell below -2 standard deviations from the median of the WHO-GS were classified as stunted (to reflect Global Stunting)
- Children whose HFA Z scores fell below -3 standard deviations from the median of the WHO-GS were classified as severely stunted.

2.7.4 Maternal MUAC

The following cut-off points for MUAC (Table1) were used to classify mothers into various nutritional status categories according to SPHERE standards[3].

Table 2: *Maternal MUAC cut-off points*

Nutritional status	Pregnant	Non-pregnant
Normal	≥ 23.0cm	≥ 21.0cm
GAM	< 23.0cm	< 21.0cm
Severe wasting	< 20.7cm	< 18.5cm

2.8 Data Quality control

Data quality was ensured through:

- thorough training of team members
- the majority of the enumerators and team leaders had prior experience in carrying out nutrition surveys
- standardization of interviewing procedures through verbal translation of questions by survey team members into the Samburu and Turkana languages during training
- standardization of anthropometric measurement procedures
- practical sessions on interviewing and anthropometric measurements taking

[3] The SPHERE Project Handbook (2004). Humanitarian Charter and Minimum Standards in Disaster Response.

- daily supervision of the teams by team leaders, survey coordinators, the consultant, Samburu district International Medical Corps manager, World Vision programme managers and Samburu district nutrition officers
- review of questionnaires on a daily basis
- on-the-spot correction/feedback of any mistakes noted during data collection to avoid mistake carry-overs
- review of questionnaires by teams before leaving the household to ensure questionnaire completeness
- frequencies for all variables were first run and the data cleaned by cross-checking any aberrant values observed on the respective questionnaire before analysis
- triangulation and validation of quantitative data using qualitative information
- entry of anthropometric data in the SMART/ENA software which enabled on-the-spot identification, cross-checking and correction of any aberrant values

3.0 RESULTS AND DISCUSSIONS

3.1 General Characteristics of Study Population and Households

The households visited had a mean household size of 5.8 (SD 2.3) persons and yielded a total of 904 eligible children aged 6-59 months for whom nutritional status assessment was carried out. On average, the households had 1.15 (SD 0.8) children aged below 5 years and 4.5 (SD 2.3) persons aged above 5 years. Three quarters (75.6%) of the households were male-headed and 23.6% female headed. The findings showed that the practice of polygamy is widely practised in the district where more than half (53.2%) of the households were polygamous families.

As shown in Table 3, the survey sample comprised of 904 eligible children (50.3% males and 49.7% females. There was a general decrease in the number of index children with age, with the proportion of those aged 18-29 months being the highest (26.9%) and lowest (8.5%) among those aged 54-59 months. The age of the children was confirmed through health cards for more than two-thirds (68.9%) of the children and through recall for 30.1%. The overall as well as age group sex ratios (males/females) were all within the expected ratio of 0.8-1.2, thus demonstrating an unbiased survey sample.

Table 3: *Age and sex distribution of sample children*

Age in Months	Males		Females		Total		Sex ratio M/F
	n	%	n	%	n	%	
6-17	107	51.0	103	49.0	210	23.2	1.0
18-29	122	50.2	121	49.8	243	26.9	1.0
30-41	111	52.4	101	47.6	212	23.5	1.1
42-53	79	48.8	83	51.2	162	17.9	1.0
54-59	36	46.8	41	53.2	77	8.5	0.9
Total	**455**	**50.3**	**449**	**49.7**	**904**	**100.0**	**1.0**

3.2 Nutritional Status of Children 6-59 Months

3.2.1 Overall Prevalence of Global Acute Malnutrition by WFH Z-scores (WHO Standards)

As a departure from the previous growth reference charts used to measure babies and children, the WHO Child Growth Standards (WHO-GS)[4], are based on the premise that the breastfed baby is the norm for healthy growth among infants. Until the development of the WHO child growth standards, existing child growth references were based on breast and/or artificially fed infants. As such, WHO-GS are designed as a standard rather than a reference; and are recommended for application to all children independent of the type of feeding. Because breastfed babies are lean babies, the shape of the curve in the new WHO Child Growth Standards differs from earlier references, particularly during the first six months of life when growth is rapid[5].

The weight-for-height (WFH) index, which reflects the current nutritional status of the community, was computed for 883 eligible underfives out of the 904 that were assessed after 21 cases (2.3%) were flagged off due to aberrant values according to the WHO Standards flagging procedures. As shown in Table 4, the proportion of children suffering from global acute malnutrition (GAM), as indicated by WFH z-scores below -2 standard deviations from the median of the WHO-GS reference population or having oedema, was 15.7% (13.0-18.9 CI) while the prevalence of severe acute malnutrition (SAM) i.e. z-

[4] WHO (2005): Anthro 2005 Version 2.02 Standards

[5] WHO Muliticentre Growth Reference Study Group. WHO Child Growth Standards based on length/height, weight and age. *Acta Paediat* 2006; (Suppl 450): 76-85.

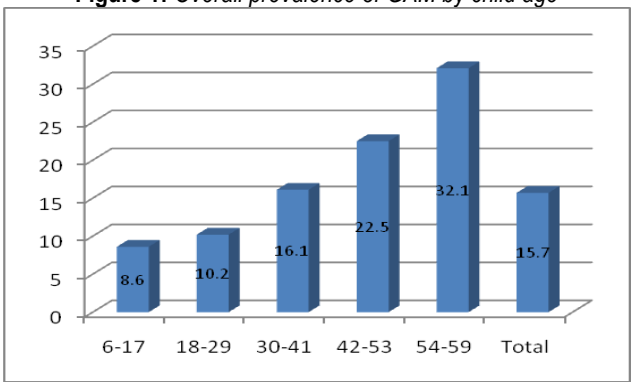
scores below -3 or oedema was 3.3% (2.3-4.6 CI). Both the prevalence of GAM and SAM were higher among boys than girls.

Table 4: *Overall Prevalence of acute malnutrition by weight-for-height z-scores (WHO standards)*

	Males (n=448)		Females (n= 435)		Total (N= 883)	
	n	95% CI	n	95% CI	n	95% CI
Global acute malnutrition (GAM) **W/H <-2 Z scores or oedema**	77	17.2 (13.6-21.5)	62	14.3 (11.3-17.8)	139	**15.7** (13.0-18.9)
Severe acute malnutrition (SAM) **W/H <-3 Z scores or oedema**	19	4.2 (2.8-6.4)	10	2.3 (1.2-4.3	29	**3.3** (2.3-4.6

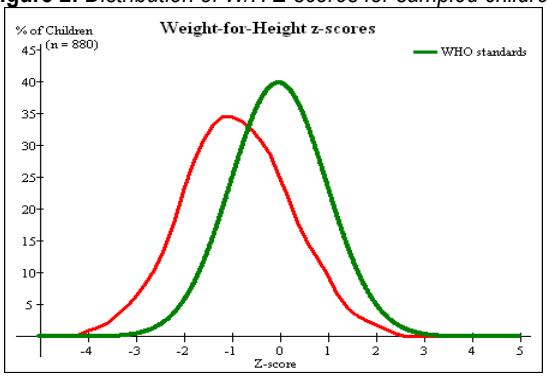
The overall prevalence of GAM by child age by WHO-GS (Figure 1) indicated a consistent increase with child age, which may among other things, be attributed to cessation of breastfeeding accompanied by waning good feeding practices and child care for relatively older children.

Figure 1: *Overall prevalence of GAM by child age*



Overall, the weight-for-height anthropometric distribution curve of the sample in Z-scores indicated a shift to the left with a mean Z-score of -0.9 (SD 1.2), implying a worse-off nutritional status for the sample children compared to the WHO-GS curve (Figure 2).

Figure 2: *Distribution of W/H Z-scores for sampled children*

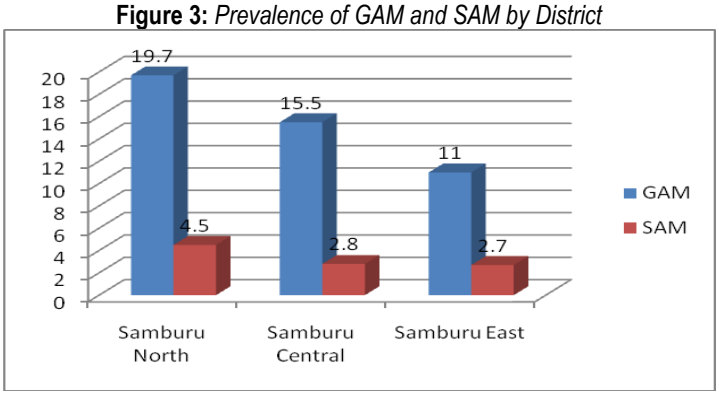


The prevalence of GAM by NCHS references of 15.1% (12.8-17.6 CI) was lower than that (22.0%) reported in a survey conducted in the district in May 2009 immediately after the long rains. However, it is imprudent to statistically compare the two GAMs since the surveys were conducted during different time periods, and more importantly, the 2009 survey utilized the 30x30 cluster sampling methodology while the current survey utilized the SMART methodology.

3.2.2 *Prevalence of GAM by District (WHO Standards)*

The findings indicate that Samburu North district was most affected by acute malnutrition out of the 3 new administrative units. This was collaborated by observations on the ground that showed that the district was the driest compared to the other two. As shown in Figure 3, the prevalence of GAM was highest (19.7% 15.6-24.7 CI) in Samburu North district followed by that of Samburu Central district (15.5% 11.7-20.3 CI) and lowest in Samburu East district (11.0% 7.7-15.3 CI). The difference in GAM prevalence between Samburu North and Samburu East districts was significant (P<0.05). Likewise, Samburu North district contributed most to the overall SAM prevalence in the Greater Samburu district with a prevalence of 4.5% (2.6-7.5 CI) followed by Samburu Central district (2.8% 1.3-5.8) and Samburu East district (2.7% 1.3-5.5 CI).

Figure 3: *Prevalence of GAM and SAM by District*



3.2.3 *Prevalence of Acute Malnutrition by MUAC*

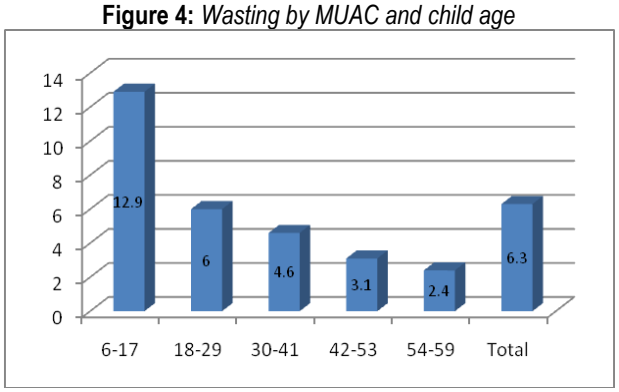
Though not as sensitive an indicator of acute malnutrition compared to WFH Z-scores, the mid-upper arm circumference (MUAC) has been in use as a quick screening tool for admission into nutrition intervention programmes. However, it tends to overestimate acute malnutrition for children below one year of age. Although the current WHO recommendation for admission into feeding programmes prescribes the use of WHO-GS, MUAC is included in the Kenya National IMAM guidelines as an admission and discharge criteria and is therefore still being used for initial field case-finding in the Greater Samburu district, after which the WHO-GS WFH Z-scores are then used for admission validation at the health facility. The SFP in Samburu uses a MUAC cut-off of 11.5cm-12.5cm and OTP uses a cut-off of <11.0cm during field admission screening. An analysis of GAM by MUAC for the underfives indicated a lower overall prevalence of both GAM (6.3% 4.8-8.1 CI) and SAM (0.4% 0.1-1.2 CI) compared to those by WHO-GS WFH Z-scores. Slightly more than one fifth (21.6% (19.0-24.4 CI) of the children were at risk of malnutrition.

Table 5: Child n*utritional status based on MUAC*

Criteria	Interpretation	n	95% CI
MUAC < 11.0cm	SAM	4	0.4 (0.1-1.2)
11.0- <12.5cm	Moderate malnutrition	53	5.9 (4.5-7.7)
Total malnourished (<12.5cm)	GAM	57	6.3 (4.8-8.1)
12.5- <13.5cm	At risk of malnutrition	195	21.6 (19.0-24.4)
>13.5cm	Normal	652	72.1 (69.1-75.0)

An analysis of GAM by MUAC and child age (Figure 4) showed a consistent increase with child age with the highest prevalence being among children aged 6-17 months (12.9% 8.7-18.4 CI) and lowest among those aged 54-59 months (2.4% 0.4-9.2 CI).

Figure 4: *Wasting by MUAC and child age*



3.2.4 Prevalence of Underweight by Weight-for-age Z-scores (WHO-GS)

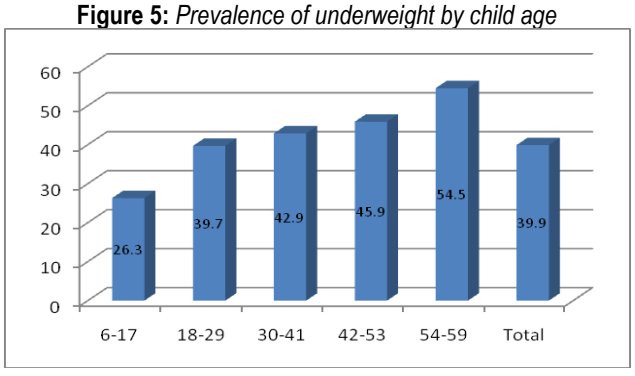
The weight-for-age (WFA) index is a composite measure of both wasting and stunting, therefore gives a mixed reflection of current and past nutritional experience of the community. As such, it is a very useful tool in individual child growth monitoring. As shown in Table 6, the prevalence of GAM by WHO-GS (WFA <-2 Z-scores or oedema) was 30.6% (26.8-34.6 CI) while SAM (WFA <-3 Z-scores or oedema) stood at 8.3% (6.3-10.8 CI). Although more girls than boys suffered from both GAM and SAM, the differences were not statistically significant as indicated by overlapping confidence intervals.

Table 6: *Prevalence of **underweight** by weight-for-age z-scores (**WHO** standards)*

	Males (n= 441		Females (n= 439		Total (N= 880	
	n	95% CI	n	95% CI	n	95% CI
Global acute malnutrition (GAM) **W/A <-2 Z scores or oedema**	142	32.2 (27.4-37.4	127	28.9 (24.6-33.6	269	30.6 (26.8-34.6)
Severe acute malnutrition (SAM) **W/A <-3 Z scores or oedema**	41	9.3 (6.6-13.0)	32	7.3 (5.1-10.3)	73	8.3 (6.3.-10.8

The prevalence of underweight by child age was computed using NCHS references since the SMART software does not generate WFH prevalence by child age. The findings (Figure 5) showed that underweight consistently increased with child age (Figure 5). However, no conclusive inference may be made out of this finding since underweight is an indicator of both current and past nutritional experience.

Figure 5: *Prevalence of underweight by child age*



3.2.5 Prevalence of Stunting by Height-for-age (HFA) Z-scores (WHO-GS)

The height-for-age (HFA) index assesses linear growth and thus reflects the cumulative effects of long-standing nutritional inadequacy and/or recurrent chronic illness which may result in a child having a low HFA (referred to as stunting) indicated by deficits in stature when compared to his/her age cohorts. It is not affected by seasonality but is rather related to the effects of socio-economic development and long-

standing food security situation in a community. The results (Table 7) indicated a global chronic malnutrition (GCM) rate of 33.7% (29.4-38.3 CI) and severe GCM rate of 10.5% (7.7-14.2 CI). The global chronic malnutrition level in Samburu is still rated 'serious' according to WHO[6] benchmarks and is higher than the National prevalence of 30%[7]. This calls for measures to alleviate long-term nutritional depravity in the greater samburu district.

Table 8: OVERALL *Prevalence of **stunting** by height-for-age z-scores (**WHO** standards)*

	Males (n= 418		Females (n= 419		Total (N= 837	
	n	95% CI	n	95% CI	n	95% CI
Global chronic malnutrition (GCM) **H/A <-2 Z scores or oedema**	154	36.8 (31.3-42.7	128	30.5 (25.8-35.8	282	33.7 (29.4-38.3)
Severe chronic malnutrition (SCM) **H/A <-3 Z scores or oedema**	55	13.2 (9.6-17.7	44	10.5 (7.7-14.2	44	10.5 (7.7-14.2

3.3 Adult Nutritional Status

The mid-upper arm circumference (MUAC) was measured to assess the nutritional status of 612 eligible childcare takers (15-49 years) out of whom 86 (14.1%) were pregnant and 526 (85.9%) were non-pregnant during the conduct of this survey. The results (Table 9) indicated that overall, 18.0% (15.1-21.3 CI) of the mothers in the Greater Samburu district suffered from chronic energy deficiency. The proportion of pregnant mothers (50.0% 39.1-60.9 CI) suffering from chronic energy deficiency (CED) was significantly higher (P<0.01) than that of their non-pregnant counterparts (12.7% 10.1-16.0 CI). Likewise, significantly more pregnant women suffered from both severe and moderate chronic energy deficiency (P<0.01). This calls for concerted efforts to bring down the level of malnutrition among pregnant women to acceptable levels in the district. A MUAC cut-off point of <21cm is used to admit pregnant and lactating women into the SFP where they exit at 23cm MUAC. All lactating women were admitted into SFP during the first 6 months after giving birth.

Table 9: OVERALL *Adult nutritional status by MUAC*

	Physiological Status					
	Pregnant (n=86)		Non-pregnant (n=526)		Total (N=612)	
Wasting by MUAC	n	95% CI	n	95% CI	n	95% CI
Severe <20.7cm pregnant <18.5cm non-pregnant	10	11.6 (6.0-20.8)	3	0.6 (0.1-1.8)	13	2.1 (1.2-3.7)
Moderate <23.0cm pregnant <21.0cm non-pregnant	33	38.4 (28.3-49.5)	64	12.2 (9.6-15.3)	97	15.8 (13.1-19.0)
Total wasted	43	**50.0** (39.1-60.9)	67	**12.7** (10.1-16.0)	110	**18.0** (15.1-21.3)

[6] WHO (2000). Management of Nutrition in Major Emergencies.

[7] GOK (2003): Kenya Demographic and Health Survey

3.4 Mother Care Groups (MCGs)

The mother care group project was started following an alarm raised by a World Vision survey in the Greater Samburu district that implicated poor health and nutritional knowledge attitudes and practices (KAP) as major causes of malnutrition. Poor knowledge was mainly reported in the area of infant and young child feeding (IYCF) practices. The coverage of the integrated management of acute malnutrition (IMAM) project was also reportedly low mainly due to active case finding and defaulter tracing.

The MCG concept has reported progress in addressing some challenges related to behaviour change and cost effectiveness as they build a sustainable community-level structure for health promotion in countries such as Ethiopia, Uganda and Mozambique. The main objective of the MCGs is improvement of the nutritional status of the underfives, pregnant and lactating mothers through own self referral systems, defaulter tracing strategies and through lead mother-led health education forums. The MCGs are inbuilt into the community health workers' (CHW's) services delivery system, where each community health worker supervises and models a group of 5 lead mothers, each of whom then models 12 other lead mothers. The 12 lead mothers each supervises and models a group of between 8 to 14 members who ultimately constitute a mother care group. One CHW therefore supervises and models about 60 MCGs with between 480–840 mothers. The 8 to 14 mothers meet on monthly basis and the lead mother takes them through the lesson of that month. During the remaining days of the month, the lead mother visits the mothers in their respective homes to see if they are having any challenges practicing what they were trained on. In addition, she takes MUAC anthropometry for any pregnant and lactating mother in the household, any child from 6-59 months of age and refers them, if need be, to the respective intervention (SFP or OTP). In addition, she checks whether any of the household member is due for any routine medication/systematic treatment or basic medical care and refers them to the health facility for the same. All this is recorded by the lead mother in the simple tally sheet checklist which summaries the health promotion activities conducted that month ranging from referrals to the actual lesson and the attendants.

Every month, International Medical Corps staffs meet with nurses and CHWs, and they go through the lesson of that particular month. Each CHW then goes and holds meetings with their 5 Lead mothers who will thereafter go and train their members. That way the project is able to achieve high coverage as it institutionalizes the community in manner that they can access and utilize the health services better. The MCG education strategy has three modules of 9 lessons each. International Medical Corps is currently on the 7th lesson of the first module and aims to ultimately and gradually replace its own staffs with MOH nurses at the health facilities from the 2nd module so that they may continue the health education even after its exit from the project.

This survey aimed at assessing the impact of the MCG project as a health/nutrition education medium and referral system in Samburu North and Samburu East for International Medical Corps and to provide baseline data for the implementation of a similar project in Samburu Central district by World Vision. This project was only operational in the 13 health facilities where International Medical Corps initially set up its project but was in the process of rolling out in 11 more facilities. The findings on MCGs are presented in Table 11. Overall, the level of awareness of the MCG project by underfive child caretakers was low at only about a quarter (25.7%) in the larger Samburu district. As expected the level of awareness was highest in Samburu North and East districts (32.6%) where the project had been operational. On the basis of awareness and membership, the project seems to have performed better with higher proportions of mothers participating in Samburu North compared to Samburu East district. In Samburu central district, only 11.0% of the mothers were aware of MCGs where membership was only confined to the breastfeeding group project, which is operational currently as a component of IMAM. In view of the potential benefits of the project, there is need for more sensitization and recruitment of mothers into the project in Samburu North and East districts.

On average overall, nearly one quarter (74.5%) of expectant mothers in the Greater Samburu district reported having attended antenatal clinics (ANC) during pregnancy, with the highest attendance in Samburu Central district (79.9%) followed by Samburu East (72.4% and Samburu North district (71.2%). The higher attendance in Central district may partly be attributable to better access to health facilities compared to other areas of Greater Samburu district. However, the potential gains accruing from the relatively high ANC attendance could easily have been diminished by the fact that only about one tenth (12.6%) of the mothers delivered in a medical facility, with the majority (62.5%) delivering at home where 60.0% were assisted by traditional birth attendants (TBAs). The majority of mothers who delivered at home were those from Samburu North (70.0%) followed by Samburu Central (63.1%) and Samburu East (54.5%).

It is recommended that children who are born outside a health facility setting should be taken to a facility within 2 weeks of birth to allow for optimal health check-up and administration of the polio zero dose antigens, services which TBAs do not offer. Overall, as shown in Table 10, the findings indicate that only half (50.5%) of the children born at home were taken to a health facility within 2 weeks after birth indicating that half of the children missed the zero polio dose. The highest proportion of children borne at home and taken to a health facility within two weeks was those (64.0%) from Samburu Central district followed by Samburu North (56.6%) and Samburu East (29.0%). It is noteworthy that mothers of up to one fifth (22.0%) of the children in Samburu East had not taken children born at home to a facility and/or had no intention of doing so, which most likely means they would have missed out on necessary immunizations.

Maternal vitamin A supplementation within 2 weeks after birth is recommended by WHO to boost the content of the vitamin in breast milk. Less than half (47.4%) of the mothers reported having received vitamin A supplementation after birth which may have compromised the adequacy of vitamin A content in breast milk for more than half (52.6%) of the infants. The highest proportion of mothers reporting having received vitamin A supplementation was in Samburu East (56.9%) followed by Samburu North (47.3%) and Samburu Central 38.0%).

Table 10: *Impact of MCGs by district*

Characteristic	Samburu Central (N=209)		Samburu North (N=214)		Samburu East (N=219)		Samburu North& Central N=433)		Total (N=642)	
	n	%	n	%	n	%	n	%	n	%
Mother aware of MCGs	24	**11.5**	90	**42.1**	51	**23.3**	141	**32.6**	165	**25.7**
Mother member of MCG or BFG	2	**1.0**	65	**30.4**	27	**12.3**	92	**21.2**	94	**14.6**
Membership: MCG	0	**0**	55	**25.7**	26	**11.9**	81	**18.7**	81	**12.6**
BFG	2	**1.0**	10	**4.7**	1	**0.5**	11	**2.5**	13	**2.0**
Mother attended ANC	167	**79.9**	151	**71.2**	160	**72.4**	311	**71.8**	478	**74.5**
Where mother delivered:										
-At home by TBA	125	**59.8**	142	**66.7**	118	**53.6**	260	**60.0**	385	**60.0**
-At home without assistance	7	**3.3**	7	**3.3**	2	**0.9**	108	**24.9**	16	**2.5**
-At home with nurse assistance	52	**24.9**	40	**18.8**	68	**30.9**	56	**12.9**	160	**24.9**
-In hospital	25	**12.0**	24	**11.3**	32	**14.5**	81	**12.6**	81	**12.6**
Time before taking child to clinic for home deliveries:	**N=275**		**N=288**		**N=255**		**N=543**		**N=818**	
-Within first 2 weeks	176	**64.0**	163	**56.6**	74	**29.0**	237	**43.6**	413	**50.5**
-After 2 weeks	92	**33.5**	119	**41.3**	125	**49.0**	244	**50.0**	336	**41.1**
-Not taken/no intention to take	7	**2.5**	6	**2.1**	56	**22.0**	62	**11.4**	69	**8.4**
Maternal vitamin A supplementation after last delivery	**N=208**		**N=207**		**N=209**		**N=416**			**N=624**
	79	**38.0**	98	**47.3**	119	**56.9**	217	**52.2**	296	**47.4**

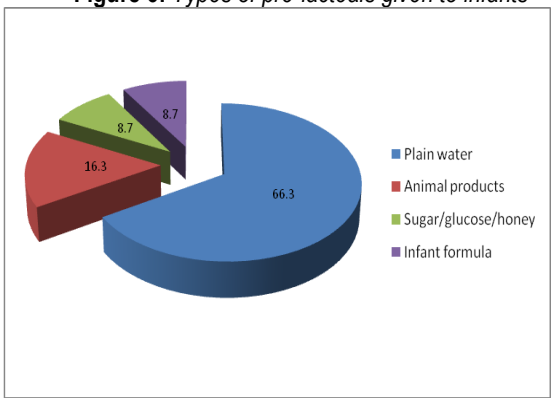
3.5 Child Feeding, Care and Health

3.5.1 Infant and Young Child Feeding Practices

Infant and young child feeding practices (IYCF) was assessed for both children below 6 months as well as those between 6-59 months. When asked whether their children had ever breastfed, all caregivers of children below 6 months old reported in the affirmative while 99.8% of those 6-59 moths old were reported to have done so. Almost three quarters (71.4%) of children below 6 months were reportedly put to the breast within the 30-minute duration as recommended by the WHO. Optimal initiation of breastfeeding is crucial for stimulation of the onset and maintenance of lactation and the provision of necessary maternal antigens to the infant through colostrum, among other benefits. Three quarters (75.9%) of the children below 6 months were reportedly given colostrums.

Infants and young children should be breastfed on demand. It is recommended that they should breastfeed every 2 hours, which translates to a breastfeeding frequency of at least 12 times per day. The results indicated that only 37.5% of the children below 6 months were breastfed 12 or more times per day with 62.5% breastfeeding less than 12 times. Another major setback to IYCF was the fact that all the infants had been given pre-lacteals, which renders the 30.6% of the 0-<6 months old children reportedly not on other food and drinks technically non-eligible for exclusively breastfeeding in the Greater Samburu district. As shown in Figure 6, the most frequently given pre-lacteal was water for 66.3% of the children followed by animal products such as milk and ghee (16.3%) and 8.7% each, for sugar/glucose water/honey and infant formula. Information derived from focus group discussions (FGDs) showed that the main reasons for giving pre-lacteals was mainly ignorance and cultural beliefs. When asked why the pre-lacteals are given to infants in the community, most respondents answered; '*in order to 'start' the digestive system of the infant to working'* and '*to quench thirst'*. According to FGD findings, such practices were said to have been *'characteristic of the community with everyone supposed to adhere to them'*.

Figure 6: *Types of pre-lacteals given to infants*

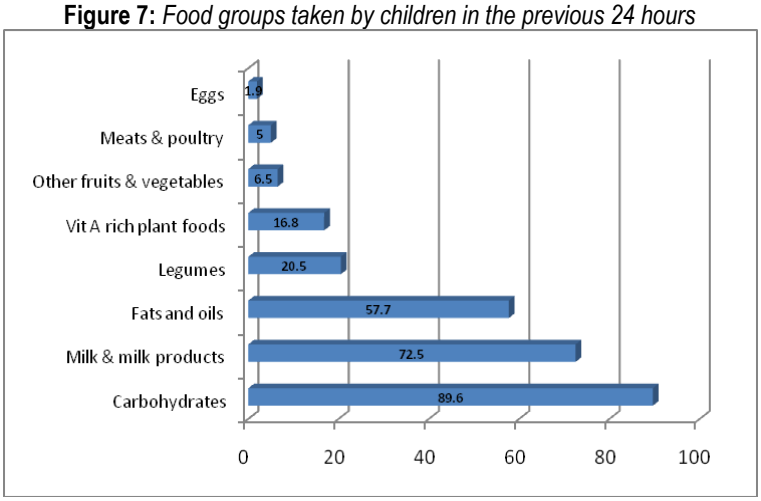


The proportion of children below 6 months reported breastfeeding during this survey's conduct was 96.4%. Overall, maintenance of breastfeeding stood at more than three quarters (78.1%) for children aged 6-23 months. As expected, maintenance of breastfeeding decreased with child age, being higher (92.2%) among those aged 6-11 months, followed by 83.0% among the 12-17 age group and 61.9% for the 18-23 month age group.

A 24-hour dietary intake recall was conducted to assess child feeding frequency and dietary diversity. On average, relatively younger children were fed slightly more times (3.7 SD 2.7) per day compared to 3.3 (SD 2.0) times for those aged 9-23 months. The findings showed that the feeding frequency for close to two thirds (30.8%) of the underfives was less than 3 times per day, with only 52.2% of the children fed 3 times and only 17.0% of them fed 4 or more times in a day. The low underfive child feeding frequency is suggestive of children not fed on demand, a situation depicting a food deficit status

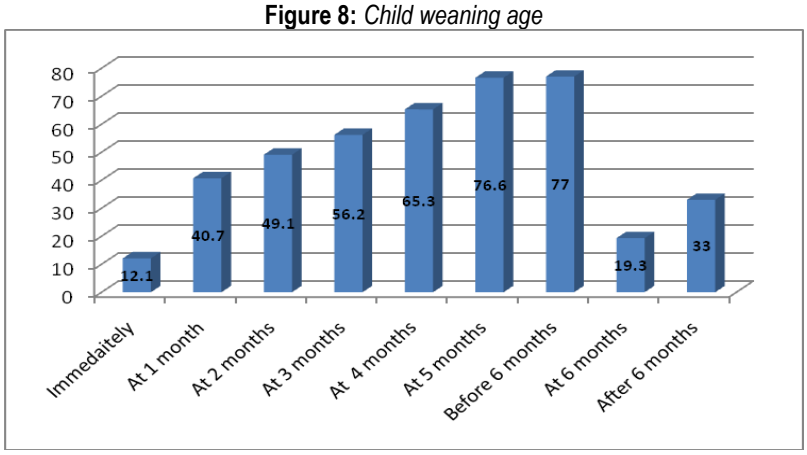
in the district. The results showed that less than one third (27.9%) of the children took food groups that constituted a high dietary diversity (4 or more food groups), with the rest (72.1%) taking low diversity diets (less than four food groups) according to Valid International benchmarks[8]. An analysis of qualitative nutrient composition of the food groups taken (Figure 7) indicates that the food group taken by the highest proportion of children was carbohydrates (89.6%) followed by milk and its products (72.5%), fats and oils (57.7%) and pulses/legumes by 20.5% of the children. The findings depict very low proportions of children taking vitamin and mineral-rich food groups.

Figure 7: *Food groups taken by children in the previous 24 hours*



The results on weaning (Figure 8) show that early weaning is commonly practised in the district. The mean child weaning age was 2.9 (SD 2.4) months. More than three quarters (77.0%) of the children were weaned before the WHO recommendation of 6 months, with more than one tenth 12.1% being weaned immediately, 40.7% by one month of age, and nearly half of them (49.1%) by the age of 2 months. A paltry 19.3% of the children were weaned at 6 months as per the WHO recommendation. According to information obtained from focus group discussions, the common foodstuffs used during weaning are milk and water with the main reasons for giving them to children early being attributed to '*breast milk not being enough (since mothers do not get enough food to eat)' and 'to accelerate growth'.*

Figure 8: *Child weaning age*



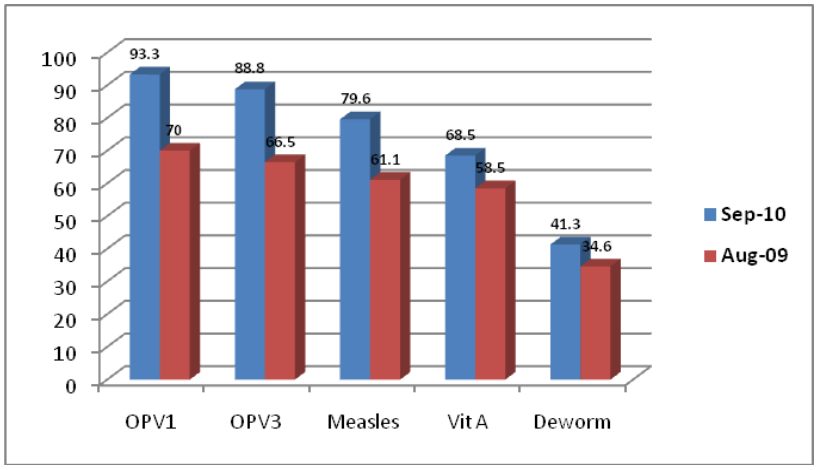
3.5.2 Child Immunization, Vitamin A Supplementation and Deworming

Child immunization and vitamin A supplementation are cheap and free public health interventions that prevent as well as reduce disease severity, therefore, are crucial for optimal child growth, development and good health. Since vitamin A supplementation is carried out as a component of routine treatment in

[8] Valid International (2006): Community-based Therapeutic Care (CTC): A Field Manual (First Edition).

health facilities, its coverage was estimated for all the sampled children covering the 6-month period prior to this survey. On the other hand, the coverage for measles vaccine was estimated only for eligible children (≥ 9 months). Relative to the findings of the August 2009 nutrition survey[9], the findings (Figure 9) indicate that overall, child immunization had improved in the greater Samburu district, with the current coverage for polio being above the KEPI recommendation of 80%, but indicating a marginal drop out of 4.5%. The coverage for measles (79.6%) had also almost reached the KEPI recommendation. There is need to upscale the coverage for vitamin A and child deworming to obliterate their potential impact against optimal child health and nutritional status.

Figure 9: *Immunization, vitamin A supplementation and deworming coverage*



3.5.3 Child Morbidity

The prevalence of the common illnesses (Table 11) was determined based on a two-week recall (inclusive of the day of the survey). The proportion of children reported sick was 43.9%. Acute respiratory infections (ARI), diarrhoea and malaria still remain the main causes of child morbidity in the district. The most common illness among the children was acute respiratory infections affecting 25.3% of the children followed by diarrhoea (6.2%) and malaria (6.2%).

Table 11: *Child morbidity*

Type of illness in the last 2 weeks	Number (N=899)	Proportion (%)
ARI	227	25.3
Diarrhoea	56	6.2
Malaria	56	6.2
Stomach ache	17	1.9
Eye infections	10	1.1
Skin infections	7	0.8
measles	6	0.7
Others	16	1.8
Reported sick	395	43.9
Reported not sick	504	56.1

Most (70.0%) of the child caregivers interviewed reported seeking qualified medical assistance from public health facilities, mobile clinics and private clinics and pharmacies when their children fell sick, with 17.4% reportedly not seeking any assistance.

[9] World Vision (August 2009): Nutrition Survey for Samburu District

3.5.4 *Supplementary and Therapeutic Feeding Programme Coverage*

During the conduct of this survey, the International Medical Corps had been implementing SFP and OTP in 26 health facilities in Samburu North East districts and World Vision had also just started a new implementation phase of the programmes in Samburu Central district. The implementation of the programmes is modelled along the Integrated Management of Acute Malnutrition (IMAM) model which will ultimately enable their full integration into the general healthcare delivery system.

There are several methods[10] of estimating the coverage of selective feeding programmes. Coverage is estimated either directly or indirectly using different formulae depending on whether the computed coverage is period or point coverage. The weight-for-height percentage of median (WFHM) has previously been used as a screening tool for admission into nutrition intervention programmes. However, since June 2009, the implementation of both SFP and OTP in the Greater Samburu district has adopted the use of WHO-GS WFH Z-scores for admitting children into the programmes rather than percentage of the median, following the WHO Technical Guidelines Recommendations, which have since been adopted by the Ministry of Health. However, MUAC is also used alongside the Z-scores. The weight-for-height WHO-GS Z-scores percentage of the median (WHM) is considered a more accurate index to use rather than MUAC, which tends to overestimate malnutrition, particularly for children below one year of age. The coverage rates in this report are based on the direct formulae considered fairly accurate for point coverage estimation and the coverage results are presented for both WHO-GS Z-scores and as well as MUAC cut-offs.

The criteria for admission into the SFP is a MUAC <12.5cm or Z-scores below -2 standard deviations while that of OTP is MUAC <11.5cm or Z-scores below -3 standard deviations. During the conduct of this survey, 54 of the sampled underfives were reportedly enrolled in the SFP. The point coverage for the SFP (computed as the number of eligible cases (9) whose WFH Z-scores in the programme divided by the total number of cases (109)) according to WHO[11] was estimated at 8.3%. Likewise, the OTP point coverage (computed as the number of eligible cases (1) enrolled in the programme divided by the total number of eligible cases (30)) is estimated at 3.3%.

On the basis of MUAC, the overall SFP coverage is computed as the number of children with MUAC between 11.5cm and < 12.5 (10) divided by the total number of children with MUAC 11.5cm and <12.5 (53)) which gives a coverage of 18.8%. It was not possible to estimate the OTP coverage by MUAC since none of the severely malnourished children by MUAC were enrolled in OTP. The estimated coverage by MUAC for Samburu Central province is 10%, Samburu North district 28.6% and Samburu East district 6.7%. The combined estimated SFP coverage for Samburu North and East districts is 20.9%. The estimated point coverage for both SFP and OTP by WHO-GS and MUAC are therefore below the SPHERE[12] recommendation of 60% coverage for intervention programmes.

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

Use of mosquito bed nets is an effective and cheap malaria-preventive strategy. Utilization of the mosquito nets was assessed by finding out who had used them the previous night. Only one quarter (25.0%) of the households reported possessing ITNs, with the majority (61.0%) of them having obtained them from the Ministry of Health and other hospitals, 22.0% from NGOs and 17.0% from shops or vendors. It is expected that the nets sourced from the MOH, Mission hospitals and NGOs were already treated. For those obtained from shops, 35.3% of the respondents reported having treated the nets with mosquito repellents while close to one third (64.7%) of the respondents had not treated

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

[11] WHO (2005). A Field Trial of a Survey Method for Estimating the Coverage of Selective Feeding Programmes.

[12] The SPHERE Project Handbook (2004). Humanitarian Charter and Minimum Standards in Disaster Response.

their nets. Out of those reporting having treated them, 18.8% had done so within the previous 1 month period, 12.5% within the last 6 months, 50.0% within a period exceeding the previous 6 months and 18.8% could not remember having treated theirs. It is recommended that mosquito nets should be treated once every 6 months to repel and kill mosquitoes. The fact that half of the households had last treated theirs more than 6 months previously subjected them to increased risk of malaria infection. The rate of ITNs utilization by household members who possessed them was very low. The findings showed that less than one fifth of various household members were reported to have used the nets the previous night. The highest proportion of household members reported as having used the nets were underfives (15.4%) followed by pregnant women (13.4%), non-pregnant women (10.4%), children above 5 years (7.6%) with only 4.3% of men reported to have used them. It was reported that nobody had used the nets in 7.6% of the households. Use of mosquito nets by the population especially pregnant women needs to be emphasized in the district due to the important health-protective role it plays in the prevention of malaria.

3.7 Water, Sanitation and Hygiene Practices

The main source of water (Table 12) for both general household use and drinking was unprotected wells (28.1% and 27.9%, respectively) followed by river (25.3% for household use and 25.5% for drinking). Households, on average, took 82.8 (SD 98.6) minutes to access their main source of water; with close to three quarters taking more than 30 minutes implying that only 28.1% of the households in the district were able to access water within the SPHERE[13] recommendation of 30 minutes. On average, households reported paying Kshs 8.43 (SD 14.9) per jerrrican of water and using 39.7 (SD 23.2) litres of water daily, which translates to about two 20-litre jerricans. It should, however, be noted that several areas were receiving some rainfall, therefore, this finding is not represenatative of a worst-case scenario in Samburu.

Table 12: *Sources of water and treatment of drinking water*

Source of water	For HHD use %	For Drinking %
Unprotected well	28.1	27.9
River	25.3	25.5
Tap	23.0	23.2
Borehole	9.8	10.3
Digging along laga	8.9	8.7
Dam	3.1	2.8
Public pan	1.4	0.8
Others	0.5	0.8
Treatment of drinking water		
Doing nothing		89.0
Boiling		6.5
Use of chemicals		2.8
Decant		1.1
Filter/sieve		0.6

Despite the majority of residents obtaining drinking water from unsafe sources, more than four fifths (89.0%) of the respondents reported not treating the water in any way before drinking, posing a health risk due to likelihood of faecal contamination since more than three quarters (77.2%) did not have access to toilets and consequently defecated in bushes, near rivers and in open spaces. Out of the 22.8% who reported having access to toilets, more than two thirds (67.6%) had traditional pit latrines and 24.6% ventilated improved pit latrines (VIP). When childcare givers were asked whether they washed their hands before feeding their children, more than three quarters (78.6%) reported in the

[13] The SPHERE Project Handbook (2004). Humanitarian Charter and Minimum Standards in Disaster Response

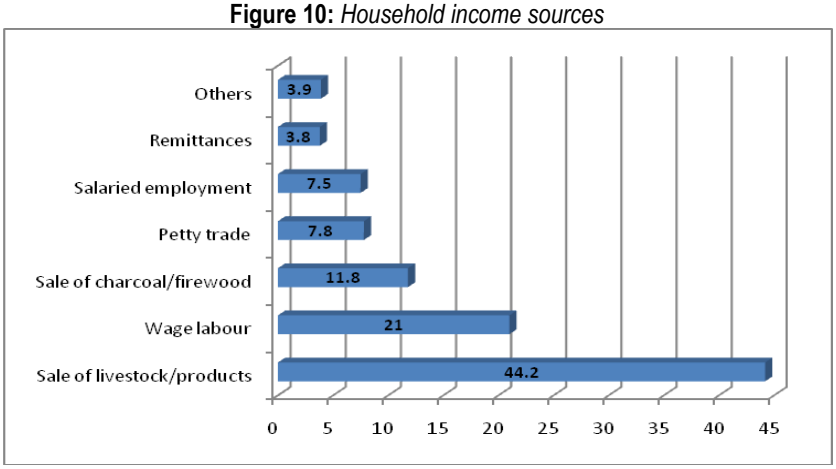
affirmative. Observations showed that more than half (54.9%) of the households had clean compounds with no evidence of child faeces scattered around.

3.8 Household Food Security Indicators

3.8.1 Sources of Income

Sale of livestock and their products had been the main source of income for households in the Greater Samburu district during the 3-month period preceding this survey accounting for 44.2% of the sampled households. As shown in Figure 9, this was followed by wage labour accounting for about one-fifth of the households followed by sale of charcoal/firewood (11.8%), petty trade (7.8%) and salaried employment (7.5%). Since the previous rains in the district, close to two thirds (64.5%) of the households reported a decrease in the number of their livestock, mainly due to death resulting from drought and diseases in more than half (54.5%) of the households. The absence of agricultural-related activities as a source of household income is suggestive of poor economic diversification with overdependence on livestock as a source of livelihood, which could easily plunge the community into food insecurity crisis whenever conditions that adversely affect livestock farming prevail. Using local wealth ranking criteria, the majority (56.7%) of the households were rated middle, 38.8% poor and only 4.5% rich. The apparent low economic status of the community was further compounded by the fact that 60.9% of the households reported having no member who earned regular income that directly benefitted the household.

Figure 10: *Household income sources*



3.8.2 Food Aid

A blanket food aid distribution for the underfives and pregnant women was implemented in the Greater Samburu district between January and April 2010. A relatively high proportion (82.0%) of the households reported having received the food, with more than half (53.2%) of the households receiving it 4 times, 26.9% 3 times, 14.5% twice and 5.5% only once. In the 3 months prior to this survey, 59.8% of the households had received general food aid under the EMOP programme. However, a majority (92.7%) of the households reported having received it more than 2 months previously, with only (7.2%) having received it within 2 months previously. The findings (Table 13) indicate that on average, the foodstuff received by households in the largest quantity was maize meal 17.0 (SD 8.1) kgs followed by sorghum (16.6 SD 10.4) kgs, dry maize (16.4 SD 10.0) kgs and beans (11.2 SD 8.5) kgs.

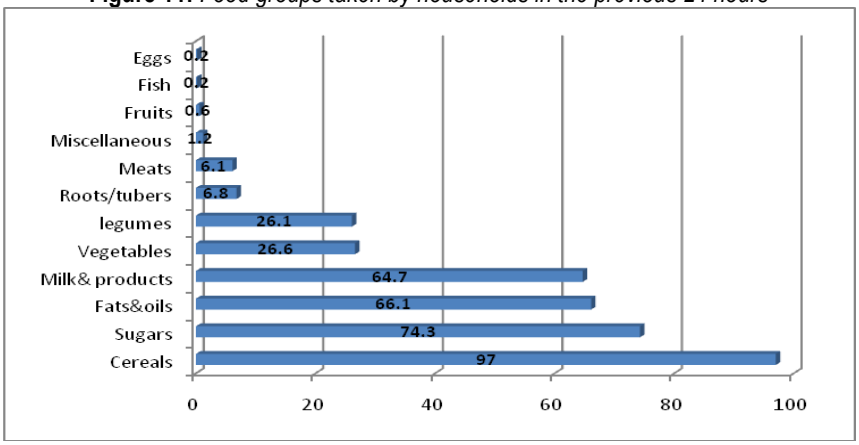
Table 13: *Quantities of food aid received by households*

Type of food	Quantity received	SD
Maize meal	17.0	8.1
Sorghum	16.6	10.4
Dry maize	16.4	10.0
Beans	11.2	8.5
CSB	2.4	2.9
Peas	1.6	1.1
Vegetable oil	1.1	1.0

3.8.3 *Household Dietary Diversity and Food Sources*

Using the 24-hour dietary intake recall for childcare takers as a proxy for household dietary diversity, the findings show that close to half (43.1%) of the households took meals that constituted low dietary diversities. The household dietary profile was also poor since the diet mainly consisted of cereals taken by 97.0% of the households, sugars (74.3%), fats and oils (66.1%) and milk and its products (64.7%) with low proportions taking vitamin- and mineral-rich ingredients (vegetables and fruits) in their meals as shown in Figure 11.This, together with the finding that households, on average, reported taking meals less (2.4 SD 0.7) times/day than usual (2.7 (SD 1.3) times per day is suggestive of relative food inadequacy prevailing in the district during this survey's conduct.

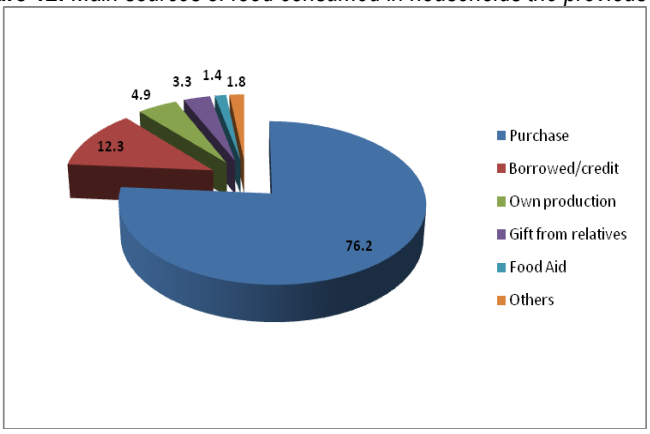
Figure 11: *Food groups taken by households in the previous 24 hours*



Every household members took all meals prepared the previous day in more than four fifths (82.2%) of the households. Out of those households where some members did not take all meals, food inadequacy was cited as the main reason in more than half (54.7%) of the households followed by members who took meals elsewhere (42.7%) and unsuitable food in 2.6% of the households.

In the previous 2-month period, more than three quarters (82.2%) of the households reported having experienced a food shortage. A balanced mix of own production and purchase is considered a good proxy indicator of food security and food stability. The findings of this survey show that more than three quarters (76.2%) of the households relied on purchase as the major source of food, with only 4.9% households relying on own production. Considering the low economic status of the population, the main sources of food were suggestive of a prevailing food insecurity situation (Figure 12).

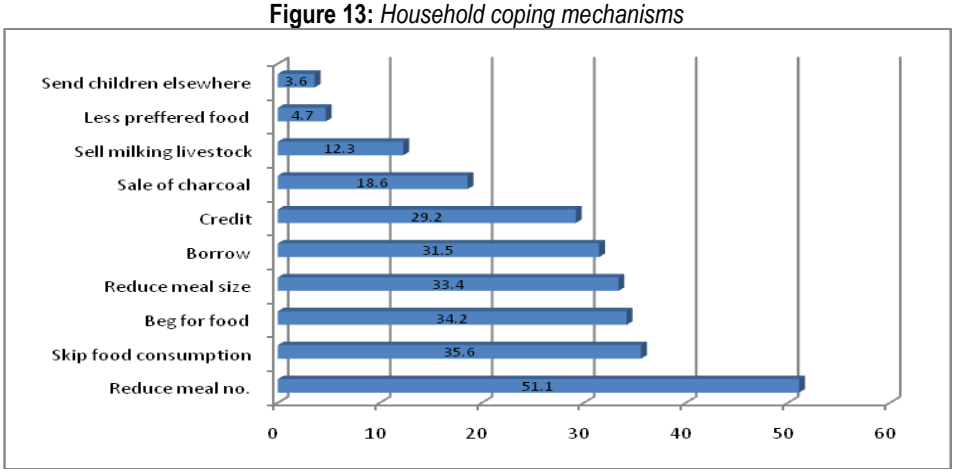
Figure 12: *Main sources of food consumed in households the previous day*



The 10 main food insecurity mitigating strategies employed by households the previous 2 months are presented in Figure 13. The coping mechanism practised by the highest proportion of households

(51.1%) was reduction in the number of meals taken, skipping some meals (35.6%) and begging for food (34.2%). Information derived from FGDs indicates that such coping strategies are characteristically practised during mild food shortage. Sale of milking livestock (reported by 12.3% of the households) was reportedly practised during severe food shortage episodes.

Figure 13: *Household coping mechanisms*



3.9 Association between GAM and Important Public Heath Variables

The findings of correlation analysis carried out to assess if selected variables influenced underfive wasting significantly and in a practically relevant manner are presented in Table 14. The findings revealed significant and positive associations between GAM and child dietary diversity, enrolment in feeding programmes, availability of mosquito nets, vitamin A supplementation and deworming. Therefore, the prevalence of GAM was significantly higher among children who had low dietary diversities, those staying in households without mosquito nets, those who had not received vitamin A supplementation and those not dewormed.

Table 14: *Association between GAM and other variables*

Variable	Status	% GAM	Odds ratio (OR)	Correlation Coefficient (R)	P value (P)
Dietary diversity	Low	14.9	4.186	+0.162	0.001
	High	4			
Household size	<6 members	10	0.167	-0.68	0.221
	>6 members	23			
Caretaker nutritional status	Wasted	22.2	2.571	+0.107	0.052
	Not wasted	10			
Toilet availability	Yes	8.9	0.633	-0.068	0.226
	No	13.4			
Household Herd size	Increased	5.7	0.700	-0.044	0.672
	Decreased	7.9			
Enrolment in feeding prog	Yes	20.4	2.277	+0.104	0.025
	No	10.1			
Mosquito net Availabile?	Yes	7.3	0.392	+0.060	0.01
	No	16.7			
Vitamin A supplementation	Yes	6.7	3.382	+0.194	0.000
	No	19.5			
Child dewormed?	Yes	6.4	0.435	-0.108	0.020
	No	13.6			
Caregiver age	<30 years	12.3	1.419	+0.050	0.352
	>30 years	9.0			
Food aid received?	Yes	10,6	1.169	+0.022	0.690
	No	9.2			
Child Sick?	Yes	12.0	0.859	-0.024	0.609
	No	10.5			

** P value < 0.05 indicates a positive significant relationship ** Odds ratio (OR) shows the risk that a child stands to be malnourished if GAM is present together with respective characteristic *** R (correlation) shows positive or negative direction of association.*

3.10 Mortality

A three-month mortality recall was conducted to assess the underfive mortality rate (UFMR) and crude mortality rate (CMR). The UFMR was 0.76 deaths/10,000/day (CI 0.54-1.07) and CMR 0.96 deaths/10,000/day (CI 00.51-1.81). Both rates of mortality are relatively low and below the WHO 'alert'[14] threshold (Table 15).

Table 15: *Underfive and crude mortality rates*

	N	Mortality rate (95% CI)
UFMR	967	0.76 deaths/10,000/day [0.54-1.07]
CMR	5068	0.96 deaths/10,000/day [0.51-1.81]

[14] CDC (1992): Famine Affected Refugee and Displaced Populations: Recommendations for Public Health Issues. MMWR, 1992; 41 (No. RR-13).

4.0 CONCLUSIONS and RECOMMENDATIONS

This was the first survey that employed the SMART methodology in the Greater Samburu district. Although the level of GAM both by WHO-GS (15.7% 13.0-18.9 CI) and by NCHS references (15.1% 12.8-17.6 CI) is less than that (22.0%) reported in a survey conducted in the district in May 2009 immediately after the long rains using the 30x30 cluster sampling, it is still unacceptably high which is reflective of a prevailing nutritional inadequacy. On the other hand, the findings of this survey also indicate that the level of stunting among the underfives was also high at 33.7% (29.4-38.3 CI), which is suggestive of long-term nutritional inadequacy. However, both the UFMR (0.76 deaths/10,000/day 0.54-1.07 CI) and CMR (0.96 deaths/10,000/day 0.51-1.81 CI) are below the emergency threshold for sub-Saharan Africa (1.14 deaths/10,000/day). A number of aggravating factors that militated against optimal child nutrition were evident from the findings of this survey and included the following:

- a relatively high disease prevalence that affected almost half (43.9%)of the underfives;
- poor infant and young child feeding and care practices (early weaning, low maintenance of breast feeding and poor feeding);
- general food scarcity in the community due to poor agricultural production, over-reliance on food purchase as a main source of food in a poor socio-economic set up, prevailing drought particularly in Samburu North and low livelihood diversification;
- low vitamin A supplementation and deworming coverage;
- poor water, sanitation and hygiene practices;
- limitations inherent in the implementation of SFP and OTP programmes (minimal active case-finding in the community, resource limitations including inadequate field staff, logistical and capacity limitations that hindered optimal implementation and achievement of high programme coverage); and
- poor maternal nutritional status mainly affecting pregnant women.

In conclusion, the high prevalence of GAM in conjunction with these aggravating factors rates the situation in the Greater Samburu district 'critical' by WHO[15] benchmarks. This makes the following recommendations imperative to avoid further deterioration of the situation:

1. An immediate up scaling of both SFP and OTP interventions modelled on the community-based IMAM with a strong outreach component (beyond and in addition to health-facility based approach) to cover all areas of the Greater Samburu district accompanied by a strong active case-finding at the community level;
2. Upscale the EMOP to universally cover all households with pregnant and lactating mothers to bring malnutrition among pregnant mothers to acceptable levels;
3. Mount public health campaigns to address the following:
    - Improve vitamin A supplementation coverage among underfives and newly-delivered mothers
    - Improve deworming coverage among the underfives
    - Promote the holding rate and utilization of ITNs
    - High morbidity load among the underfives through medical outreach camps to improve access by the largely nomadic Samburu population
    - Improve motherhood practices including ANC attendance and promote optimal infant and young child feeding and care
    - Improve water and environmental sanitation and hygiene practices in the community;
4. Together with other partners promote livelihood diversification specifically focussing on small-scale agricultural activities to reduce over-reliance on livestock as a source of livelihood for the

[15] WHO (2000): Management of Nutrition in Major Emergencies.

Samburu population to ultimately improve the population's nutrition security and dietary profiles

5. Provision of adequate resources for full implementation of the Government's Community Strategy in all parts of the Greater district; and
6. Up-scaling of the MCG project in Samburu North and Samburu East districts to realise its full potential and initiation of the project in Samburu Central district.

Appendix 1: **Plausibility check for Greater Samburu District Data**

Indicator	Survey Value	Acceptable/ value range	Interpretation/ Comment
Digit preference-weight	0	0-10	Good
Digit preference – height	4	0-10	Good
WHZ (standard Deviation)	1.10	<1.5	Acceptable
WHZ (Skewdness)	0.07	<±2.0	Good
WHZ kurtosis	-0.16	<±2.0	Good
Percentage of flags	2.3%	2.5%– 5.0%	Good
Age Distribution)			
Group1 6-17 months	23.2		
Group2 18-29 months	26.9		
Group3 30-41 months	23.5		
Group4 42-53 months	17.9		
Group5 54-59 months	8.5		
Age ratio G1+G2/G3+G4+G5	1.0		
Sex ration	1.0	0.8-1.2	Good

Appendix 2: Survey Tools

Name of district	Name of Division	Division No	Name of Village/ Sub-location	Cluster No	Date of Interview (dd/mm/yy)	Name of Team Leader	Team No
					_____/_____/_____		

Qnn D: Mortality Data Form

1	2	3	4	5	6	7	8	9	10	11	12	13
HH no.	**Total number** of people in HHD (Hdsize) currently	Total Number **< 5 years** in HHD currently	**Total people** join HH in the last **3**months (**Since Mid-June 2010**) Excluding birth)	Number of **underfives** join HH last 3 months (**Since Mid-June 2010)** Excluding birth)	**Total people leave HHD** in the last **3** months **(Since Mid-June 2010)**	**Number underfives leave** household in the last **3** months (**Since Mid-June 2010)**	**No of Births in the HHD** in the last **3** months (**Since Mid-June 2010)**	**** Total number of deaths in the HHD** in the last **3** Months (**Since Mid-June 2010)**	Number deaths of people **< 5 yrs old** in the last **3** months (**Since Mid-June 2010)**	Number deaths of people **> 5 yrs Old** In the last **3** months (**Since Mid-June 2010)**	**Causes** of death for people **< 5 years Old** (Use codes below)	**Causes** of Death for people **> 5 Years Old** (Use codes below)
1												
2												
3												
4												
5												
6												
7												
8												
9												
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**** First ask (CAUTIOUSLY and CAREFULLY) if there has been any death in the household in the last 3 months**
Causes of death Codes:

0=N/A [Applies to Qns 12 and 13 only)
1= Watery Diarrhoea
2= Bloody Diarrhoea
3= ARI (Cough + difficulty breathing (pneumonia)
4= Malaria (Fever with malaria-like chills
5= Measles (persistent fever, oesophagus infection, skin rash, red eyes)
6= Malnutrition (bilateral oedema and or wasting)
7= Killed/Accidents
8= Not known
9=Old age
10=Others (specify) _____

FOCUS DISCUSSION CHECKLIST

There should be 8-10 people in each FGD. Representation should be sought from a wide cross-section of community members including local leaders, women leaders, TBAs, and community members of different socio-economic status (rich, medium and poor). Separate FGDs should be conducted for men and women.

[Note: Probe ALL responses given]

1. What is the **current** livestock situation in this community in terms of:
    a) Body condition
    b) Pasture availability and condition
    c) Access to animal products by children and women e.g. milk and meat
    d) Any recent serious disease outbreaks
    e) Who makes important decisions e.g. selling and slaughter on livestock (cattle, shoats and chicken)
2. How are the various **socio-economic** groups categorized in this community?
    a. In case of drought or food shortage, which of these groups is most adversely affected? Give reasons why
    b. What proportion of households fall under each of the categories mentioned in this area (cluster) **currently?** (Use proportional piling if necessary).
3. What is the **current food availability situation** in this community in terms of:
    a. Household food production
    b. Availability of food in the market
    c. Prices of food in the market
4. What are the **main coping strategies** that this community has used to deal with food shortage in the **last two months?** List those stated.
5. For each coping strategies listed in **Q4**, ask **when** it is usually practiced: is it when the food shortage situation is **severe or mild?**
6. **At what age** are babies given foods other than breast milk for the **first time** in this community? **(food is any solid or liquid such as animal milk, water, juice, glucose, porridge etc which is not breast milk)**
7. What type of food is **mainly** given to babies for the first time after birth and what are the reasons for giving the mentioned food?
8. What is the major problem facing this community **currently?**
9. What do you think your **Community** can do to recover from the problem listed in **Q8?**
10. What **external assistance** do you think the community would need to recover from the problem listed in **Q8?**
11. What are the main causes of maternal and underfive malnutrition in this community?
12. What do you think should be done at the community level to address this problem among mothers and the children?

Qnn A: Household Questionnaire Nutrition and Food Security Survey for Samburu District

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

Note: This Questionnaire must be filled in** ALL the households visited **regardless of whether they have children 6-59 months or not.

Household Demographic Information:

1. **How many people live in this household together and share meals? (Household size)** [_____] .
2. How many of them are: Total < 5 years [_____] Total 0-<6 months [_____] Total 6-59 months [_____] Total > 5 years [_____]
3. Who is the head of this household? [_____] (**Codes: 1=Husband 2=Self (Mother) 3=My parent 4=Other (specify)** _____
4. Is your family monogamous or polygamous? [____] (**Codes: 1=Monogamous 2=Polygamous 3=Single parent**) **(If Monogamous SKIP to Q6)**
5. **If polygamous (i.e. Q4 =2)**, how many wives does your husband have? [_____]
6. **Household Water Sources and Consumption**

6.1 What is your current MAIN source of water for general household use? **Codes:** 1=River 2=Lake 3=Tap water 4=Borehole 5=protected well 6=Unprotected well 7=Public pan 8=Water bowser/tanker 9=Dam 10=Digging along the Laga 11=Rain water 12=Other _____	**6.2 How long does it take to go to the MAIN source of water, fetch it and come back (including waiting time at the water point) in minutes?**	**6.3 On average, how many jerricans of water does the household use per day?** **[Enter in litres]**	**6.4 How much do you pay for a 20 litre jerrican of water currently?** **(enter zero if water is free)**	**6.5 What is your Current main source of DRINKING water?** **Codes:** 1=River 2=Lake 3=Tap water 4=Borehole 5=Protected well 6=Unprotected well 7=Public pan 8=Water bowser 9=Dam 10=Digging along the Laga 11=Rain water 12=Other Specify_____	**6.6 Do you do anything to the water before drinking it?** **Codes:** 1=Nothing 2=Boiling 3= Add chemicals 4= Use traditional herbs 5=Filters/Sieves 6=Decant
Main source	Minutes	Litres	Kshs		

Household Food Consumption

7. **Usually,** how many times does your household take meals in a day? [_____]
8. How many times did the household take meals **YESTERDAY?** [_____]
9. Did **all eligible** members of your household (excluding those who are away from home or very young children) take all the meals prepared **YESTERDAY?** [_____] (**Codes: 1=Yes 2=No**)
10. **(If NO),** for what reason did some members who were present not take ALL meals? [_____] **Codes: 1=Not enough food 2=Took meals elsewhere 3=Food prepared not suitable for them**

Maternal Health Care Information

11. Are you aware of any mother care/breastfeeding groups in your village? [Excluding HIV/AIDS/Self help groups, merry-go rounds, home-based care groups] [_____] **Codes: 1=Yes 2=No**

12. **[IF YES],** are you a member of any of the groups? [_____] **Codes: 1=Mother care group 2=Breastfeeding group 3=No**

13. During your last pregnancy, did you attend Ante-Natal Clinic (ANC)? [_____] **Codes: 1=Yes 2= No 3= Mother never delivered [If Never delivered SKIP to Q 19]**

14. **[IF YES],** how many times did you attend the clinic? [_____]

15. **[IF NO],** why did you not attend? [_____] **Codes: 1=Not aware of existence/importance of ANC 2=Health facility too far 3=Unfriendly health workers 4=TBA services adequate 5= Cultural barriers e.g. staff too young, male staff etc 6=Other (Specify)_____**

16. Where did your last delivery take place? [_____] **Codes: 1=At home by TBA 2=At home by Nurse 3=At home without assistance 4=Hospital**

17. **[If at HOME],** how long did it take before you took child to clinic? [_____] **Codes: 1=Within first 2 weeks 2= Between 2 weeks and 1 month 3=After 1 month 4= Child not taken/does not intend to take child to clinic**

18. After your last delivery, did you receive vitamin A supplementation? (Show mother Vitamin A Capsule) [_____] **1= Yes 2= No**

19. **Food consumption for mother or primary child giver**: Since you **(mother)** woke up yesterday morning to the time you slept in the evening, what types of food and drinks did you take? Enter 1 for food groups reported as having been consumed and 0 for those not consumed. If a food group was consumed more than once, entre 1 only once. [Do not read the list to the respondent]. [This question applies only to the caretaker and not any other household member]

	Food group	Examples	1=Yes 0=No	19b) What was the **main** source of food consumed in HHD yesterday?
19.1	**Cereals and Cereal Products**	Maize, rice, pasta, ugali, porridge, bread, biscuits, millet, sorghum, wheat [and any *other locally available grains*]	19.1	
19.2	**Fish and Sea Foods**	fresh or dried fish or shellfish	19.2	
19.3	**Roots and Tubers**	Irish potatoes, sweet potatoes, yams, cassava, or foods made from roots or wild roots and tubers	19.3	
19.4	**Vegetables**	Sukuma wiki, cabbages, carrots, spinach, and any other locally available vegetables including wild vegetables	19.4	Codes: 1= Own production 2= Purchase 3= Gift from relatives 4= Food aid 5= Bartered 6= Borrowed/credit 7= Wild food 8= Other (Specify) [_____]
19.5	**Fruits**	Oranges, ripe bananas, mangoes, avocados,	19.5	
19.6	**Meats and Poultry**	Camel, beef, lamb, goat, rabbit, wild game, chicken or other birds, liver, kidney, heart or other organ meats or blood-based foods	19.6	
19.7	**Eggs**	Chicken, bird eggs	19.7	
19.8	**Pulses / Legumes / Nuts and Seeds**	Beans, peas, lentils, nuts, seeds or foods made from these	19.8	
19.9	**Milk and Milk Products**	Fresh/fermented milk, cheese, yogurt, or other milk products	19.9	
19.10	**Fats and Oils**	Oil, fats, ghee, margarine or butter added to food or used for cooking	1910	
19.11	**Sugars / Honey and Commercial Juices**	Sugar in tea, honey, sweetened soda or sugary foods such as commercial juices, chocolates, sweets or candies	19.11	
19.12	**Miscellaneous**	Spices, sweets, unsweetened beverages,	19.12	

20. Sanitation – Toilet facility

20.1. Does your household have access to a toilet facility that you use? [If NO, Skip to 20.3] 1=Yes 2=No	**20.2. (If yes), what type of toilet facility do you have?** 1=Bucket 2=Traditional pit latrines 3=Ventilated improved pit latrine 4=Flush toilet 5=Other Specify _____	**20.3. (If No), where do you go/use? (probe further)** 1= Bush 2=Open field 3.=Near a water source 4.=Behind the house 5.=Other (specify)_____	**20.4 [OBSERVE] how children's faeces is disposed** 1= disposed of immediately and hygienically 2= Not disposed (scattered in the compound)	**20.5 Do you wash your hands before you feed your child?** 1 = Yes 2 = No	**20.6 [OBSERVE] Is the compound clean?** 1 = Yes 2 = No

21. **Food Aid**

21.1 Did your household receive the **blanket food rations** meant for children <5years and pregnant and lactating women distributed between January and April this year? [____]1**= Yes** 2**= No**

21.2 [IF YES], how many times did your household receive the blanket rations? [____] **[enter no. of times]**

21.3 Have you received **General food aid** within the last three (3) months i.e. **since Mid- June this year?** [____] 1**= Yes** 2**= No** [If NO skip to Q22]

21.4 If Yes when? [_____] 1= Less than 1 month ago 2= between 1 and 2 months 3= Over 2 months ago

21.5 **(If YES)** Please indicate the food commodities received in the last distribution, quantity received, how it was utilized and duration that each foodstuff lasted.

		How was each of the foodstuffs received used? **Multiple responses possible** (Please TICK appropriately)					How many days did each of the received food last?
FOOD AID COMMODITY	QUANTITY Received(KGS)	Resold	Bartered	Shared with kin	Saved for seed	Consumed In the HHD	
21.6 Maize							
21.7. Beans							
22.8 Corn meal/maize meal							
22.9 Vegetable oil (litres)							
22.10 Peas							
22.11 CSB (Corn soya blend)							
22.12 Rice							

22. Coping Strategies

	22.1 In the previous TWO months, (**i.e. Since Mid-July)** did your household experience a food shortage? [_____] **1=Yes 2=No [If NO Skip to Q23]** **[If Yes]** what did you do to **mitigate/solve** the food shortage? First tick all the coping strategies mentioned. Do not read the list to the respondent but **PROBE** **COPING STRATEGIES**	**22.2 [IF YES]**, How many times **in a WEEK (Frequency)** did HHD engage in the coping strategies mentioned? **Enter Number of times**
22.3	Reduction in the number of meals per day	22.3
22.4	Skip food consumption for an entire day	22.4
22.5	Reduction in size of meals	22.5
22.6	Restrict consumption of adults to allow more for children	22.6
22.7	Feed working members at expense of non-working	22.7
22.8	Swapped consumption to less preferred or cheaper foods	22.8
22.9	Borrow food from a friend or relative	22.9
22.10	Purchase food on credit	22.10
22.11	Consume wild foods (normal wild food)	22.11
22.12	Consume toxic/taboo foods (acacia pod/bitter fruit)	22.12
22.13	Consume immature crop	22.13
22.14	Consumption of seed stock	22.14
22.15	Send children to eat elsewhere eg neighbours, school, religious centres	22.15
22.16	Withdraw child(ren) from school	22.16
22.17	Begging or engaging in degrading jobs	22.17
22.18	Individual migration out of the area	22.18
22.19	Household migration out of the area	22.19
22.20	Sale of farm implements	22.20
22.21	Sale of milking livestock	22.21
22.22	Sale of household goods	22.22
22.23	Disintegration of families	22.23
22.24	Abandonment of children or elderly	22.24
22.25	Sale of charcoal and/or fire wood	22.25
22.26	Part of family migrating with animals to look for grazing	22.26
22.27	Ask for food assistance from religious organizations	22.27

23. **Possession and Utilization of ITNs**

23.1 **Does this household have a mosquito net or nets?** **Codes:** 1 = Yes 2 = No **[IF NO, GO TO Q 24]**	23.2 **[If YES], Where did you get it from?** **Codes:** 1 = A shop/vendors 2 = An agency/NGO 3 = MOH/Mission hospital **[If 2 or 3 Skip to Q 23.5]**	23.3 **[If from the shop] Have you ever treated your net (soaked or dipped it in dawa or chemical to repel mosquito or insects)?** 1 = Yes 2 = No [If NO, Skip to 23.5]	23.4 **[If YES], When did you last treat it?** **Enter code** 1) Less than one month ago 2) Between one and six months ago 3) More than six months ago 4) Cannot remember	23.5 Who slept under the mosquito net last night? (Probe - enter all responses mentioned) **1**) Children less than 5 years **2**) Children over 5 years **3**) Pregnant woman **4**) Non-pregnant woman **5**) Father **6**) Nobody used

24. **Livestock Situation**

	Livestock Size	
		Codes
24.1	Has the number of your livestock changed since the last rains? **Codes:** **1**=Increased **2**=Reduced **3**=Remained the same	
24.2	If increased/decreased what are the reason(s)? **Note: Multiple responses possible** **Codes:** (**1**= Animals gave birth **2**= Bought **3**= Given **4**= Death because of drought **5**= Death because diseases **6**= Sold **7**= Raid **8**= Other (specify)----------	

25. **Sources of Income**

	Main Source of Income	
	In the last **three** months **[i.e. Since Mid-June this year]** what was the **MAIN** source of income for your household? **Codes:** **1=** Sale of livestock **2**= Sale of livestock products **3**= Sale of food ration **4**= Sale of own crop **5**= Wage labor **6**= Salaried employment **7**= Petty trade **8=** Remittances **9=** Sale of charcoal/firewood **10**= Beadwork **11**= Business **12=** Quarrying **13=** Other (Specify) _____	

26. **Household Wealth Ranking**

	Household Wealth Ranking	
26.1	According to your community's wealth ranking system, how do other people classify your household? **1**= Rich **2**= Middle **3**= Poor	
26.2	How many people in your household earn some income that **directly benefits** the household?	

Qnn No C: < 6 MONTH-OLD CHILD BREAST FEEDING QUESTIONNAIRE - ONLY to be filled for Children 0 to <6 Months belonging to the Households visited

- Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child.
- Fill in the identification information in the table below from the **Main Household Questionnaire**

Name of district	Name of Division	Division No	Name of Village/ Sub-location	Cluster No	Date of Interview (dd/mm/yy)	Name of Team Leader	Team No
					_____/_____/_____		

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
HHD No.	Child serial No.	Child's Name	Child Age in DAYS (Convert months to days)	Child age verification 1= Vaccination card 2= Birth certificate 3= Baptism card 4= Recall	Sex of child 1= M 2= F	Did (Name) ever breastfeed? 1= Yes 2= No	(If No), why did (Name) not breastfeed? Codes: 1= No milk from breasts 2= Refused to breastfeed 3= Traditional beliefs 4= Child deformity 5=Mother not available 6=Mother health problems	[If yes], How long after birth did you put (Name) on the breast for the first time? [Convert and enter number of hours. If <30 minutes, enter Zero]	[If Yes], During the first 3 days after delivery, did you give (Name) the fluid/liquid that came from your breasts? Codes 1= Yes 2= No	In the first 3 days after delivery, was (Name) given anything else other than breast milk? Codes: 1= No 2=Plain water 3=Sugar/glucose water/honey 4=Animal milk/products 5=Infant formula 6=Fruit juice	Is (Name) still breast-feeding? Codes: 1= Yes 2= No	(If Yes) how many times did (Name) breastfeed Yesterday?	Is (Name) taking other foods or drinks currently? Codes: 1=Yes 2=No	(If Yes), at what age did you start giving (Name) other foods and drinks in Days? (Convert if months to days)
	1.													
	2.													
	3.													
	4.													
	5.													
	6.													
	7.													
	8.													
	9.													
	10.													
	11.													
	12.													
	13.													
	14.													
	15.													
	16.													
	17.													
	18.													

[Continued from page 1]

Name of district	Name of Division	Division No	Name of Village/ Sub-location	Cluster No	Date of Interview (dd/mm/yy)	Name of Team Leader	Team No
					_____/_____/_____		

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
HHD No.	Child serial No.	Child's Name	Child Age in DAYS (Convert months to days)	Child age verification 1= Vaccination card 2= Birth certificate 3= Baptism card 4= Recall	Sex of child 1= M 2= F	Did (Name) ever breastfeed? 1= Yes 2= No	(If No), why did (Name) not breastfeed? Codes: 1= No milk from breasts 2= Refused to breastfeed 3= Traditional beliefs 4= Child deformity 5=Mother not available 6=Mother health problems	[If yes], How long after birth did you put (Name) on the breast for the first time? [Convert and enter number of hours. If <30 minutes, enter Zero]	[If Yes], During the first 3 days after delivery, did you give (Name) the fluid/liquid that came from your breasts? Codes 1= Yes 2= No	In the first 3 days after delivery, was (Name) given anything else other than breast milk? Codes: 1= No 2=Plain water 3=Sugar/glucose water/honey 4=Animal milk/products 5=Infant formula 6=Fruit juice	Is (Name) still breast-feeding? Codes: 1= Yes 2= No	(If Yes) how many times did (Name) breastfeed Yesterday?	Is (Name) taking other foods or drinks currently? Codes: 1=Yes 2=No	(If Yes), at what age did you start giving (Name) other foods and drinks in Days? (Convert if months to days)
	19.													
	20.													
	21.													
	22.													
	23.													
	24.													
	25.													
	26.													
	27.													
	28.													
	29.													
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	33.													
	34.													
	35.													
	36.													

Appendix 3: LOCAL EVENTS CALENDAR FOR LARGER SAMBURU DISTRICT
SEPTEMBER 2010

Months		2005		2006		2007		2008		2009		2010	
January		-New year - Opening of schools		-New year -Drought/migration of livestock to Nandome - Opening of schools	**56**	-New year -Opening of schools	**44**	-New year -Postelection violence - Opening of schools	**32**	-New year -Opening of schools	**20**	-New year -BSFP of BSFP -Opening of schools	**8**
February					**55**		**43**		**31**	-Government operation on livestock recovery (East)	**19**	-Ewasonyiro floods (end of feb) (East)	**7**
March **Child MUST have been born BEFORE 11th march 2010*** **				-Pokot raid in Central	**54**		**42**		**30**	-Government operation on livestock recovery (East)	**18**	*** -Minor solar eclipse -Voter registration	**6**
April	**Long rains**	Easter		Easter	**53**	Easter	**41**	Easter	**29**	-Trachoma mass campaigns -Easter	**17**	-End of BSFP -Trachoma mass campaigns -Easter	**5**
May		-Opening of schools		-Opening of schools	**52**	-Opening of schools	**40**	-Opening of schools	**28**	-Loruko raids. -Opening of schools	**16**	-Gen Lenges death -Opening of schools	**4**
June		Madaraka Day		Madaraka Day	**51**	Madaraka Day	**39**	Madaraka Day	**27**	-Madaraka Day	**15**	-Gen Lenges burial -Madaraka Day -Mammoth harambee for samburu women	**3**
July		Ngichami circumcision (North)			**50**		**38**		**26**		**14**	**-1st samburu lady elected councilor (north)**	**2**
August		-Ngichami circumcision (North) -Camel Derby		Camel Derby	**49**	-Start of Soya distrb (SFP) -Camel Derby	**37**	Camel Derby	**25**	-Census (Nkikenare) -Camel Derby	**13**	-Katiba Yes/No -Camel Derby	**1**
September		-Major solar eclipse -Opening of schools		-Opening of schools	**48**	-Opening of schools	**36**	-Opening of schools	**24**	-Opening of schools	**12**	-Opening of schools	**0**
October **Eligible Child MUST have been born AFTER 11th oct 2005****	**Short rains**	** Kenyatta Day	**59**	Kenyatta Day	**47**	Kenyatta Day	**35**	Kenyatta Day	**23**	-Kenyatta Day -Kanampiu village massacre (Central)	**11**	Kenyatta Day	
November		Katiba ya ndizi na chungwa	**58**		**46**		**34**	-Obama elections	**22**		**10**		