INTEGRATED HEALTH AND NUTRITION SMART SURVEYS BARINGO CENTRAL/NORTH & EAST POKOT/MARIGAT

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Final report

Coordinated and implemented by
Ministry of Public Health and Sanitation

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ABBREVIATIONS

ARTI	Acute Respiratory Tract Infection
ASAL	Arid and Semi-Arid Lands
CTC	Community Therapeutic Care
CHW	Community Health Workers
CI	Confidence Interval
CMAM	Community Management of Acute Malnutriton
CSB	Corn-Soya Blend
CS	Community Strategy
DD	Dietary Diversity
DHMT	District Management Health Team
DMB	Drought Monitoring Bulletin
DNO	District Nutrition Officer
EBF	Exclusive Breast Feeding
EMOP	Emergency Operations Programme
ENA	Emergency Nutrition Assessment
EPI	Expanded Program on Immunizations
EWS	Early Warning System
FEWSNET	Famine Early Warning Systems Network
FFA	Food For Asset
GFD	General Food Distribution
GM	Growth Monitoring
GoK	Government of Kenya
HH	Household
HINI	High Impact Nutrition Interventions
HYSAN	Hygiene and Sanitation
IMAM	Integrated Management of Acute Malutrition
IPC	Integrated Food Security Phase Classification
IYCF	Infant and Young Child Feeding
KEPI	Kenya Expanded Programme of Immunisation
KFSSG	Kenya Food Security Steering Group
KII	Key Informant Interview
MIYCF	Maternal, Infant and Young Child Feeding
MNLD	Maize Lethal Necrosis Disease
MoMS	Ministry of Medical Services
MoPHS	Ministry of Public Health and Sanitation
NDMA	National Drought Management Authority
NIB	National Irrigation Board
NCHS	National Centre for Health Statistics
NSO	Nutrition Support Officer (UNICEF)
OJT	On The Job Training
ORS	Oral Rehydration Solution
OTP	Outpatient Therapeutic Programme
PLW	Pregnant and Lactating Women
PPS	Probability proportional to size
PRRO	Protracted Relief and Recovery Operations
RC	Reserve Cluster
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
TFP	Therapeutic Feeding Programme
U5	Under Five Years Old
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infection
WFP	World Food Programme
WHO-GS	World Health Organisation Growth Standards
WFH	Weight for Height
WHM	Weight for Height Median
WVK	World Vision Kenya

EXECUTIVE SUMMARY

Baringo County is in Rift Valley Province and is divided into four administrative districts namely: Baringo Central, Baringo North, Marigat and East Pokot. It borders Turkana to the North, West Pokot to the North West, Keiyo and Marakwet to the West, Koibatek and Nakuru to the South and Laikipia and Samburu to the East. The district covers an area of 8,655 km2 with an estimated population of 422,465 persons. The district includes 140.5 km^2 of Lake Baringo, Lake Bogoria and Lake Kamarok. Lake Kamarok is reported to have dried and a new lake named 94 has developed in the last fifteen years.

The district has a bimodal rainfall pattern with the long rains falling in March to May and short rains from July to September. Temperatures range from 10 degrees in the Tugen highlands to 37 degrees in the lowlands with the hottest months being January to early March.

The WVK project area covers four districts of Baringo County namely East Pokot, Marigat, Baringo North and Baringo Central. The district is divided into four Livelihood zones: mixed farming, Pastoral, Agro pastoral and irrigated cropping.

In the last six months, the greater Baringo district has been under stressed (Borderline/moderate) phase and has been worsening in all livelihood zones as a result of the erratic rains. Currently, the quantity/quality of forage has deteriorated in all livelihood zones as well as a drastic decline of milk production. Livestock prices have increased slightly as food prices have slightly decreased in comparison to previous months. However, with deteriorating forage and water availability as the county approaches the hunger-gap period, all livelihood zones are classified at 'Alert' warning stage- with a worsening trend.

In the light of this health and nutrition WVK conducted nutrition surveys covering the 4 districts in Baringo. The surveys aimed to estimate the level of malnutrition among children 6-59months and pregnant, lactating women (PLWs) and also investigated Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age. Due to the heterogeneity of the intervention area, 2 independent surveys were be conducted in in Baringo Central/North and East Pokot/Marigat, concurrently to assess the nutritional status of children 6-59 months of age and pregnant and lactating women. Ideally, 4 surveys would be carried out but due to limitations of time and resources, as well as comparability to 2011 results- two surveys were conducted to cover the greater Baringo County but with equal representation to segregate results. One survey covered Baringo North and Central and the other covered East Pokot and Marigat Districts.

Specific objectives

- To determine the prevalence of acute and chronic malnutrition of children aged 6-59 months and pregnant and lactating women (PLW) aged 15-49 years.
- To determine the Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age;
- Assess the prevalence of malnutrition in pregnant women and lactating mothers'.
- Estimate coverage of measles, BCG vaccination, OPV, deworming and vitamin A and diarrhea management of children 6-59m and iron supplementation of PLW aged 15-49 years.
- Estimate morbidity rates in children 6-59 months and care-giving practices.
- To establish hygiene and sanitation practices of the community using hand-washing and water-treatment indicators
- Estimate coverage for Supplementary Feeding Program, Outpatient Therapeutic Program (from coverage report)
- Assess Household food security levels/situation, using secondary data.

Methodology

- Survey design: Cross sectional
- Target Population: Children 6-59 months of age in order to determine their nutritional status. In addition, children 0-23 months old to assess infant and young child feeding (IYCF) practices as well as women of the reproduction age (15-45 years) to establish their nutritional status.
- Calculation of sample size (including rationale for estimation of prevalence, precision, design effect, household size, and anthropometry sample size) presented and approved by NIWG before commencement of fieldwork.
- Anthropometry sample consisted of 36 and 48 clusters respectively in BCN and EPM.
- Selection of clusters, households and children: The clusters were selected using two stage Probability Proportional to Size (PPS) method. Modified EPI method was used to select households. All children between 6-59 months of age staying in the selected household were included in anthropometry sample. The IYCF sample was achieved by included age category 0-23 months. The target per cluster was 6 children 0-5 months and 6 children 6-23 months.
- Selection of women for determination of nutritional status: All women in the reproductive age (15-49 years) in the identified households were enlisted in the study and their MUAC measurements taken.

SUMMARY OF KEY FINDINGS GREATER BARINGO DISTRICT NUTRITION SURVEYS DECEMBER 2012

Malnutrition results

	BARINGO CENTRAL/NORTH (BCN)	EAST POKOT/MARIGAT (EPM)

Wasting (WHO 2006)	**N=604**	**N=908**
Global Acute Malnutrition (GAM)	**5.1 %(3.6 - 7.3 C.I.)**	**12.2 % (9.8 - 15.2 C.I.)**
Severe Acute Malnutrition (SAM)	**0.2 %(0.0 - 1.3 C.I.)**	**1.8 %(1.0 - 3.0 C.I.)**
Underweight (WHO 2006)	**N=607**	**N = 909**
Prevalence of global underweight	**18.1 %(14.4 - 22.6 C.I.)**	**21.6 % (18.1 - 25.5 C.I.)**
Prevalence of severe underweight	**3.3 %(1.8 - 5.8 C.I.)**	**4.5 %(3.4 - 5.9 C.I.)**
Stunting (WHO 2006)	**N = 589**	**N = 881**
Prevalence of global stunting (<-2 z-score)	**34.3 %(29.3 - 39.7 C.I.)**	**25.5 %(22.1 - 29.3 C.I.)**
Prevalence of severe stunting (<-3 z-score)	**11.5 % (8.7 - 15.2 C.I.)**	**6.8 %(5.2 - 8.9 C.I.)**
Prevalence of acute malnutrition (Percentage median NCHS 1977)	**N = 606**	**N = 911**
Prevalence of Global Acute Malnutrition (<80% and/or oedema)	**1.3 %(0.6 - 3.0 C.I.)**	**5.8 %(3.9 - 8.7 C.I.)**
Moderate Acute Malnutrition(<80% and >= 70%, no oedema)	**1.3 %(0.6 - 3.0 C.I.)**	**5.7 %(3.8 - 8.5 C.I.)**
Severe Acute Malnutrition (<70% and/or oedema)	**0.0% (0.0 – 0.0 C.I)**	**0.1 %(0.0 - 0.8 C.I.)**
Prevalence of Acute malnutrition MUAC	**N=436**	**N=921**
Severe under nutrition < 115 mm	**0.3 %(0.1 - 1.3 C.I.)**	**1.2 %(0.6 - 2.3 C.I.)**
Moderate ≥115–<125 mm	**1.5 %(0.7 - 3.1 C.I.)**	**6.3 % (4.9 - 8.0 C.I.)**
Global Acute Malnutrition ≤125 mm	**1.8 %(0.9 - 3.4 C.I.)**	**7.5 %(5.8 - 9.6 C.I.)**
Maternal Malnutrition	**N=147**	**N=168**
Pregnant and Lactating mothers of U6 by MUAC: Wasted <21 cm	**0(0.0%)**	**10(06.0%)**
% of female caretakers at risk of malnutrition (MUAC<23.0)	**54(11.7%)**	**154(23.4%)**

Morbidity, immunization and supplementation results

	BARINGO CENTRAL/NORTH (BCN)	EAST POKOT/MARIGAT (EPM)
Child morbidity (6-59 months old)	**N= 614**	**N= 917**
Prevalence of reported illness	**(338)45.0%**	**(473)51.6%**
Fever /Malaria(alone or in combination with other symptoms)	**20.6%**	**33.3%**
ARIs (cough and cough with difficult breathing)	**65.9%**	**42.6%**
Watery Diarrhoea	**9.6%**	**18.9%**
Bloody Diarrhoea	**0.6%**	**1.7%**
Skin Infections	**3.2%**	**2.4%**
Appropriate diarrhoea management[1]	**351(56.9%)**	**407(43.9%)**
Immunization of children 6-59 months old	**N=616**	**N= 917**
OPV1 (card and recall[2])	**(612)99.2%**	**(886)96.6%**
OPV3 (card and recall)	**(654)98.9%**	**(823)90.1%**
Measles (children ≥ 9 -59 months)	**(559)97.2%**	**(718)86.0%**
Vitamin A supplementation 6-59months Once	n=616 (553) **89.8% (85.4-94.1 C.I)**	n=927 (765) **82.5% (77.3-87.8 C.I)**
Vitamin A supplementation 6-11months Once	n=82 (56) **68.3% (57.7-75.1 C.I)**	n=167 (107) **64.1% (51.8-71.3 C.I)**
Vitamin A supplement 12-59months More than once in last year	n=607 (251) **40.8% (29.6-51.9 C.I)**	n=580 (331) **35.7% (28.6-42.8 C.I)**
Deworming for children >12months	**(264)51.3%**	**(267)36.6%**

[1] Giving of fluids and/or medicine(with the exception of traditional herbs)

[2] Age verification by Recall in BCN- 36.0%; EPM-52.6% of children

Iron Supplementation	N=415	N=637
Iron supplementation among pregnant women	**309 (74.5%)**	**456(71.6%)**
Iron consumption for at least 3 months	**54(16.0%)**	**79(18.0%)**

Infant and Young Child Feeding (IYCF) Indicators

Breastfeeding Practices					
Initiation of breast feeding:					
	Age Group	**Baringo Central/North N=457 N=225**	**East Pokot / Marigat N=987 N=445**	**Target**	**Comment**
• **Ever breastfed**	**0-23m**	**(453)99.1%**	**(911)98.7%**	**>80%**	✓
• **Given colostrum**	**0-5m**	**(217)96.4%**	**(440)98.9%**	**>80%**	✓
• **Given pre-lacteals within 3 days of birth** **Main Pre-lacteals:** **Plain Water** **Herbs ('Sakit')** **Sugar/glucose water** **Powder/animal milk**	**0-23m**	**(103)42.4%** **(43)17.6%** **(32)13.1%** **(17)7.0%** **(7)2.9%**	**(219)46.7%** **(97)20.7%** **(92)19.6%** **(22)4.7%** **(7)1.5%**	**n/a**	**Unsatisfactory**
• **Early introduction to complementary foods**	**0-5m**	**(146)64.9%**	**(257)57.8%**	**n/a**	**Unsatisfactory**
Key Indicator 1 **Timely Initiation of Breastfeeding (within1 hr.)**	**0-23m**	**(361)79.0%**	**(825)90.6%**	**>80%**	✓
Key Indicator 2 **Exclusive Breastfeeding**	**0-5m**	**(62)27.6%**	**(143)32.1%**	**>50%**	**Unsatisfactory**
Key Indicator 3 **Currently Breastfeeding**	**0-23m**	**(406)88.8%**	**(804)88.3%**	**>80%**	✓

Complementary Feeding (CF) Indicators

Complementary Feeding Practices					
		Baringo Central/North (BCN)	**East Pokot / Marigat (EPM)**	**Target**	**Comment**
	6-23m	**N=232**	**N=466**		
Key Indicator 4 **Introduction to solid and semi-solid food**	**6-8m**	**n=42** **(41)97.6%**	**n=85** **(73)85.9%**	**n/a**	✓
Key Indicator 5 **Minimum Dietary Diversity(Total)**	**6-23m**	**n=231** **(210)90.9%**	**n=466** **(448)96.1%**	**>80%**	✓

Dietary Diversity for BF children(+3)	**6-23m**	**n=183 (163)89.1%**	**n=359 (346)96.4%**	**3**	✓
Dietary Diversity for NBF children(+4)		**n=48 (44)91.7%**	**n=106 (102)96.2%**	**4**	✓
Key Indicator 6 **Minimum Meal Frequency**	**6-23m**	**n=225 (194)86.2%**	**n=466 (362)77.7%**	**>80%**	✓
Children 6-23m (non-breastfed) mean number of times/day(Mean SD)	**6-23m**	**4.06(SD±1.8)**	**3.89(SD±1.6)**	**4**	
% 6-23m (non-breastfed):4+times	**6-23m**	**n=47 (26)55.3%**	**n=104 (55)52.9%**		**Unsatisfactory**
Children 6-8m (breastfed)mean number of times/day(Mean SD)	**6-8m**	**3.79(SD±2.0)**	**3.69(SD±2.2)**	**2**	
% 6-8m (breastfed):2+times	**6-8m**	**n=42 (38) 90.5%**	**n=84 (68)81.0%**		✓
Children 9-23 m(breastfed) mean number of times/day (Mean SD)	**9-23m**	**3.76(SD±1.6)**	**3.84(SD±1.8)**	**3**	
% 9-23m (breastfed):3+times	**9-23m**	**n=184 (107)58.2%**	**n=268 (213)79.5%**		
Key Indicator 7 **Minimum Acceptable Diet**	**6-23m**	**N=171 (150)87.7%**	**N=466 (356)76.4%**		✓
Key Indicator 8 **Consumption of iron-rich or iron-fortified foods**	**6-23m**	**n=186 (46)19.8%**	**n=465 (130)28.0%**	**n/a**	**Unsatisfactory**

Hand-washing Times:

	BARINGO CENTRAL NORTH (BCN)-DEC 2012	BARINGO CENTRAL NORTH (NOV 2011)	EAST POKOT/MARIGAT (EPM)-DEC 2012	EAST POKOT/MARIGAT (EPM)-NOV 2011
Critical times when hands are washed	**N= 466**	**N= 594**	**N= 489**	**N= 516**
After using the toilet	**24.10%**	**75.9%**	**11.80%**	**54.3%**
After cleaning child who has defecated	**11.80%**	**36.2%**	**10.70%**	**45.9%**
Before feeding a child(including BF)	**13.00%**	**44.6%**	**13.40%**	**48.6%**
Before eating/ preparing a meal	**29.50%**	**75.6%**	**30.10%**	**77.9%**
After handling animals	**02.5%**	**04.4%**	**18.70%**	**24.9%**

Hygiene and Sanitation Indicators:

	Baringo Central/North (BCN)		**East Pokot / Marigat (EPM)**	
Caretakers washing hands appropriately	**n=466 (178)**	**61.8%**	**n=698 (423)**	**60.6%**
Access to safe (treated) drinking water	**(320)**	**68.7%**	**(124)**	**17.8%**

10. RECOMMENDATIONS

Immediate Recommendations

Nutrition and Health

Baringo Central North (BCN)

- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening (active case-finding). In addition, stablish in-patient services of SAM and MAM in dispensaries and PHCs.
- In light of the deteriorating situation, based on food security indicators, two surveys in April and December (long-rain and short-rain season) is recommended. Alternatively, timing of the surveys should coincide with onset of the hunger gap period (January-March) in both survey zones.
- Exclusion of productive areas (with consistent food access) from subsequent BCN surveys is recommended, for precarious areas to be sampled, giving a more robust estimate of areas of poor nutrition status. However, a coverage survey should be used to validate this (with cognizance of the fact that malnutrition is multi-causal) and not always linked to food access.
- To address increased coverage for Food for Assets (FFA) during hunger-gap period
- Establish the community strategy components of primary health care, with a focus on IMAM community-based component. IMAM and growth monitoring implementation in facilities should be tracked through OJTs.
- Addressing the high morbidity load among U5s and access to essential health and nutrition services by strengthening the integrated outreach component

East Pokot and Marigat (EPM)

- Observing the trends of malnutrition over the past 2 years, EPM is still recommended for targeted SFP and OTP for children age 6 to 59 months to address the micro-nutrient and macronutrient food gap, justified by the serious rate of GAM. This intervention would be most effective with a strong general food distribution system and good coverage for IMAM interventions. Relevant support mechanism should be installed immediately to facilitate this. As a contingency measure, households with children recently discharged from SFP programme should be targeted as beneficiaries of GFD (FFA), to reduce the relapse cases, due to HH food insecurity.
- Continuous MUAC screening for active case-finding as hunger-gap approaches and strengthen therapeutic targeted interventions with a focus on SFP
- Establish regular nutrition surveillance through nutrition surveys- at both seasonal periods (April & Dec)
- Addressing the high morbidity load among U5s and access to essential health and nutrition services by strengthening the integrated outreach component- primarily focusing on regular medical outreach camps/mobile clinic to improve access to the nomadic and remote populations..
- An immediate up scaling-up of both SFP and OTP interventions modelled on the community-based IMAM with a strong outreach component (beyond and in addition to health-facilities) to cover all divisions of EPM. Community Strategy (CS) and establishment of CUs will facilitate this. Following sub-normal long rains, failed planting season and high food prices, food security situation is likely to deteriorate pending onset of short rains-there is need to support identification and treatment of children with malnutrition.
- Training recruitment and motivation of additional CHWs to improve rehabilitation of acutely malnourished children through the existing selective feeding and outreach programs and active case finding until household food security is restored and critical public health issues are addressed. This will require capacity-building in IMAM implementation of CHWs and TBAs to appropriately identify and manage acutely malnourished children.
- Training of CHWs and TBAs to encourage ANC attendance

BCN & EPM

- Decentralize essential health components to improve access to health services by:
  - ✓ Improve coverage of Vitamin A and deworming through targeting both ECD centres and mobilization of children during the Mass IMAM-GFD linkage
  - ✓ Establish the community strategy components of primary health care, with a focus on IMAM community-based component.
- Strengthen programmes and strategies currently addressing infant and young child nutrition (IYCN) with a view to improving the protection, promotion, and support of optimal IYCF. Viable action points include:
  - ✓ Systems strengthening would ensure facility and community level care for pregnant women and lactating mothers This would ensure key support for timely initiation of breast feeding and iron-folate/Vitamin A supplementation. Efforts such as the MtMSG, Community Strategy, Malezi Bora as well as outreach efforts should optimize the care for maternal, infant and young child nutrition.
  - ✓ As the HINI program is rolled out there is need for continual monitoring of both facility and community based interventions to track progress while also documenting the process to assess the trends in the outcomes as well as impact indicators. Provision of adequate data collection tools and training District Health Records Officers and health facility in charges on the same. Particular attention should go to Vitamin A supplementation and deworming, improved maternal nutrition, iron/folate supplementation during the prenatal period and ensuring ORS/zinc support for diarrhoea.
  - ✓ CHW mentorship of PLW women to promote better nutritional practices and effect positive behavioural change.

- ✓ Delivery of key messages could use the following avenues: community-based promotion through CHWs, peer-led MtMSGs, and community groups/meetings and religious leaders. Key breastfeeding indicators that require strengthening are EBF (including discouraging pre-lacteals and early introduction of complementary foods). Cultural practices that should be discouraged include not initiating BF until plain water or 'sakit' is given. IT has been established that there is a very strong traditional respect for use of sakit and plain water as an adjunct to breastfeeding.[3]- mothers thus lose the opportunity for EBF. These should be formulated into discussion points in MtMSGs and community meetings.
- ✓ Training on IYCF counselling and support for HC staff to provide IYCF education to mothers at nutrition service points. Facility-based promotion would include- strengthening mother support groups in facilities and delivery of context and culturally specific IYCN messages. These messages will address key barriers for improved feeding practices as well as improved nutritional recommendations. Strengthening of the programme is recommended, based on poor IYCF practices. Recommended areas for key messages include: elimination of pre-lacteals, time of introduction of complementary foods, risks of early or late introduction of complementary foods, food choices and preparation of appropriate complementary foods. Use of national tools/job aids and local adaptation of community mobilization and sensitization strategies (including community level materials), for BCC.
- Improve coverage of Vitamin A and deworming through ensuring distribution during vaccination and outreach campaigns and concurrent recording in Mother/child cards. Since coverage is poorest n 24-59m age-group , additional distribution through ECD and during school feeding programs
- Emphasis of HINI key messages -including consumption of maternal micronutrient supplementation for at least 3 months during pregnancy & lactation(iron and folate),
- Advocacy for use and treatment of ITNs by U5s to prevent U5 morbidity and mortality from malaria.
- Ensuring prescription of zinc sulphate, with ORS for all diarrhoeal episodes, recorded appropriately and monitored using the DHIS
- Strengthen the reporting component especially for micro-nutrient supplementation, deworming and zinc sulphate as the MoH reporting tools currently do not have provision some of the indicators e.g. deworming and hence even when done, it is not recorded.
- Growth monitoring statistics are very poor, requiring emphasis during IMAM implementation. Reward systems can be explored to motivate appropriate growth monitoring in the HCs

Water and Sanitation

- Strengthening of hygiene practices to reduce the incidence of diarrhoeal disease associated with contaminated water in the household including health education to educate the community on domestic treatment of drinking water(especially in EPM) and effective hand washing (soap/ash) and use of latrines/toilets. The critical hand-washing times that need to be re-emphasized are washing after cleaning child's bottom and before feeding the child. In particular, a focus on longer-term strategies with a Behaviour Change Communication (BCC) component would help to translate knowledge to practice. The starting point to this would be a Knowledge, Attitude and Practice (KAP) for BCC. Utilization of CHWs to emphasize hygiene practices/toilet usage can impact knowledge.
- Recharge at water points was good following long rains. However, water stress is likely to heighten as boreholes dry up in the coming months. Maintenance of Gen-sets, submersible pumps and fuel subsidy for borehole supplies should continue for community owned boreholes to support free water distribution to communities as well as schools and health facilities.
- Implementation of mechanisms for regular water treatment at water points and establishment of a rota-system to separate human and animal use of earth pans concurrently, especially in pastoralist zone. This will improve access to safe water in all areas.
- Strengthen awareness-creation of total sanitation through cascading trainings of community management committees.
- Continue strengthening community-led total sanitation training and support timely and consistent provision of water purification chemicals for water treatment at Household level

Food Distribution, Food Security and Livelihoods Rehabilitation

- Continue GFD until start of short rains and upscale the food aid targets as recommended by KFSSG mid-season assessment considering the long rains performance. In addition, WFP, through World Vision can support the use of CSB Plus to ensure optimal micronutrient fortified foods for young children.
- Agropastoral/mixed farming zones to be given incentives to produce and HH utilization (particularly for U5)as well as selling of excess produce to purchase nutrient-rich foods.
- Social Support systems are positive coping mechanisms for vulnerable households, and these should be facilitated.
- Migration has began in search of pasture and water. The feasibility of providing fodder for the core breeding animals at these sites would be appropriate in the short term. In the medium-term, increase of fodder production and conservation to replace lost access to dry-season grazing areas, should be implemented in pastoralist areas
- For fisheries zones, training of sustainable fishing and maintenance of equipment (in addition to supply of equipment) should be strengthened. insecurity should be mitigated at targeted fish markets so as to enhance supply.
- Placing livelihoods at the centre of emergency preparedness and planning is a critical base for the design of timely and appropriate programmes and policy responses that mitigate hazards. This shift is already being implemented in the county. FFA implementation is recommended continue as this provides positive coping mechanisms in lean times. HSNP should be scaled-up, to enable timely responses that protect livelihoods.

[3] Women FGDs- All livelihood Zones

Long-Term Interventions

Baringo Central North (BCN)
Nutrition and Health

- Using livelihoods analysis for preparedness and response planning means that household coping strategies are more readily supported when a shock becomes evident. Analysing livelihoods also ensures that the underlying causes of food insecurity are addressed before and even during a crisis, and that targeting is effective and interventions are appropriate. Examples include livelihoods-based early warning systems employing Household Economy Analysis (HEA).
- Focus on programmes by relevant actors that improve and sustain dietary diversity and consumption of micronutrient.-rich foods. This can be led by assessing the seasonal availability and HH utilization of nutrient-dense foods . This would address improved complementary food access for children six months to two years.
- Maintain IMAM-trained CHW and community volunteers and reinforce growth monitoring and promotion, nutrition and IYCN key messages,
- Separate the BCN zone to high and low malnutrition rate areas for targeted intervention/resources
- Establishment of C.Us to cover both Central and North zones
- Twice yearly vitamin A supplementation and de-worming should be promoted; possibly though the MSGs and CHWs
- KAP barrier analysis for MIYCF indicators and consumption of maternal micronutrients.
- Standardized recording of zinc supplementation as well as monitoring for complete dosage administration
- Strengthen outreach health facilities PHCs and dispensaries, especially ensuring key messages on disease prevention;& growth monitoring
- Supporting and Strengthening C.S. with establishment of C.U.

East Pokot and Marigt (EPM)

- Strengthen outreach health facilities and community and mobile clinics/satellite services, and maintain IMAM-trained CHW and community volunteers, with priority in locations with low HC coverage.
- Establishment of C.Us to cover all areas of the zone

Water and Sanitation

- To address the issues of limited access to safe water, there is a need for rehabilitation/protection of water systems including the unprotected wells (e.g. capping of wells), to upscale water storage.
- Orderly and efficient resource utilization should be championed by water-use management committees (members selected by the community) to regulate and reduce conflicts at water points, especially during shortage periods.
- Advocacy/public health campaigns on domestic water treatment such as boiling of drinking water and use of purification chemical to minimise risks of water-borne diseases, should be carried out.
- Reinforcement of hygiene messages and water treatment, for disease prevention in through various channels like child to parent initiatives, outreach motivation-e.g. soaps and kiswahili/local vernacular radio.

Food Distribution, Food Security and Livelihood Rehabilitation

- Implementation of drought preparedness strategies as well as surveillance- data collection, monitoring and evaluation should be comprehensively done. Effective linkages and collaboration between the community and the DSG, an effective feedback system and coordination so as to enhance drought preparedness strategies
- In pastoralist zone, grazing committees to reinforce building reserves during abundant periods and ordered management of rangeland
- Support by relevant stakeholders to develop and sustain breeding herds and market other stock to increase resilience
- Since traditional animal husbandry is very vulnerable to drought, building of alternative and sustainable livelihoods to enhance resilience to drought, with a focus on gender empowerment should be encouraged. This is primarily targeted at increasing the household food security. Structured associations for marketing wild honey could expand its gains e.g. MtMsGs could couple as chamas. Another viable activity in mixed livelihood zones is poultry-keeping. This has the additional benefit of increasing HH dietary diversity diversity (e.g. consumption of eggs).
- The agropastoralist zones/mixed farmers requires strengthening of training for mixed cropping and enhanced varieties (drought-tolerant; early-maturing). Species diversification and splitting in dry season is also necessary to maintain vibrant crop market and food security.
- Revitalize markets for agro pastoralist & mixed farming zones (economic stimulus package/CDF)
- Use of MtMSGs and extension support to operationalize use of nutrient-dense foods and improved recipes for CF.
- Livelihoods programmes like FFA should continue to strengthen sustainable coping strategies during the lean times.

1. INTRODUCTION

1.1 BACKGROUND INFORMATION

Context

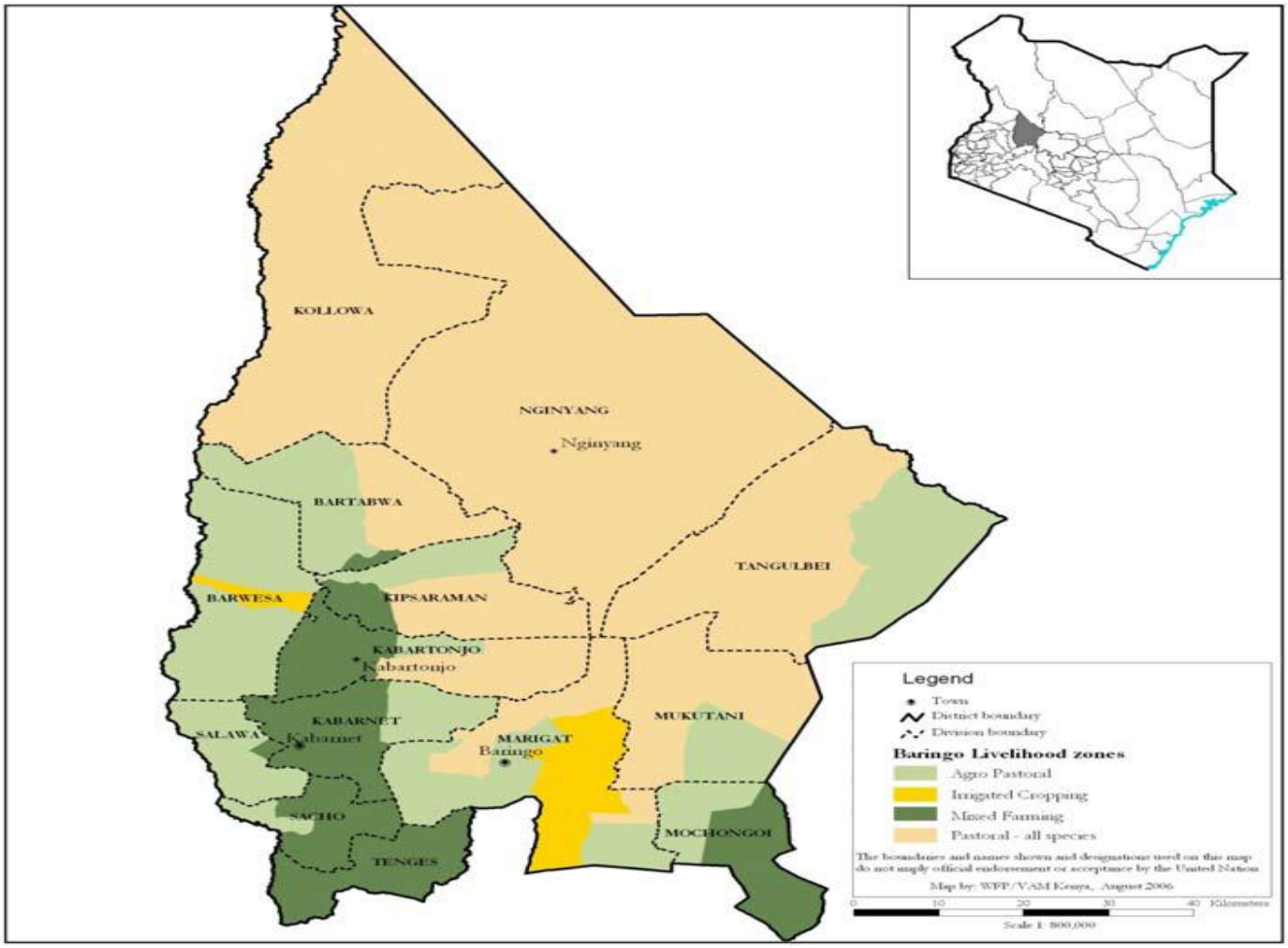
Baringo is one of the fourty seven counties in Kenya and it is situated in the Rift Valley region. It borders Turkana and Samburu county to the North, Laikipia to the east, Nakuru and Kericho to the south and Uasin Gishu to the south west, Elgeyo-Marakwet, and West Pokot to the west. The county is located between longitudes 35 30' and 36 30' East and between latitudes 0 10' South and 1 40'. The county is cut across by the Equator at the southern part. The district covers an area of 8,655 km^2 with an estimated population of 555,561persons[4] The county's population growth rate is 2.9 percent per annum which is slightly below the national average of 3%. The population of the county is projected to be 606,060 in 2012[5]. The district includes 140.5 km^2 of Lake Baringo, lake Bogoria and Lake Kamarok. Lake Kamarok is reported to have dried and a new lake named 94 has developed in the last fifteen years.

The district has a bimodal rainfall pattern with the long rains falling in March to May and short rains from July to September. Temperatures range from 10 degrees in the Tugen highlands to 37 degrees in the lowlands with the hottest months being January to early March..

he county is predominantly inhabited by the Tugen community in the five sub counties and the Pokot community in one Sub County among others. The Ilchemus and Endorois communities are the minorities in the county among a few other sub-tribes. There are four main livelihood zones namely mixed farming, pastoral, agro-pastoral and irrigated cropping (Figure 1).

The survey area was divided into 2 zones: Baringo Central/North (BCM) and East Pokot/Marigat (EPM) that covered the 6 administrative districts of Baringo County with a total of 26 division and 116 locations. The total area of the county is 77,000 km^2 The estimated Under-5 target population of the survey zones was estimated as 30769(BCN) and 35981(EPM)[6].

Figure 1: Map of Baringo County



[4] KNBS Current Population estimates from 2009 National Census Data
[5] Baringo County Development Plan (Draft)-2012
[6] Under 5 population estimated at 15.8 % of the total population, from 2009 National Census Data

Geography

The major topographical features in the county are river valleys and plains, the Tugen Hills, the floor of the Rift Valley and the southern Plateau. One of the prominent river valleys is the Kerio Valley, which is situated on the western part of the county and is a fairly flat plain. In the eastern part of the county near Lake Baringo and Bogoria is the Liboi Plain covered mainly by the latchstring salt-impregnated silts and deposits.

The Tugen Hills form a conspicuous topographic feature in the county. The altitude varies from 300m to over 2000m above the sea level. The trend of the hills is north-south and mainly consists of volcanic rocks. The hills have steep slopes with prominent gullies. On the eastern and western parts of the hills are escarpments. The floor of the Rift Valley owes its origin to the tectonic and volcanic disturbances which have dislocated surfaces forming separate ridges. The troughs of the rift which have a south alignment are occupied by Lake Baringo and Bogoria. There are several extinct volcanoes, namely, Tiati, Paka Kamugo and Korossi.Approximately 45% of Baringo County is either too steep (Tugen Hills) or too dry (eastern parts around Lake Baringo and then eastern parts, that is, Nginyang, and some parts of Baringo) for crop cultivation. However in the valleys, alluvial soils, ground water, water concentration, run-off catchment or with additional irrigation, some crop production can be profitably practised. The county has different agro-ecological zones necessitating different agricultural activities. Exotic forests exist in county the but the known indigenous forests are found in Kabarnet, Kabartonjo, Tenges, Lembus, Saimo, Sacho and Ol' Arabel, and Eldama Ravine. Other additional ecological features are Lake Baringo basin, fluorspar mines, Laikipia ranges, Elgeyo escarpment, Kerio Valley and other touristic attractions that the county offers.

The county is classified as arid and semi-arid. Most parts of East Pokot, Baringo Central, Baringo North, Mogotio Districts are arid and semi-arid[7] except for Koibatek District which is in a highland zone. The temperatures range from a minimum of 10 °C to a maximum of 35 °C in different parts of the county. The rainfall varies from 1,000mm to 1,500mm in the highlands to 600mm per annum in the lowlands.

Livelihoods

The major economic activities for Baringo County are livestock-based, subsistence farming, and petty trade. The county can be divided into two major zones: the highlands and the lowlands. The higher elevations of the county are in the modified tropical zones with soils that are generally well drained and fertile. This zone contains the high potential areas for agricultural and improved livestock development. On the Tugen Hills, coffee is grown on small scale while food crops like cereals, fruit trees and horticultural crops are also cultivated. These agricultural activities are combined with elaborate soil conservation measures. In the south-west part, there is a large-scale farming of cereals and horticultural crops, while the Kerio Valley has potential of cotton production.

The lowlands are in a semi-arid climate zone. They have complex soils with various textures and drainage conditions which have developed alluvial deposits. Some of these soils are saline. A large area is characterized by shallow stony soils with rock outcrops and lava boulders. This zone is essentially a rangeland and apart from scattered isolated pockets of dry subsistence agriculture and small scale irrigation in Marigat and Barwessa, the major socio-economic activities centre on livestock and bee -keeping.

Although much has been done, a large part of the county's potential is yet to be developed. Most of the highlands can be developed by the introduction of effective and efficient methods of soil conservation and land management. In the lowlands the main issue is lack of adequate moisture for crop growth; therefore development of irrigated cultivation and introduction of drip irrigation and drought resistant crops can improve the livelihoods of the farmers in the area.

Current climatic conditions and Food Security

Rainfall pattern in the district is bimodal and ranges between 1,000mm to 1,500mm in the highlands to 600mm per annum in the lowlands. The April-June rains constitute the long rains while the October-December rains are the short rains The long rains started during the second dekad of April as opposed to the normal onset which is the first dekad of April. The rains were unevenly distributed spatially. Baringo County received more than 300% of normal long rains. The temporal distribution of the rains was fair although some areas received high rainfall amounts in a few days. While the rains ceased in the second and third dekad of June, the county continued to receive off-season rains through August. Short rains were received late, in the last week of November, This was normal at this time of the year as the rain received is minimal. However the spatial & temporal distribution was poor throughout the month[8]. The good long rains have led to marked improvements in Baringo, leading to changes in food insecurity phase classifications. In February 2012, the northern pastoral area in East Pokot was in Crisis Phase (IPC Phase III) of food insecurity. However, due to the positive impacts of on-going interventions and good long rains, by August 2012, this area improved to the Stressed Phase (IPC Phase II).

Though the long rains were good, a combination of landslides, flooding, leaching and suspected maize lethal necrosis disease (MLND) lead to a drop in maze harvest in the county where only 70% of long term average maize harvest was achieved.

Nevertheless, the majority of households had good maize stocks that last well into the short rains season. About 75 % only of agro-pastorals planted maize & beans due to the late onset of the short rains. Household food consumption was also expected to remain favourable due to improved availability of other crops such as potatoes and beans.

[7] Draft National ASAL Policy, 2004

[8] NDMA DMB-November 2012 placing all livelihood zones at Alert Warning Stage-deteriorating

With good pasture and browse and water availability, livestock body condition had peaked, but is expected to deteriorate. This is due to the fact that the quality and quantity of forage deteriorated in all livelihood zones as well as outbreak of CCPP & PPR, causing decline of body condition in small stock.

Food access indicators are also flagging as reflective of a deteriorating situation. Milk production declined drastically during the November owing to small stock condition. Subsequently, milk utilization also remained well below average compared to similar time last year- due to low availability and sharing among the extended family. Although livestock prices have steadily risen July-November 2012 (higher external demand, boosting prices), the trend is reversing and the terms of trade remains very poor especially in pastoralist livelihood areas due to high food and cereal prices. Currently a pastoralist needs to sell 3.0 goats to purchase a bag of maize. The county average was below the long-term mean by 31.1 % signifying very unfavourable terms of trade for purchasing power. For the irrigated cropping livelihood, the situation is slightly better, owing to better livestock prices and accessibility of cereals with low prices in this area. The low prices of livestock offered coupled with the erosion of the peoples' purchasing power has depleted the asset level of the pastoralists through high number of animals sold to purchase food hence a threat to household food security. Pastoral-all species livelihood zone needs a particular attention owing to low animal prices obtained compared to high prices incurred to purchase cereals. All livelihood zones are currently graded under 'Alert' warning trend with a worsening trend[9]. The food security situation is expected to worsen significantly owing to the cumulative effects of the above conditions.

Improvement of food security conditions are dependent on several factors, including the onset of the long rains, continued relief response and the need for the GoK and its donor partners to increase non-food investments aimed at mitigating vulnerability to hunger. The threat of cattle-rustling incidents that traditionally increase during rite-of-passage season (December), is also likely to impact the food security prognosis[10].

Food Distribution

Baringo County has been on Emergency Operation (EMOP) food relief support since September, 2004 to August, 2009 after which it was put under Protracted Relief and Recovery Operation (PRRO) whose phase 1 commenced in September, 2009 to date. No relief food was received between the periods of March, 2007 and September, 2008. The Protracted Relief and Recovery Operation phase IV covered the period March, 2011 to August, 2011.The number of people that benefited in this phase was 96,223. There was a joint effort by the government of Kenya (GoK) and the World Food Programme (WFP) in terms of relief food provision accounting to 16,200 beneficiaries under Food for Assets (FFA) and 13,960 beneficiaries under the government of Kenya (GoK) general food distribution (GFD) .

At the time of the survey, East Pokot district was receiving food relief. The general food distribution was 50% ration in which a cereal, corn soya blend (CSB), a pulse, iodized salt and fortified oil was distributed on a monthly basis. Most of the GFD was provided by WFP . In Marigat district, WFP and partners were implementing Food for Assets targeting 16,000 beneficiaries. There was supplementary feeding programme (SFP) targeting children underfive years of age, pregnant and lactating women and Outpatient Therapeutic Programme (OTP) in both the districts.

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Baringo Central has not been receiving food relief having been phased out in December 2010 whereas the distribution of relief food commenced in Baringo North in November 2011 targeting 16,000 beneficiaries or 7.1% of the population. The general food distribution was 50% ration in which a cereal, corn soya blend (CSB), a pulse, iodized salt and fortified oil was distributed on a monthly basis. Most of the GFD was provided by WFP. There was supplementary feeding programme (SFP) targeting children underfive years of age, pregnant and lactating women and outpatient therapeutic programme (OTP) in both the districts.

All GFD commodities were available at 75% ration scale of 2100Kcal, the daily per capita energy requirement[11]

Nutrition and Health Activities in Baringo County:

WVK, WFP and UNICEF are working in collaboration with the Ministry of Public Health and Sanitation (MOPHS) on child survival activities in the County. The main responsibility of MOPHS is quality assurance of the nutrition and health-related activities through the coordination of all activities in Baringo County. The main health and nutrition activities[12] in which WVK works in partnership with MOPHS include:

1. Supporting the MoPHS and Ministry of Medical Services (MoMS) in East Pokot/ Baringo District to ensure quality and 90% coverage of high impact nutrition interventions (HINI) at health facility and community level.
2. To support District Health Management Teams (DHMT)) to strengthen their capacity in coordination and timely and accurate reporting on High Impact Nutrition Interventions.
3. Improve Nutrition outcomes through integration and linkages with WASH and livelihood interventions

The main activities undertaken and achievements during the last reporting period (August 2012) were:

[9] NDMA DMB-November 2012 placing all livelihood zones at Alert Warning Stage-deteriorating
[10] Food Security Prognosis- KFSSG Long Rains Assessment Report
[11] Based on UNHCR/UNICEF/WFP/WHO Guidelines for Food and Nutrition Needs in Emergencies
[12] Baringo HINI Quarterly Report (June-August 2012)

- Commencement of the second phase of the High Impact Nutrition Interventions in June 2012
- On Job Training (OJT) was done to 11 health facilities in Marigat and Central districts, 12 in East Pokot and 6 in Baringo North. The OJT was based on the gap assessments as identified by the team of partners during respective monitoring visits and training sessions.
- Refresher training on Integrated Management of Acute Malnutrition (IMAM) and Linkage was conducted in Baringo. The training targeted 42 health facilities implementing IMAM. 42 health facilities-in- charges were trained.
- Integrated Outreach for Pregnant and Lactating Women (PLW) and U5s in East Pokot.
- Community Health Workers (CHW) training on IYCF was conducted in Baringo North District, in preparation for the World Breast feeding week.
- Formation, support and mentoring of 88 mother to mother support groups(MtMSG) - appropriate IYCF practices (both breastfeeding and complementary feeding) are emphasized. Some MtMSGs have incorporated income-generating activities (enhancing sustainability) and plans are underway to start kitchen gardening in three health facilities spearheaded by the support groups.
- HiNi integration during the emergency response to flooding in Marigat and landslides in Baringo Central.
- Support of the World Breastfeeding Week
- DHMT/WVK joint support supervision was conducted in 13 facilities in Marigat and Baringo Central, two in East Pokot and five in Baringo North.
- Improved linkage of nutrition to water sanitation and hygiene: water treatment and provision of AquaTab during flooding of communities living around and consuming water from the lake: health education of PLWs during the landslide response in Kabarnet; routine health education and hand-washing messages for PLWs during food distribution in East Pokot

Lessons Learnt during the implementation period:

- Outreaches services are relevant in reaching communities in hard to reach areas and enable mothers and children access nutrition services without having to walk long distances.
- Mother support groups with capacity to engage with other activities like Income Generating Activities are stronger and able to meet more regularly thus more sustainable.

The main challenges to programme implementation were reported to be:

- Absence of Baringo APHIA Plus which was the main source of support for most health facility in-charges meetings Their absence has created a vacuum in the way services are currently delivered especially in those hard to reach area in East Pokot.
- Lack of CHWs motivation-The previous motivation went a long way in up scaling most nutrition indicators in the health facilities and acting as a link between health facilities and the community, many CHWs have dropped due to lack of motivation.

Nutrition Surveillance:

Nutrition surveillance data in Baringo is routinely collected by National Drought Management Authority (NDMA), located at the Office of the Prime Minister (Ministry of State for the Development of Northern Kenya and other Arid Lands). Field monitors collect data on mid upper arm circumference (MUAC) of children 12-59 months old, from NDMA's sentinel sites as part of its early warning system (EWS), on a monthly basis. Data is then submitted to NDMA data analyst and outcomes published in the Drought Monitoring Bulletin (DMB). World Vision Kenya (WVK), working in collaboration with MOPHS has received support from UNICEF to conduct nutrition surveys. SMART nutrition survey data collected from the 2 survey zones , from 2011, which is used for annual trend analysis.

Table 2: Relief programmes currently in the area

Organization	Activities
World Vision:	Lead Implementing Partner for GFD/FFA; HINI
NDMA	Livelihood and surveillance
UNICEF	IMAM (Supplies)/Nutrition Support; Health; WatSan
AphiaPlus IMARISHA	Health
Kenya Red Cross:	Emergency relief; Cash Transfers; WATSAN;
WFP:	GFD / SFP/SMP (LS, Supplies);Coordination/ M&E/ Assessments

1.2 SURVEY OBJECTIVES

This report summarizes the outcomes of a nutrition survey whose aim was to assess the nutritional status of children less than 5 years of age and determine the prevalence of global and severe malnutrition within four districts of Baringo County. The assessment was commissioned by MoPHS, with support of World Vision Kenya. The surveys were undertaken from 08nd- 14th December and carried out in collaboration with UNICEF. The two independent surveys were categorized in the same zones, as previously, for continued surveillance as follows:

a. Baringo Central and North (BCN)
b. East Pokot and Marigat (EPM)

These surveys aimed to determine the current nutritional status and underlying causes of malnutrition in the district to analyse the possible factors contributing to malnutrition and recommend appropriate interventions that would inform future programming. It also aims to produce a nutrition surveillance system in Baringo. As all the surveys were designed and conducted in the same manner singular descriptions are used to present the methods used throughout the process.

The specific objectives of this survey are:

1. To determine the prevalence of acute and chronic malnutrition of children aged 6-59 months and pregnant and lactating women (PLW) aged 15-49 years.
2. To determine the Infant and Young Child Feeding Practices (IYCF) among children 0-23 months of age;
3. Assess the prevalence of malnutrition in pregnant women and lactating mothers'
4. Estimate coverage of measles, BCG vaccination, OPV, deworming and vitamin A and diarrhea management of children 6-59m and iron supplementation of PLW aged 15-49 years.
5. Estimate morbidity rates in children 6-59 months and care-giving practices.
6. To establish hygiene and sanitation practices of the community using hand-washing and water-treatment indicators
7. Estimate coverage for Supplementary Feeding Program, Outpatient Therapeutic Program (from coverage report)
8. Assess Household food security levels/situation, using secondary data.

2.0 METHODOLOGY

2.1 General Approach

The **2-stage cluster** survey methodology was employed in accordance with SMART and the National Guidelines for Nutrition and Mortality Assessments in Kenya. The SMART software sample size calculation gave the number of children required as the minimum number for the anthropometric surveys. The target population for the anthropometric survey was children aged 6-59 months. The survey tool used was the recommended Nutrition, Food Security and Mortality Household Questionnaire modified to include all the minimum indicators to be collected in a nutrition survey[13]. Data was collected on anthropometry, morbidity, vaccination and deworming status, Vitamin A supplementation, IYCF and care practices, PLW status, growth monitoring as well as hygiene and sanitation practices. To collect the qualitative data, Focus Group Discussion (FGD), clusters were randomly selected in each of the divisions based on the livelihood zones. These included pastoral, mixed farming, irrigated cropping and agro pastoral livelihood zones. A total of 14 FGDs(8 IN EPM and 6 in BCN) were conducted, and each group was composed of 8-12 participants. Key informants from MoMS/MoPHS, government departments and other implementing agencies were also interviewed to obtain additional information. Secondary Data was obtained from WVK reporting documentation, surveillance data and the recent East Pokot Coverage Report.

2.2 Type of Survey

This Anthropometric and Retrospective Mortality survey utilized the Standardized Monitoring of Relief and Transitions (SMART) methodology and was also in accordance with both the National Guidelines for Nutrition and Mortality assessments in Kenya. Anthropometric and household (HH) data were collected simultaneously in all households visited during the survey, that had target children. Qualitative data from FDGs, key informant interviews and general observations were also collected to complement the quantitative findings.

2.3 Sampling Methodology and Sample Size

A two-stage cluster sampling method with probability proportional to size (PPS) design was employed for this nutritional survey. The Emergency Nutrition Assessment (ENA) for Standardized Monitoring of Relief and Transitions (SMART) software was used to determine the sample size using village-level population data for each of the two survey zones.

First Stage Sampling:

In the first sampling stage, survey sample size was determined by entering relevant information (estimated GAM rate, desired precision and design effect) into the ENA for SMART software:

Table 3 : Anthropometry sample size

[13] Appendix 7.7 of National Guidelines for Nutrition and Mortality assessments in Kenya

Survey	Total Population[14]	Under 5 population[15]	Estimated prevalence[16]	Precision [17]	Design effect[18]	Sample size Children	Average HH Size[19]	Sample size HH
Baringo Central/ North	**194739**	**(15.8%) 30769**	**4.2%**	**2.0%**	**1.28**	**538**	**5.7**	685
East Pokot/ Marigat	227,726	(15.8%) 35981	7.6%	2.5%	1.87	871	5.6	1138

Table 4: Sample size for IYCF

Survey	0-5.9 m required per cluster	6-23.9 m required per cluster
Baringo Central/North (BCN)	**209/36= 5.8**	162/36=4.5
East Pokot/Marigat(EPM)	305/36= 8.5	300/36=8.3

For the IYCF practices 6 children in BCN and 9 children EPM- less than 6 months of age were be selected from the households visited in each of the clusters.
Similarly, 5 children (BCN) and 9 children (EPM) 6-23 months of age were be selected from both anthropometry and IYCF each of the clusters making a total of 468 children for IYCF assessment (i.e. at least 13 children 0-23.9 m from each cluster). The sample was attained by enlisting the children in these age categories as found in the households visited. In case the required sample size was not realized from the number of households visited, more households were sampled in a similar manner to those for the anthropometric survey (described above), as a purposive sample, until the required sample was realized.

Table 5: Summary of parameters considered for sample size calculation for the survey zones

Survey	Sample of o-5.9m age-group	Sample of IYCF[20]	Sample of Anthropometry	Children for anthro. In each cluster	# of HH[21] to visit	Sample size considered	# of households / cluster	# of clusters
Baringo Central/North	245	**190**	**538**	**16**	**685**	**538**	20	**36**
East Pokot/Marigat	**245**	208	871	17	1138	871	**24**	**48**

In accordance with the National Guidelines for Nutrition and Mortality Assessments in Kenya, the ENA programme automatically included reserve clusters (RC), which would act as contingency, so that in the event that 10% of the clusters in each respective zone was inaccessible, the RCs would be used.

The second sampling stage comprised of village and household selection. In order to select survey clusters, the names of villages/sub-locations, their respective population sizes and the required number of clusters were entered into the SMART software, which generated the actual list of the villages to survey (including reserve clusters). At the field level, simple random sampling was used to select HH. The survey teams first reported to the area chief, assistant chief or a village elder who assigned them a cluster guide. With the assistance of the cluster guide, the teams then went to the approximate centre of the village and spun a pen to select a random direction to walk to the boundary of the village. Choosing this initial random direction ensured randomization of the households to be visited in order to avoid systemic bias which may arise if survey teams systematically sample households in a biased subjective manner e.g. in proximity to shopping centres.. The first household to be visited was randomly selected by drawing a random number from the random number tables between zero and the total number of houses. The subsequent households were selected by proximity always selecting households to the right. In villages with more than one cluster, the village was segmented and the centre of each segment determined and households selected as described above. In a cluster that was sparsely populated, all the households in the cluster were visited. All children aged 6-59 in every household visited were included in the anthropometric survey and 0-6 month category included in IYCF survey.

[14] Based on KNBS projected population for 2012
[15] Based on the Kenya Population Census 2009
[16] November 2011 Surveys prevalence of two surveys in Baringo County was used to estimate the current prevalence, due to the fact that both years experienced fairly good rains.
[17] Based on recommended precisions needed at various levels of malnutrition prevalence-SMART 2006
[18] Design Effects (DEFF) from 2011 data
[19] Based on Baringo County SMART surveys report Nov 2011
[20] This is based on IYCF multiple survey sample size calculation –the highest IYCF indicator sample
[21] Number of households to be visited from anthropometry sample

A household was defined as a group of people who lived together and 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 considered as separate households and assessed separately. 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, and no substitution of households was done. 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 the minimum households, following the SMART methodology[8].

2.4 Data collection Tools and Variables Measured

For each survey zone, a total of 6 survey teams, each comprising of 1 team leader and 3 enumerators collected the data. The six teams were managed by a survey coordinator. 4 sets of questionnaires were used for data collection. These included a Household hygiene and sanitation (HYSAN) and growth monitoring (GM) questionnaire, Under-6 IYCF, 6-23m IYCF, and an anthropometry questionnaire. Also, focus group discussion (FGD) guides were used to collect qualitative data. Each survey zone had an FGD team.

The Household Health, Nutrition and Food Security questionnaire was divided into different sections as shown below:

2.4.1 The household HYSAN and Growth Monitoring/ANC attendance questionnaire.

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

Growth Monitoring: Information on growth monitoring of the U5 and ANC attendance of PLW in target children HHs.

2.4.2 6-59 months old Child (Anthropometry) and PLW questionnaire

Using this questionnaire, the following data were collected:

Child age: the age of the child was recorded based on a combination child health cards, the mothers'/caretakers' knowledge of the birth date and use of a calendar of events for the 4 districts was adopted with updates for 2012.

Child sex: it was recoded whether a child was 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, nutritional oedema was indicated.

Child weight: the weights of children were taken with minimal light clothing on, using the electronic UNISCALE (mother and child scale) and recorded to the nearest 0.1kg. The teams were trained to use both the Uniscale and Salter scale so they were competent in use of both instruments.

Child length/height: Children were measured bareheaded and barefooted using wooden UNICEF height boards with a precision of 0.1cm. Children under the age of two years were measured while lying down (length) and those over two years while standing upright (height). 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-<87cm) or in an upright position (heights greater ≥87cm). Height rods with a marking at 87cm were used to assist in determining measuring position.

Child MUAC: the MUAC of children were taken using child tapes, respectively, and recorded to the nearest 0.1cm. The results were used to decide if referral to the SFP/OTP program was needed or not. If the MUAC was below 11.5cm or presence of oedema, the caretaker received a referral slip. In the analysis, the Weight-for-height z-scores (WHZ) was calculated using the international reference population tables (WHO/CDC) for all children and analyzed by ENA software.

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

Child immunization and Vitamin A supplementation: data on vitamin A supplementation, deworming, and immunization for polio and measles were collected to estimate their coverage. The coverage for measles immunization and deworming was only done for eligible children (≥ 9 months) and (≥ 12 months) respectively.

Maternal Health Data: MUAC of the primary caretaker of the index child (between 15-49 years) as well as physiological status, iron supplementation were taken

2.4.3 6-23 months old child questionnaire

If the index child/ren were in this age category, information on breastfeeding, complementary and child feeding were collected. Dietary diversity information based on a 24-hour food intake recall was collected for the children to assess the number of food groups taken the previous day.

2.4.4 0-5 months old child questionnaire

This was used to collect breastfeeding and infant and young child feeding (IYCF) practices data in the households that had a child in this age category**.** Information on timely initiation of breastfeeding, giving of colostrum and pre-lacteal feeds, maintenance of breastfeeding, liquids given and complementary feeds of the child, based on a 24-hour recall, in line with the WHO guidelines to minimize recall bias was used thus obtaining more valid information. Exclusive Breast Feeding (EBF) was computed based on a new variable based on responses to the existing indicators in this questionnaire.

2.4.5 Focus group discussion (FGD) guides

[8] SMART (2006): Measuring Mortality, Nutritional Status and Food Security in Crises Situations: SMART METHODOLOGY

FGD guides for women, fathers and grandmothers of children Under 2 years was used to collect qualitative data to complement quantitative data.

2.5 Training and Supervision

The survey was coordinated and supervised by an external consultant, WVK M&E coordinator and nutrition manager, DHMT team-leaders and county DNOs who coordinated each survey zone together with UNICEF NSO and WVK Nutrition Officers as the Survey Supervisors.

For data collection, a total of 6 teams were recruited and trained for each survey. Each team comprised of a team leader and three enumerators. The consultant and assistant consultant carried out training assisted by the WVK Staff and the UNICEF NSO as survey supervisors. The existing local events calendars for each of the 4 districts were updated jointly with the survey team and the questionnaires translated. A modified anthropometric standardization exercise[22], as recommended by the SMART methodology, was used as an assessment of the team members' anthropometry techniques. Each team member was given a score of competence based on performing measurements with accuracy and precision.

After the theoretical training, the team were equipped with a 'Surveyor's Manual' for reference during fieldwork. Practical field experience was conducted on the last day of training, in one of the unselected clusters to take anthropometric measurements of children and caretakers, conduct interviews and fill questionnaires. The pre-testing exercise was performed on 5 households.

Each team was supervised at least once a day throughout the data collection by either the survey consultant, NSO, WVK nutrition officers or survey supervisors. At the end of each day at base, there was a de-briefing session and review of questionnaires. The survey, including the training, lasted for a period of 11 days.

The following topics were covered during training:

- survey objectives, types and causes of malnutrition
- SMART survey and sampling methodologies
- verbal interpretation of the questions into the local languages during training for uniform contextual understanding by all the teams
- household, child and IYCF questionnaire interviewing techniques
- anthropometric measurement procedures
- practical on conducting interviews and anthropometric measurements
- interview techniques
- duties and responsibilities
- research ethics
- community entry behaviour
- survey logistics

2.6 Data Entry and Analysis

Anthropometric, household and IYCF data entry was done using SPSS and processing was done using the SMART/ENA software where the World Health Organization Growth Standards (WHO-GS) 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[9] standards and cut-off points and exported back to SPSS for further analysis. IYCF and all the other quantitative data were entered and analysed in the PSAW Statistics 18 (SPSS Version 18.0), ENA/EPI and Excel[23].

2.7 Nutritional Status Cut-off Points

Table 5: Definitions of acute malnutrition using WFH and/or oedema in children aged 6–59 months

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

Mid-Upper Arm Circumference (MUAC)

Guidelines for the results were expressed as follows:

- Severe malnutrition is defined by measurements <115mm

[22] SMART Regional Training Kit for Capacity-Building and Methodology (ACF Canada) 2010

[9] WHO 2006

[23] Infant and Young Child Feeding: Collecting and analyzing data, CARE USA 2010

- Moderate malnutrition is defined by measurements >=115mm to <125mm
- At risk of malnutrition is defined by measurements >=125mm to <135mm
- Normal >=135mm

MUAC cut off points for the women for pregnant and lactating women: Cut off <21 cm signifying GAM (global acute malnutrition

The following nutritional indices and cut-off points were used in this survey:

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

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) 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 or had bilateral oedema were classified as severely wasted (to reflect SAM)
- A cut-off point of <12.5cm MUAC was used to denote GAM among the under-fives.

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 a very useful tool 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.
- Children whose WFH indices were <80% of the National Centre for Health Statistics (NCHS) median or had bilateral oedema were classified as wasted (GAM)
- Children whose WFH indices were <70% of the NCHS median or had bilateral oedema were classified as severely wasted (SAM)

2.7.3 Height-for-age (HFA) – Stunting[24]

Height-for-age is a measure of linear growth and therefore an unequivocal reflection of the cumulative effects of past nutritional inadequacy and/or illness episodes.

- 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.***

Table 6: Definition of boundaries for exclusion

1. If Sex is missing the observation is excluded from analysis.
2. If Weight is missing, no WHZ and WAZ are calculated, and the programme derives only HAZ.
3. If Height is missing, no WHZ and HAZ are calculated, and the programme derives only WAZ.
5. For any child records with missing age (age in months) only WHZ will be calculated.
6. If a child has oedema only his/her HAZ is calculated.

Additional analyses for frequencies, descriptives, correlations, cross–tabulations and regressions were conducted using SPSS, Epi-Info, ENA Epi Info and Excel. Indices were expressed both in terms of z scores that represent the difference between observed weight and median weight of the reference population expressed in standard deviation. The result of this survey was compared to WHO standard cut-off points. The IYCF data was analysed to yield data for key indicators in SPSS and excel spreadsheets using the step by step guidelines developed by CARE[25].

Survey data validation process

Data quality was ensured through:

- thorough training of team members for four days
- Additional anthropometry training based on poor standardization scores
- 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 local language spoken in the county during training
- standardization of anthropometric measurement procedures

[24] The cut-off point for analysis was adjusted downwards from 65cm to 60cm for inclusion of this children. From prior experience, this is a relatively stunted population with youngest age-group(6-8months) found to have children <65cm length.

[25] Infant and young child feeding practices, collecting and using data: a step by step guide. January 2010

- practical sessions on interviewing and anthropometric measurements taking
- daily supervision of the teams by the consultant, , UNICEF NSO, WVK Nutrition Officers and 2 survey coordinators
- review of questionnaires on a daily basis for completeness and consistency
- plausibility checks from SMART/ENA software specific to each team during daily data entry
- 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 and consistency
- 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 of quantitative data using qualitative information-FGDs, KIIs, secondary data and observation
- Age of children verified by EPI health cards- in the absence of cards, the local calendar of events formulated was used to give estimates of the birth month and year.
- Validation of preliminary results by DHMT, District Nutrition Technical Forum (DNTF), partners and other stakeholders during dissemination meeting.

Survey Limitations

- There were inherent difficulties in determining the exact age of some children (even with use of the local calendar of events), as some health cards had erroneous information. This may have led to inaccuracies when analysing chronic malnutrition. Although verification of age was done by use of health cards, in some cases no exact date of birth was recorded on the card other than the date a child first seen at the health facility or just the month of birth. Recall bias may link to wrong age which then leads to wrong weight for age and height for age indices.
- There was poor recording of vitamin A and de-worming in the health cards. Some of the mothers indicated that their children had received Vitamin A and de-worming while it was not recorded in the health cards.

Good Practice

- It was noted that use of the Uniscale (rather than Salter Hanging Scale) was beneficial such that children were more compliant in having their weight taken and for this particular environment (no trees in the vicinity of households and absence of roof beams), it was more appropriate than the Salter scale.
- Community mobilization which incorporated a significant part of administrative authorities' interaction and prior identification of cluster guides, would assist in enhancing ownership of the outcome results of the survey.
- Joint data collection for 12 clusters in the East Pokot survey zone on the first day of data collection (with re-constituted teams that contained a pokot speaker) to equalize work-load, while teams were still fresh
- Data entry supervision is best carried out centrally by a team of 3/survey. Daily supervision and transportation of completed questionnaires was factored into movement plan by survey supervisors and coordinators

Lessons Learnt

- Training: Coordinated; Joint practical exercises; assessment of use of calendar of events; modified standardization can be carried out in the health facilities or during food distribution.
- Monthly updating of separated calendar of events for each zone. Should be done before survey period with inputs from chiefs, community leaders and DSO. To be reviewed by DNTF continuously.
- Data Collection: Migrated clusters surveyed in current location; Enhanced and cumulative calendar of events
- Overall (Baringo Surveys): Strong survey planning committee; Supervision of surveys is imperative. Supervision works best with movement planned 'radially' i.e. starting from nearest location and moving further subsequently.
- Planning for concurrent surveys requires 10 dedicated survey supervisors to supervise at most, 2 teams daily- this needs to be factored into the budget planning.

3.0 RESULTS AND DISCUSSIONS

3.1 Demographics of Study Population and Households

Indicator	Baringo Central/North (BCN)	SD	East Pokot/Marigat (EPM)	SD
Total HH Sample	2,933		4,391	3,455
Total HH Size	466		698	
Total U5 Sample (6-59months)	616		927	864
Number of persons/HH	6.3	± 2.36	6.3	±2.72
Number of U5/HH (6-59months)	1.3	± 0.67	1.3	±0.83

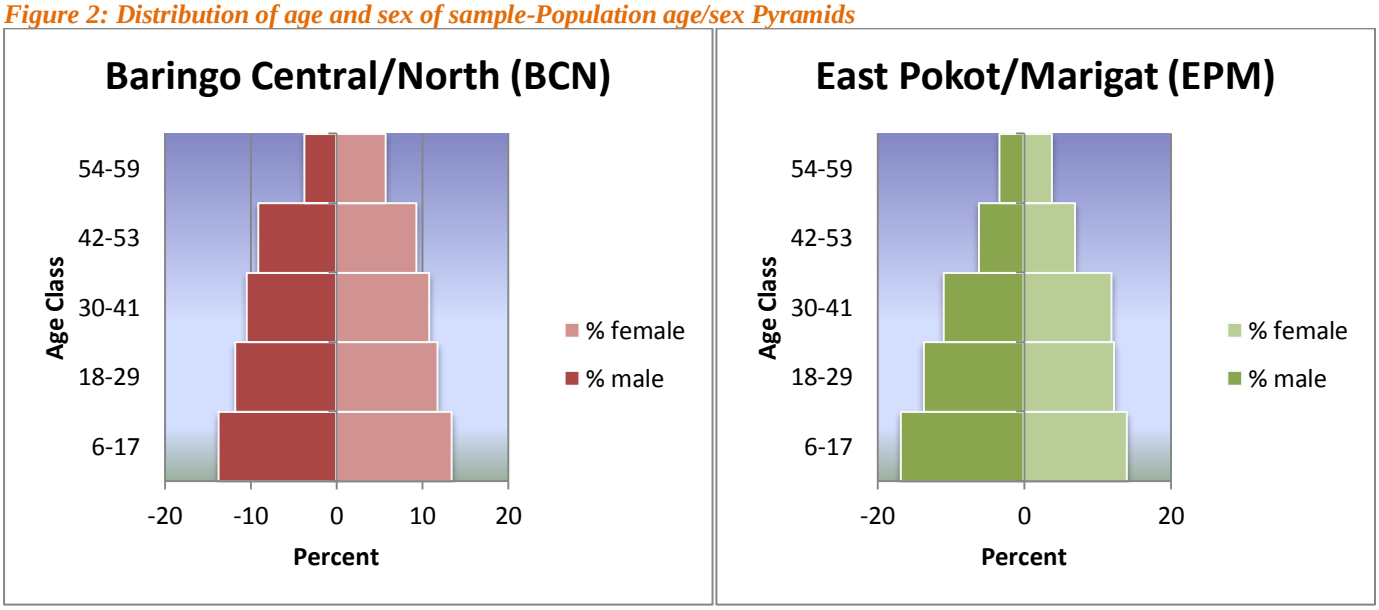
3.1.1 Distribution by age and sex

Table 7: Distribution of age and sex of sample

	Baringo Central/North (BCN)		East Pokot/Marigat (EPM)	
	Total (%)	**Ratio Boy : girl**	**Total (%)**	**Ratio Boy : girl**
6-17	27.2	1.0	30.8	1.2
18-29	23.6	1.0	26.0	1.1
30-41	21.3	1.0	22.9	0.9
42-53	18.5	1.0	13.1	0.9
54-59	9.5	0.7	7.2	0.9
Total	100.0	**1.0**	100.0	**1.0**

Table 7 illustrates the distribution of the sexes between 5 age group categories. Despite the fact that in some age groups, there was slightly unequal, the overall sex ratios for both survey zones indicated almost equal representation of boys and girls i.e. within the recommended range of 0.8 – 1.2[26] demonstrating an unbiased sample as a whole. The age and sex distribution of the study group is shown below:

Figure 2: Distribution of age and sex of sample-Population age/sex Pyramids



From the figure above, it is clear that there is an under-representation of the older age groups, especially in EPM data, such as the 50-59 months group as well as 42-53 months group. While the sample may reflect a higher mortality in this subgroup, the more likely explanation is , that these children were not present on the day of the survey- with numerous older children being in pre-school or having migrated with animals (they are perceived as less vulnerable than the younger children).

3.2 Nutritional Status of Children 6-59 Months

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

The WFH index is the most appropriate index to quantify wasting in a population and reflects the current nutrition/health status of the community. The information presented here is based on the analyzable sample of eligible children whose plausible anthropometric data were collected, excluding those that were SMART flagged. Between 1.1% (BCN) -1.4%(EPM) of the children for the WHZ analysis were excluded according to WHO-GS due to flagged values.

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

Table 8: OVERALL Prevalence of acute malnutrition by weight-for-height z-scores (WHO 2006 standards)

	BARINGO CENTRAL/NORTH(BCN)	EAST POKOT/MARIGAT (EPM)
Wasting (WHO 2006)	**N=604**	**N=908**
Global Acute Malnutrition (GAM)	**5.1 %(3.6 - 7.3 C.I.)**	**12.2 % (9.8 - 15.2 C.I.)**
Moderate Acute Malnutrition(MAM)	**5.0 % (3.5 - 7.1 C.I.)**	**10.5 % (8.4 - 13.0 C.I.)**
Severe Acute Malnutrition (SAM)	**0.2 %(0.0 - 1.3 C.I.)**	**1.8 %(1.0 - 3.0 C.I.)**

Table 8 shows that the prevalence of Global Acute Malnutrition (GAM) among all children in BCN was between **3.6 - 7.3 %** indicative of a poor nutritional status and a serious/possibly critical situation in EPM (**9.8 - 15.2%**) based on the WHO standards[27]. The prevalence of Severe Acute Malnutrition (SAM) in both survey zones are below <2%.

Figures 3: Distribution of W/H Z-scores for Sampled Children
Baringo Central/North

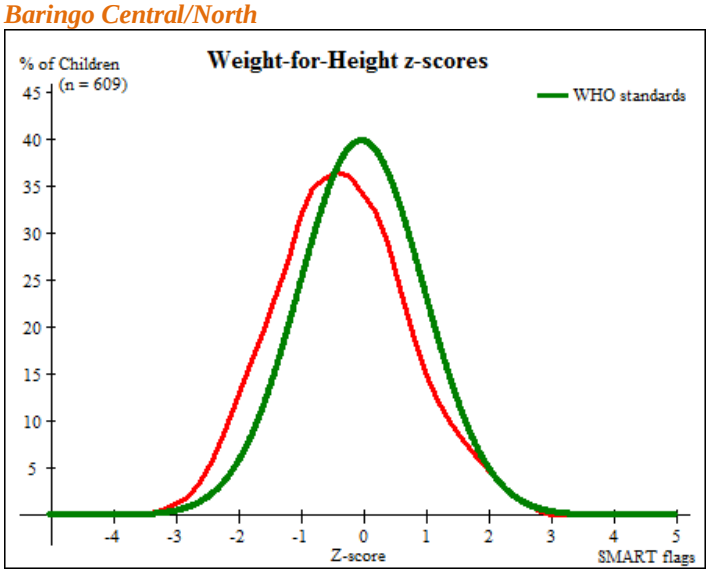


Figure 3 depicts the WFH z-score distribution curve of the survey sample relative to the WHO-GS curve. The findings indicate a shift to the left of the sample curve, with a mean score of -0.33 and a standard deviation of 1.05, which indicates that overall, the population exhibits a slightly poorer nutritional status compared with the WHO reference population.

East Pokot/Marigat

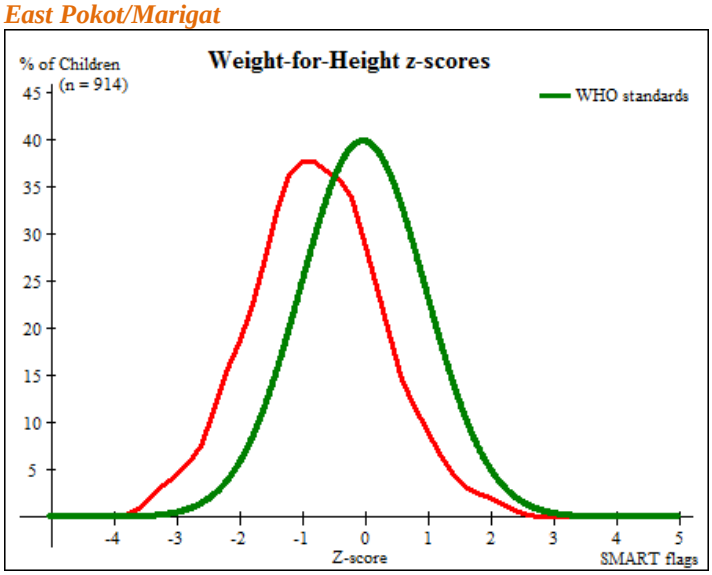


Figure 3 depicts the WFH z-score distribution curve of the survey sample relative to the WHO-GS curve. The findings indicate a greater shift to the left of the sample curve than BCN, with a mean score of -0.76 and a standard deviation of 1.03, which indicates that overall, the population exhibits a poorer nutritional status compared with the WHO reference population, as well as BCN sample.

Table 9: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	Baringo Central/North (BCN) N=604		**East Pokot/Marigat (EPM) N=908**	
z-score	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic **No. 1** **(0.2 %)**	Not severely malnourish No. 603 (99.8 %)	Marasmic **No. 16** **(1.8 %)**	Not severely malnourish No. 892 (98.2 %)

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

Table 9 shows:
Baringo Central/North (BCN): 1 child (0.2%) is severely wasted (marasmus). No oedema cases were observed.
East Pokot/Marigat (EPM): 16 children (1.8%) are severely wasted (marasmus). No oedema cases were observed.

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

Table 10: Prevalence of acute malnutrition by sex, based on weight-for-height z-scores (and/or oedema)

	Baringo Central/North (BCN) N=604	**East Pokot/Marigat (EPM) N=908**
Sex	Prevalence of global malnutrition (<-2 z-score and/or oedema)	Prevalence of global malnutrition (<-2 z-score and/or oedema)
Boys	(57) **15.7 %** (12.2 - 19.8 C.I.)	(16) **5.4 %** (3.3 - 8.8 C.I.)
Girls	(25) **7.4 %** (4.8 - 11.2 C.I.)	(15) **4.9 %** (2.7 - 8.6 C.I.)

Analysis of the data by sex shows that a higher proportion of boys is more malnourished than girls in both survey zones. However the overlapping confidence limits and chi-square analysis indicated that the difference in malnutrition between the boys and girls was NOT statistically significant (p>0.05) - both genders are at equal risk of malnutrition.

Prevalence of acute malnutrition (weight-for-height z-scores) by comparison of age groups

Table 11: Prevalence of acute malnutrition based on weight-for-height z-scores and by age group

	Baringo Central/North (BCN)		**East Pokot/Marigat (EPM)**	
Age (months)	SAM	MAM	SAM	MAM
6-11	(0) 0.0%	(1) 0.6%	(3) 1.1%	(35) 12.6%
12-23	(0) 0.0%	(9) 6.3%	(3) 1.3%	(15) 6.4%
24-35	(0) 0.0%	(5) 3.9%	(5) 2.4%	(22) 10.5%
36-47	(0) 0.0%	(11) 9.8%	(3) 2.5%	(12) 9.9%
48-59	(1)1.7%	(4) 6.9%	(2) 3.0%	(11) 16.7%
Total	(1)100%	(30) 100%	(16)100%	(95)100%

To analyse the effect of age on nutritional status, the whole sample was disaggregated into age-groups. Analysis was done on the sub-sample that would coincide approximately with the weaning period in a child's life cycle (6-29months) and thus highlight the effect of infant-feeding practices. There is NO statistical significance in difference between acute malnutrition rates observed among children aged 6-29 months and the whole sample (p>0.05). Thus in this sample, age is NOT a risk factor for malnutrition.

Prevalence of acute malnutrition based on the percentage of the median and/or oedema

Table 12: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	Baringo Central/North (BCN)	**East Pokot/Marigat (EPM)**
Prevalence of acute malnutrition (Percentage median NCHS 1977)	**N = 606**	**N = 911**
Prevalence of Global Acute Malnutrition (<80% and/or oedema)	1.3 % (0.6 - 3.0 C.I.)	5.8 % (3.9 - 8.7 C.I.)
Moderate Acute Malnutrition(<80% and >= 70%, no oedema)	1.3 % (0.6 - 3.0 C.I.)	5.7 % (3.8 - 8.5 C.I.)
Severe Acute Malnutrition (<70% and/or oedema)	0.0 % (0.0 - 0.0 C.I.)	0.1 % (0.0 - 0.8 C.I.)

Compared to WHO-GS, the WFH z-scores index, the weight-for-height percentage median (WFHM) index (NCHS references) gave the expected lower rates for both GAM (1.3% BCN; 5.8% EPM)and no children detected for SAM (0.0%) .

3.2.2 Prevalence of Acute Malnutrition by MUAC

Overall, MUAC usually tends to indicate lower GAM levels compared to WFH z-scores. The use of MUAC in screening for admission into feeding programmes is currently in a phase-out process for eventual replacement with WFH z-scores in accordance with the WHO Technical Guidelines Recommendations, which have since been adopted by the MoH. However, MUAC is still in use in many nutrition intervention programmes in Kenya (including in the SFP and OTP programmes in Baringo County) since it is still a criteria for admission in the national IMAM guidelines.

Table 13: Distribution of MUAC by Nutritional Status

	Baringo Central/North (BCN)	**East Pokot/Marigat (EPM)**
Prevalence of Acute malnutrition MUAC	**N = 611**	**N = 921**
Severe under nutrition < 115 mm	0.3 % (0.1-1.3)	1.2 % (0.6-2.3)
Moderate ≥115–<125 mm	1.5 % (0.7-3.1)	6.3 % (4.9-8.0)
Global Acute Malnutrition ≤125 mm	1.8 %(0.9 – 3.4)	7.5% (5.8-9.6)
At risk of malnutrition 125 – <135 mm	14.9%(11.5-18.4)	20.7%(17.1-24.4)

The prevalence of malnutrition based on MUAC was lower (1.8%-BCN; 7.5%) than that shown by WHZ. The total percentage of children at risk of malnutrition was quite large at 14.9% for BCN and 20.7% for EPM survey.

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

A low weight-for-age (WFA) is referred to as underweight. The prevalence of underweight among the children was 30.8% (26.8-35.1 CI) while 7.2% (5.6-9.3 CI) were severely underweight as shown in Table 14. As was the case for acute malnutrition, more boys than girls suffered from global underweight as well as severe underweight- but this was not statistically significant ((chi-square test: p= 0.678; 0.511). It should be noted that due to the lack of reliable age verification of target children in both survey zones, this may not reflect the accurate underweight levels in Baringo.

Table 14: Prevalence of underweight by weight-for-age z-scores (WHO standards)

	Baringo Central/North (BCN)	East Pokot/Marigat (EPM)
Underweight (WHO 2006)	**N=607**	**N = 909**
Prevalence of global underweight	18.1 % (14.4 - 22.6 C.I.)	21.6 % (18.1 - 25.5 C.I.)
Prevalence of moderate underweight	14.8 % (11.9 - 18.3 C.I.)	17.1 % (14.1 - 20.5 C.I.)
Prevalence of severe underweight	3.3 % (1.8 - 5.8 C.I.)	4.5 % (3.4 - 5.9 C.I.)

3.2.4 Prevalence of Chronic Malnutrition (Stunting) by Height-for-age (HFA) Z-scores (WHO-GS)

A low height-for-age reflects deficits in linear growth and is referred to as stunting.

Stunting rates were high but below the national rate (35.3%) and the Rift Valley Province rate (35.7%)[28]. The findings (Table 15) indicate a higher overall global chronic malnutrition (GCM) rate of 34.3% (29.3-39.7 C.I.) and a severe chronic malnutrition (SCM) rate of 11.5% (8.7-15.2 C.I.) in BCN than EPM[25.5%(22.1-29.3)]. While both zones experience chronic food insecurity, this disparity between the two survey zones may be explained by the acute emergencies (flooding, landslides) during 2012 that have been experienced in BCN-exacerbating the stunting rate.

However, it should be noted that due to the lack of reliable age verification of target children in both survey zones, this may not reflect the accurate stunting levels in Baringo. There was no significant difference in the level of stunting between the boys and girls, as judged by the overlap in the Confidence Intervals.

Table 15: OVERALL Prevalence of stunting by height-for-age z-scores (WHO standards)

	Baringo Central/North (BCN)	East Pokot/Marigat (EPM)
Stunting (WHO 2006) Chronic Malnutrition (CM)	**N = 589**	**N = 881**
Prevalence of global stunting (<-2 z-score)	34.3 % (29.3 - 39.7 C.I.)	25.5 % (22.1 - 29.3 C.I.)
Prevalence of Moderate Stunting (<-2 z-score and >=-3 z-score)	22.8 % (19.2 - 26.8 C.I.)	18.7 % (16.1 - 21.7 C.I.)
Prevalence of severe stunting (<-3 z-score)	11.5 % (8.7 - 15.2 C.I.)	6.8 % (5.2 - 8.9 C.I.)

Table 16: Mean z-scores, Design Effects for WHZ and excluded subjects

	Baringo Central/North (BCN)	East Pokot/Marigat (EPM)
Weight-for-Height (WHZ) Indicator	**N=604**	**N=908**
Mean z-scores ± SD	-0.33±1.04	-0.76±1.03
Design Effect (z-score < -2)	1.01	1.51
z-scores not available*	0	0
z-scores out of range	7	13

* contains for WHZ and WAZ the children with oedema.

The mean z-scores of both survey zones deviated slightly to the left of normal distribution, thus reflecting a negative number. The Weight for Height standard deviation of both zones was within the acceptable range of 0.8-1.2. The design effect (DEFF) of BCN WHZ of 1.01 shows homogeneity of the acute malnutrition of target children. However, DEFF of EPM of 1.51 indicates heterogeneity of WHZ of children in different clusters. This suggests that there may be different rates of malnutrition between clusters in East Pokot and Marigat.

Since no child had oedema in the survey zones, all z-scores were available. Z-scores out of range indicated the flagged values excluded by SMART flags due to aberrant values.

[28] KDHS 2009

4.1 Children's Morbidity

Table 17: Prevalence of reported illness in children in the two weeks prior to interview

	BARINGO CENTRAL/NORTH(BCN)	EAST POKOT/MARIGAT (EPM)
Child morbidity (6-59 months old)	**N= 614**	**N= 917**
Prevalence of reported illness	**(338)45.0%(38.4-54.4 CI)**	**(473)51.6%(44.7-58.5 C.I)**
Fever /Malaria(alone or in combination with other symptoms)	20.6%	33.3%
ARIs (cough and cough with difficult breathing)	65.9%	42.6%
Watery Diarrhoea	9.6%	18.9%
Bloody Diarrhoea	0.6%	1.7%
Others (skin/fungal/eye/ear infection; burns, bites)	3.2%	2.4%
Appropriate diarrhoea management (Giving of fluids and/or medicine(with the exception of traditional herbs)	**351(56.9%)**	**407(43.9%)**

A 2-week child morbidity recall (inclusive of the day of survey) was assessed to establish the prevalence of common illnesses among the children. A high proportion (45.0%; 51.6%) of U5s was reported to have been sick (Table 17). The most prevalent illnesS was Acute Respiratory Infections (ARI) suffered by 65% in BCN and 43% in EPM. The other significant illnesses are malaria (21%; 33%), diarrhoea and others. 'Other' symptoms included skin/fungal/eye/ear infection; vomiting; scabies; bites, stomach-ache and vomiting. The leading causes of morbidity in Baringo were upper respiratory tract infection (URTI), malaria and diarrheal diseases.in 2011[29]. In addition, upper respiratory tract infection, malaria and diarrhoea are endemic during this time of year (dry cool season)[30]. FGD information also confirmed these diseases (including pneumonia) to be the most common causes of morbidity in U5s. An analysis of the relationship between morbidity and nutritional status established that GAM prevalence was significantly higher among those reported to have been sick compared to those who were not. Chi-square analysis done to determine whether there was any association between sickness and malnutrition (Table 18) showed that there was NO significant association (p>0.01).

Table 18: Relationship between morbidity and malnutrition

	BARINGO CENTRAL/NORTH(BCN)	EAST POKOT/MARIGAT (EPM)
Child morbidity (6-59 months old)	**N= 614**	**N= 917**
Children ill during the recall period who were also acutely malnourished (<-2 Z-scores)	**(31)5.1%**	**(113)12.3%**
p-value	**0.094**	**0.270**

The practice of feeding during illness was investigated using FGDs with majority responding that *"fluids are increased to avoid dehydration. Feeding times increase because the baby cannot eat much when they are sick. Hard foods are indigestible at this time.* Grandmothers from EPM survey zone said that *"breast feeding is continued to fight against diseases, improve bonding and for strong bones"*. However, those from BCM said that "Milk is withdrawn when child has malaria because it will make the baby vomit". They suggested that alcohol, tobacco and other local fruits (ngosiek) is not suitable when the child is sick whereas Porridge (uji) and milk are suitable foods during illness, especially when the child has malaria or diarrhoea.

Qualitative data from BCN survey zone also indicated that health-seeking practices included seeking medical attention from the nearest health facility as a first resort. However, in EPM, *"herbs are given first so that it induces vomiting then cultural rituals follow (like kelok) i.e. going to the bush and slaughtering a goat to chase away the diseases. Only as a last resort, they take to the child to hospital if the cultural methods do not work".* It was reiterated by Women in Kositei in East Pokot that "traditional medicine is used as the first assistance a because they get well very fast. Going to hospital is the last resort because of their culture they trust and have confidence in their herbs".The community reported that the main causes of child morbidity were *"negligence among some mothers to take their children to clinic"echanjo"- because the children put everything in their mouths and easy to contract diseases and also lack of mosquito nets. Hunger, diseases and unhygienic environment and mosquitoes that are breeding in the shrubs "ngimekwia", bushes around and stagnant water that brings malaria and also untreated drinking water that causes typhoid"*

[29] Baringo District Top Ten Leading Causes Of Morbidity, 2011
[30] KFSSG Long Rains Assessment Report

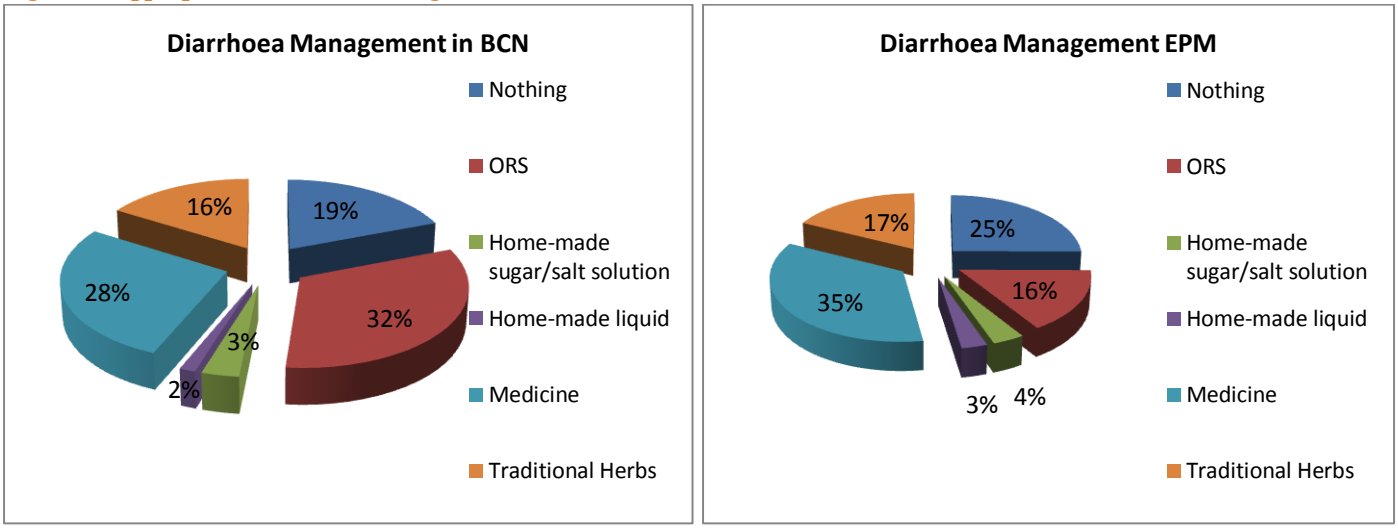
4.2 Appropriate diarrhoea management

Table 19: Appropriate Diarrhoea Management

	BARINGO CENTRAL/NORTH(BCN)	EAST POKOT/MARIGAT (EPM)
Child morbidity (6-59 months old)	**N= 614**	**N= 917**
Appropriate diarrhoea management[31]	351(56.9%)	407(43.9%)

One of the HiNi intervention targets is to increase therapeutic zinc supplementation for diarrhoea management to 50%. During the survey, zinc supplements to be administered with ORS, were not available in the health facilities. There had been no supply from KEMSA kits since July 2012[32]. Therefore, the surveys assessed the presence of other appropriate diarrhoea management techniques. Appropriate diarrhoea management was described as the giving of fluids and/or medicine (with the exception of traditional herbs). This yielded positive responses from caretakers with over half (56.9%) in BCN and 43.9%. From figure 4 below, most caregivers sought medical attention when the child had diarrhoea (32%-BCN; 16%-EPM) while a smaller percentage gave ORS (28.5%) and home-made liquid/syrup medicine (28%-BCN; 35%-EPM). However, caregivers from BCN survey zone supplemented this with ORS- suggesting their knowledge of benefit of replacing fluids lost. Only 16% of caregivers from EPM gave ORS- suggesting the need for health education on replacement of fluids during diarrhoeal episodes. Caregivers from both hardly replaced lost fluids with home-made liquids, despite (<5% in both zones) this being a cost-effective method. Of concern is the use of traditional herbs in both survey zones (16%-BCN; 17%-EPM) for diarrhoea management, and caregivers that do "nothing" (19%-BCN; 25%-EPM). As this is also reinforced by FGDs, this seems to be a gap area in health education that needs to be addressed. In the absence of quantitative data, qualitative data showed thatU5s will benefit from the combined effects of zinc and ORS in prevention/ treatment of diarrhoea. However, implementation of this measure is difficult due to limitations that include insufficient and inconsistent supplies in KEMSA kits, completion of full dose (10 tablets for 10 days for all U5s with diarrhoea), compliance by caretakers due to difficulty in giving small children tablets, lack of knowledge on zinc supplement benefits by caretakers and non-standardized recording of prescriptions for DHIS[33].

Figure 4: Appropriate diarrhoea management



4.3 Vaccination Results and Growth Monitoring

Table 20: Vaccination coverage: OPV 1, OPV 3 for 6-59 months and Measles for 9-59 months

	Baringo Central/North (BCN)	**East Pokot/Marigat (EPM)**
Immunization 6-59 months old	**N=616**	**N= 917**
OPV1 (card and recall)	(612)99.4% (84.2-99.9 C.I)	(886)96.6% (79.4-99.8 C.I)
OPV1 (Card Only)	(472)76.6% (69.0-84.3 C.I)	(571) 62.3% (53.5-71.1 C.I)
OPV3 (card and recall)	(609) 98.9% (83.8-99.6 C.I)	(823) 90.1% (72.5-98.9 C.I)
OPV3 (Card Only)	(469) 76.1% (68.6-83.7 C.I)	(516) 56.6% (47.3-65.8 C.I)
Measles(children ≥9-59 m) (card and recall)	(566)92.2% (74.5-99.1 C.)	(729)80.3% (63.2-97.4 C.I)
Measles (Card Only)	(404)65.8% (56.9-74.7 C.I)	(416) 45.8% (36.7-54.9 C.I)
Growth Monitoring(Card Only)	(64) 13.9% (8.0-19.8 C.I)	(52) 07.8% (3.3-12.3 C.I)
Growth Monitoring (card and recall)	(123)26.7% (15.9-37.6 C.I)	(135) 20.2% (10.2-30.3 C.I)

[31] Giving of fluids and/or medicine(with the exception of traditional herbs)
[32] DPHN
[33] Health Facility K.I.Is and observations during survey period

When estimating measles coverage, only children 9 months of age or older were taken into consideration as they are the ones who were eligible for routine vaccination. The vaccination coverage was calculated as children immunized based on records and recall. Using both card and confirmation, child immunization for polio (OPV), (≈90%) and measles (≈80%) was commendably high-above the recommended KEPI coverage cut-off point of 80%[34]in all zones. Coverage has improved in 2011 by addressing poor health seeking behaviour by the community, distances to health facilities by using campaigns and growth monitoring improvement, which have a great impact on the immunization status of the child[35]. In BCN- 36.0% and EPM-52.6% of children of the coverage reported here was based on recall and not evidenced by an EPI/ANC Health card.

The proxy used for appropriate growth monitoring was child's height taken by a health professional during the past year. The rate is very low in both survey zones with only about ¼ of children in BCN (27%) and 20% in EPM. Consistent growth monitoring is necessary for accurate tracking of the child's nutrition status e.g. recording of valid age would facilitate computation of robust stunting and underweight data.

4.4 Vitamin A Supplementation/ Deworming

Table 21: Vitamin A supplementation and deworming coverage

	Baringo Central/North (BCN) N=616	**East Pokot/Marigat (EPM) N=927**
Vitamin A supplementation None	(63) 10.2% (5.9-14.6 C.I)	(162) 17.5% (12.2-23.4 C.I)
Vitamin A supplementation 6-59months Once	n=616 (553) **89.8% (85.4-94.1 C.I)**	n=927 (765) **82.5% (77.3-87.8 C.I)**
Vitamin A supplementation 6-11months Once	n=82 (56) **68.3% (57.7-75.1 C.I)**	n=167 (107) **64.1% (51.8-71.3 C.I)**
Vitamin A supplement 12-59months More than once in last year	n=607 (251) **40.8% (29.6-51.9 C.I)**	n=580 (331) **35.7% (28.6-42.8 C.I)**
Deworming once in the last 6 months(12-59 months)	**(264) 51.3% (43.8-58.8 C.I)**	**(267) 36.6% (30.3-42.9 C.I)**

Vitamin A supplementation starts at 6 months, and subsequently at 6 months interval until a child reaches age of 5 years[36]. In the previous six months prior to this survey, an overall 89.8-BCN%; 82.5%-EPM of U5s were reported to have received vitamin A supplementation- higher but comparable to Nov 2011 survey coverage (BCN-76.9%; EPM-67.3%). In the previous year, the proportion of children over 12 months old who had received it more than once as recommended was 40.8%-BCN; 35.7%-EPM reportedly having received more than once- a slightly improved rate in Nov 2011 (BCN-50.2%; EPM-34.3%). This was despite a stock-out in the 1st half of the quarter[37]. The overall vitamin A coverage among children aged <1yr was 68.3%; 64.1% comparable to Nov 2011 survey results (66.7%; 70.0%). Results of this parameter were based on recall. 12.8% in BCN and 5.8% in EPM received Vitamin A more than twice in the last year. The number of times a child receives the supplement may be higher than twice in a 12-month period because of the integration of vitamin A supplementation with immunization campaigns and Malezi Bora which improve coverage especially in areas where there is limited accessibility to health facilities. However, it was observed that Vitamin A coverage was hardly recorded in the Mother-Child card. This is one of the areas that need immediate improvement in the area of growth monitoring. Recording of Vitamin A supplementation is critical to avoid toxicity from over-dosing. While Vitamin A supplementation still falls short of the KEPI optimum cut-off of ≥80% and HiNi programme targets-there was an upward trend in 2012, due to increased caregiver interest in immunization & supplementation of U5s[38].

Using card and confirmation, only 51.3% in BCN and much lower in EPM-36.6% of the children had received de-wormers during the 6-month period prior to this survey. A higher rate of deworming was reported by 2011 survey (60.8%; 52.0%). There has been a significant decline in December 2012 and supplementation and deworming still falls short of the KEPI optimum cut-off of ≥80%, and HiNi programme targets. This is indicative of the need of health education with emphasis of the benefit of dewormers to the child's health and prevention of malnutrition,

4.5 PROGRAMME COVERAGE FROM EAST POKOT[39]

Table 22: Selective Feeding Programmes Coverage in East Pokot:

Programme type	**Point Coverage**	**Period Coverage**	**Comments**
Supplementary feeding programme coverage (SFP)	**44.4%**	**54.5%**	Satisfactory period coverage; low point coverage **Positive factors:** ➢ Self-referrals to the facility especially due to sickness ➢ Programme acceptability by the community

[34] For the population to be protected against epidemics.
[35] KFSSG Turkana Long Rain Mid-Season Assessment Draft Report (June 2012)
[36] WHO
[37] DPHN
[38] DHMT Discussions of preliminary results
[39] From SQUEAQ draft report(East Pokot)- November 2012

			➢ Integration of IMAM into the routine health care service ➢ The programmes is responding to need and context of the area ➢ Good standard programme indicators ➢ Linkage between SC, OTP, SFP & GFD **Negative factors:** ➢ Low level of awareness about the programme in the community ➢ Mismatch in case definition for malnutrition ➢ Distance the health facilities ➢ Inconsistent supply of RUTF and Corn Soy Blend ➢ Absenteeism of some health workers in the health facilities ➢ Lack of motivation among the CHWs and inadequate number of CHWs ➢ Lack of involvement of community leaders ➢ Migration in search of pasture ➢ Alcoholism and negligence
Therapeutic feeding programme coverage (OTP)	**66.7%**	**85.7%**	**Positive factors:** ➢ Lack of stigmatization of malnourished children ➢ Programme acceptability by the community ➢ Integration of IMAM into the routine health care service ➢ The programmes is responding to need and context of the area ➢ Good standard programme indicators ➢ Linkage between SC, OTP, SFP & GFD **Negative factors:** ➢ Malnutrition is not perceived as an illness therefore intervention is not timely because children are only brought to hospital as a result of illness ➢ Mismatch in case definition for malnutrition ➢ Distance the health facilities ➢ Inconsistent supply of RUTF ➢ Absenteeism of some health workers in the health facilities ➢ Lack of motivation among CHWs and inadequate number of CHWs ➢ Lack of involvement of community leaders ➢ Migration in search of pasture ➢ Alcoholism and negligence

5.0 FOOD UTILIZATION

This section explored the consumption patterns of infants 0-5 months and 6-23months. The data was collected based on 24-hour recall, and can be used to extrapolate the HH food consumption patterns. Unusual feeding patterns (both greater and reduced consumption) were excluded from this recall method, so as to evaluate the 'normal' consumption patterns.

5.0.1 Infant and Young Child Feeding (IYCF) and Care Practices

Information on infant and young child feeding practices was obtained based on a 24-hour recall, in line with the WHO guidelines to minimize recall bias and thus obtain more valid information.

Breastfeeding Practices

Table 23: Summary of Breastfeeding Practices

Breastfeeding Practices					
Initiation of breast feeding:					
	Age Group	Baringo Central/North N=457 N=225	East Pokot / Marigat N=987 N=445	**Target**	**Comment**
Ever breastfed	0-23m	(453)99.1%	(911)98.7%	**>80%**	✓
Given colostrum	0-5m	(217)96.4%	(440)98.9%	**>80%**	✓
Given pre-lacteals within 3 days of birth **Main Pre-lacteals:** **Plain Water** **Herbs ('Sakit')** **Sugar/glucose water** **Powder/animal milk**	0-23m	(103)42.4% (43)17.6% (32)13.1% (17)7.0% (7)2.9%	(219)46.7% (97)20.7% (92)19.6% (22)4.7% (7)1.5%	**n/a**	**Unsatisfactory**
Early introduction to complementary foods	0-5m	(146)64.9%	(257)57.8%	**n/a**	**Unsatisfactory**

Key Indicator 1 **Timely Initiation of Breastfeeding** (within1 hr.)	0-23m	(361)79.0%	(825)90.6%	**>80%**	✓
Key Indicator 2 **Exclusive Breastfeeding**	0-5m	(62)27.6%(19.4-35.8 C.I)	(143)32.1% (24.6-39.7 C.I)	**>50%**	**Unsatisfactory**
Key Indicator 3 **Currently Breastfeeding**	0-23m	(406)88.8%	(804)88.3%	**>80%**	✓

Almost all of the children 0-23 months in the two survey zones are reported to have ever breastfed (≈100%). The majority (≈85%) of the children were still being breastfed at the time of the survey. This is confirmed by women FGDs in all livelihoods which unanimously agree on breastfeeding up until 2 years, unless the mother gets pregnant before this. The exception to this is during pregnancy where the mother cannot continue to breastfeed the child because *"breastfeeding in the pregnancy state will affect the breastfeeding child by who will get diarrhoea and also the mother needs to 'prepare' milk for the newborn"* The other circumstance that the mother will not breastfeed is in the presence of diseases such as HIV/AIDS when the health staff has advised her not to. Timely initiation of breastfeeding is quite good in EPM zone (90.6%) but markedly low in BCN (79%), with missing the target of at least 80% to put the infant to the breast within one hour after birth as recommended by WHO[40]. However, this is a decline to Dec 2011 rates (89.1%; 88.1%;)The low timely initiation of breastfeeding in BCN has been linked to cultural practices such as administering a specific herbal medicine (*tibilikwet*) to remove the meconium and clean the throat. Also given is warm water, porridge and cow's milk that is given priority before breastfeeding[41]. The grandmothers attributed this practice of delay of BF to the need to *'observe the child, until it starts searching for the breast".*

In both survey zones, ≈95% of the children had been given nutritious, immune-boosting colostrum-which is an important breastfeeding practice. However, almost half of all caregivers (BCN 42.4%; EPM-46.7%) have been given pre-lacteals, a practice that is not recommended because it interferes with the establishment of breastfeeding. This rate of pre-lacteal administration has remained consistent from 2011. Among infants given pre-lacteals, the most frequently given items were plain water-by the highest ratio of the respondents, followed Herbs ('Sakit'). Most significant is the universal use of sakit ('*tibilikwet'*) to remove meconium. These herbs from a cultural perspective are indispensible because[42]:

- It can protect the child against diseases
- washes the urinary system
- It washes the meconium of the baby
- Opens the air ways

This poses a threat to implementation of various appropriate BF indicators and should be addressed in health forums/education.

From Table 23 above, only 28-32% of the children less than 6 months of age had been exclusively breastfed. Exclusive breastfeeding was computed among infants who had not received pre-lacteals and were not on other foods or liquids, and had breastfed within previous 24 hours. The findings revealed that a smaller number of the infants were exclusively breastfed compared to a national average of 31.9%[16] according to the Kenya Demographic and Health Survey (KDHS) report. There seems to be a decline of EBF rates for both survey zones from 2011 and a national and HINI target of 50%. The proposed reasons for this declining rate of EBF (and current decrease in comparison to 2011) are negative cultural norms: use of sakit and lack of adequate IYCF knowledge among TBAs and CHWs. Many infants had been weaned early (BCN-64.9%; EPM-57.8%) The FGD data confirmed that this was likely to happen because mothers normally stop BF during the 4th month-where she introduces plain water on animal milk to supplement. Also, a new pregnancy causes immediate cessation of BF: *"When the mother is pregnant immediately the breast feeding stops because the infant grows thin and becomes sick especially diarrhoea hence you stop completely breastfeeding".* Early weaning increases the risk of infections in young children, with the foods given being nutritionally inferior to breast milk, which ultimately aggravates malnutrition. The qualitative data from FGDs backs up the quantitative data indicating both knowledge about the benefits of BF practices:

- **They believe in breastfeeding until the next pregnancy**
- **It makes the baby strong and bondage**
- **It makes the weight of the child goes up**
- **It assists in family planning**
- **The child becomes active, sharp and active in class and talks so quickly.**
- **The child cannot become sick .**

They believe that breast milk is best food for young babies and makes baby grow well and prevent them from diseases

[40] WHO (1989): Protecting, promoting and supporting breastfeeding: special role of maternity services: a joint WHO/UNICEF Statement. Geneva, WHO.
[41] Grandmothers of U2 from Kaprokonya and Kapkelewa-Baringo Central
[42] Grandmothers of U2 from Marigat and Endao-Marigat
[16] Kenya National Bureau of Statistics (June 2010): Kenya Demographic and Health Survey.

Maintenance of breastfeeding (currently BF) at 2 years was analyzed by looking at the proportion of children who were still being breastfed (based on a 24-hour recall) by one age category: 20-23m. This finding implies that most children (≈88%), in both survey zones, are breastfed up to 2 years or longer as is recommended.

Complementary feeding practices

Table 24: Summary of Complementary Feeding Practices

Complementary Feeding Practices					
		Baringo Central/North (BCN)	East Pokot / Marigat (EPM)	Target	Comment
	6-23m	N=232	N=466		
Key Indicator 4 **Introduction to solid and semi-solid food**	6-8m	n=42 **(41)97.6%**	n=85 **(73)85.9%**	**n/a**	✓
Key Indicator 5 **Minimum Dietary Diversity(Total)**	6-23m	n=231 **(210)90.9%**	n=466 **(448)96.1%**	**>80%**	✓
Dietary Diversity for BF children(+3)	6-23m	n=183 **(163)89.1%**	n=359 **(346)96.4%**	**3**	✓
Dietary Diversity for NBF children(+4)		n=48 **(44)91.7%**	n=106 **(102)96.2%**	**4**	✓
Key Indicator 6 **Minimum Meal Frequency**	6-23m	n=225 **(194)86.2%**	n=466 **(362)77.7%**	**>80%**	✓
Children 6-23m (non-breastfed) mean number of times/day(Mean SD)	6-23m	4.06(SD±1.8)	3.89(SD±1.6)	**4**	
% 6-23m (non-breastfed):4+times	**6-23m**	n=47 **(26)55.3%**	n=104 **(55)52.9%**		**Unsatisfactory**
Children 6-8m (breastfed)mean number of times/day(Mean SD)	6-8m	3.79(SD±2.0)	3.69(SD±2.2)	**2**	
% 6-8m (breastfed):2+times	**6-8m**	n=42 **(38) 90.5%**	n=84 **(68)81.0%**		✓
Children 9-23 m(breastfed) mean number of times/day (Mean SD)	9-23m	3.76(SD±1.6)	3.84(SD±1.8)	**3**	
% 9-23m (breastfed):3+times	**9-23m**	n=184 **(107)58.2%**	n=268 **(213)79.5%**		✓
Key Indicator 7 **Minimum Acceptable Diet**	6-23m	N=171 **(150)87.7%**	N=466 **(356)76.4%**		✓
Key Indicator 8 **Consumption of iron-rich or iron-fortified foods**	6-23m	n=186 **(46)19.8%**	n=465 **(130)28.0%**	**n/a**	**Unsatisfactory**

Introduction to solid and semi-solid food

86-98% of children 6-8months old had solid and semi-solid foods introduced at the optimum time of ≥24 weeks old. However, a significant proportion of children were introduced to complementary foods either too early or late, which also poses a threat to optimum nutrition. This indicates poor feeding practice in the community which needs to be addressed. The FGDs provided some insight to this practice as breast milk was considered to be insufficient from about 3-4 months. *The first foods introduced were milk mixed with sakit (goats and cow's milk because they are natural and strong) , millet porridge with milk (uji), ugali,,bananas, mashed potatoes, fish soup. 'Breast milk is not enough and this food is soft the baby can digest'*[43].

Dietary diversity score (DDS) and Minimum Dietary Diversity

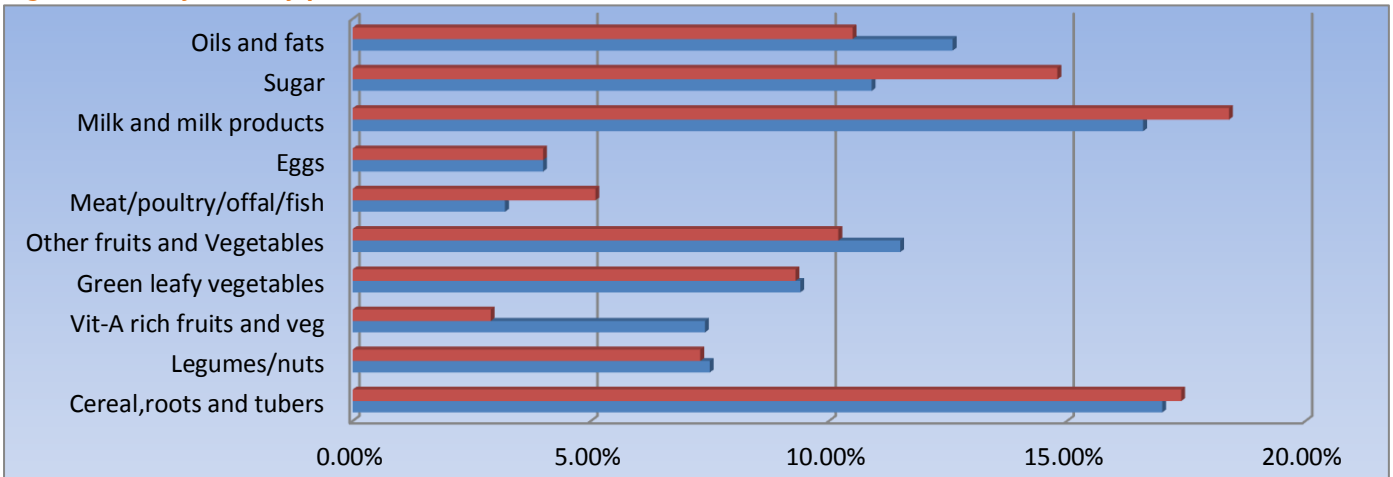
The dietary diversity indicator is based on the premise that the more diverse the diets are the more likely they are to provide adequate levels of a range of nutrients. For this indicator, the caretaker was asked what the child had eaten/drank in the last 24 hours. The following food groups are summed, with each of the groups scored "1" if the child had the food group yesterday, and "0" if not. Minimum dietary diversity is defined as proportion of children 6-23 months who receive foods from 4 or more food groups. The 8 food groups used for calculation of this indicator are:

◆ Grains, roots and tubers◆ Legumes and nuts◆ Dairy products (milk and milk products)◆ Flesh foods (meat, fish, poultry and liver/organ meats)◆ Eggs◆ Vitamin-A rich vegetables ◆Fruits and vegetables ◆ Fats and Oils

This results in a diversity score ranging from 0 to 8 for each child. Higher scores correspond to a more adequate range in the diet.

[43] Grandmothers of U2 from Marigat and Endao-Marigat

Figure 5: Dietary Diversity for Children 6-23 months old



	Cereal,roots and tubers	Legumes/ nuts	Vit-A rich fruits and veg	Green leafy vegetables	Other fruits and Vegetables	Meat/poultry/offal/fish	Eggs	Milk and milk products	Sugar	Oils and fats
East Pokot/Marigat	17.40%	7.30%	2.90%	9.30%	10.20%	5.10%	4.00%	18.40%	14.80%	10.50%
Baringo Central/North	17.00%	7.50%	7.40%	9.40%	11.50%	3.20%	4.00%	16.60%	10.90%	12.60%

For non-breastfed children the minimum dietary diversity is considered to be consumption of foods from ≥4 food groups out of 7 food groups per day. For breastfed children the minimum dietary diversity is considered to be ≥3 food groups. The findings showed a relatively high proportion of breastfed children (89.1%; 96.4%) and 91.6%; 96.2% of non-breastfed children attained the minimum dietary diversity respectively (Table 24). These findings imply that the non-breastfed children consumed more or less a similarly diverse diet to breastfed children and were thus likely not to be limited in the diversity of nutrients received. The composite indicator from the two indicators of dietary diversity showed that 90.9%; 96.1% of all the children achieved the minimum dietary diversity for their breastfeeding status. This statistic has vastly improved from 2011 (≈73%). This may be attributed to increased food access due to a bumper seasonality (better harvests) and stable food prices.

From Figure 25 above, it is evident that the least consumed category of foods was eggs, meat and fish, vegetable and fruits(especially in EPM), while the greatest is milk and milk products, carbohydrate foods (composing of cereals and sugar-added in tea) oils and fats and other fruits and veg, contributing to a good dietary diversity. This also compares well with the reported favored weaning foods during the FGD-*ugali fish, milk (concoction of herbs, water and milk), mashed potatoes and bananas*. Githeri and vegetables are left out of the weaning diet as they are considered too hard for the child to chew or can give diarrhoea. This accounts for the relative lack of legumes and Vit-A vegetable food groups from 24-hr recall. Of concern is lack of eggs in the weaning diet- constituting the least utilized food group despite the relative accessibility of eggs, (especially in the urban and agro-pastoral livelihood zones) and their value as a cheap source of animal protein.

Minimum Food Frequency

For the average healthy breastfed infant, meals of complementary foods should be a minimum of 2 times per day at 6–8 months of age and 3 times per day at 9–23 months of age, respectively and 4 times for non-breastfed children 6–23 months [44] with additional nutritional snacks offered 1–2 times per day as desired (FANTA, 2003, WHO, 2003). Thus, the child should feed at least 3-5 times a day. As a whole, those children (6-23 months of age) received meals ≈4 times. This confirms the FGD findings which gave 3-4 meals a day as the feeding frequency of children under 24months, when there is plenty of food[45]. A commendable 78% (EPM)-86% (BCN) children 6-23 months achieved the minimum food frequency of 4 or more meals.

Minimum Acceptable Diet

This is a composite indicator that is defined as the proportion of *breastfed* children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day. It also includes non-breastfed children who have achieved the same, and in addition, 2 milk feedings. Of the 6-23m children analysed in both zones, more than 75% achieved this. This situation is again attributed to the good food access and availability during the survey season.

Consumption of iron-rich or iron-fortified foods

Proportion of children 6-23 months old who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home. Suitable iron-rich or iron-fortified foods include flesh foods, commercially fortified foods specially designed for infants and young children which contain iron(infant formulas), or foods fortified in the home with a micronutrient powder containing iron or a lipid-based nutrient supplement containing iron(e.g. Plumpy Nut). The overall outcome for all children 6-23m indicated that only a small proportion of children received iron-rich foods. The least in BCN at 19.8% and highest in EPM at 28% expected as a result of greater availability of meat and Plumpy Nut)..

6.0 Primary Child Caregiver Indicators

[44] WHO Indicators for assessing infant and young child feeding practices, Part 1-Definitions (2009)

[45] Women's FGD from Kolowa- East Pokot

6.0.1 Adult Nutritional Status

Table 25: Nutrition Status of caregivers of 6-59 month old children

	Baringo Central/North (BCN) N= 436	East Pokot / Marigat (EPM) N= 657
% Caretakers with MUAC < 21cm	(7)1.6%	(43) 06.5%
% women pregnant and lactating	(217) 50.6%	(483) 73.4%
Maternal Malnutrition	**N=147**	**N=168**
Pregnant and Lactating mothers of U6 by MUAC: Wasted <21 cm	0(0.0%)	10(06.0%)
% of female caretakers at risk of malnutrition (MUAC<23.0)	54(11.7%)	154(23.4%)

Out of the 436-657 caretakers, 15-49 years, assessed in both survey zones, 51%-73% were pregnant and breast-feeding and the remaining proportion were neither lactating nor pregnant. The mid-upper arm circumference (MUAC) was measured to assess the nutritional status of the eligible caretakers (female primary caretaker of child 6-59months, 15-49 years old). The results compared well with Nov. 2011 results [Caretakers with MUAC <21cm- BCN-4(2.0%); EPM-6(4.4%)] with improvements in BCN- that may be attributed to the comparatively better food access during both rainy seasons, than in 2011.

As expected, the survey findings also showed that of the pregnant and lactating women (PLW) ratio, only 6% of pregnant and U6-months breastfeeding caretakers in EPM had MUAC <21cm meaning that they are acutely malnourished/have chronic energy deficiency (CED)[46]. However, about than ¼ of all caretakers in EPM are at risk of malnutrition (MUAC<23.0cm). The admission criteria into SFP is adult MUAC<21.0 for pregnant and lactating mothers of children <6 months old. The magnitude of under-nutrition was low among pregnant women compared to those who were not pregnant, as computed by difference between PLWs and total caretakers wasting proportions. Pregnancy imposes a big nutrient-need load on mothers, which in the absence of adequate extra nutrients leads to utilization of body nutrient reserves leading to malnutrition.

6.0.2 Micronutrient Supplementation for Caretakers and Maternal Health Care

Table 26: Iron-folate supplementation for pregnant mothers and Maternal Health Care

	Baringo Central/North (BCN)	East Pokot / Marigat (EPM)
Iron Supplementation	**N=415**	**N=637**
Iron supplementation among pregnant women	**309 (74.5%)**	**456(71.6%)**
Iron consumption for at least 3 months	**54(16.0%)**	**79(18.0%)**
Appropriate ANC attendance (≥ 3 times)	**353 (78.8%)**	**376 (58.4%)**

Iron supplementation in pregnancy has been advocated for decades as a means of controlling anaemia and routine iron supplementation is the current cornerstone of efforts to reduce iron-deficiency anaemia. WHO recommends a 6-month regimen of a daily supplement containing 60 mg of elemental iron along with 400 µg of folic acid for all pregnant women. In rural Kenya where anaemia prevalence is high (>40%), WHO recommends postpartum treatment for three additional months[47].

Questions addressing whether the caregiver had taken any form of iron supplementation and duration of consumption during her last pregnancy yielded responses, as shown in Table 26 above. Though still short of the HINI project target of at least 80% supplementation coverage, there has been a substantial improvement in iron supplementation for PLW since Nov. 2011[62.%; 5.4%(BCN); 59.8%;7.8%-EPM]-which was characterized by stock-outs, due to consistent supplies of iron-folate this year[48]. Emphasis needs to be given to the importance of iron consumption for at least 3 months.

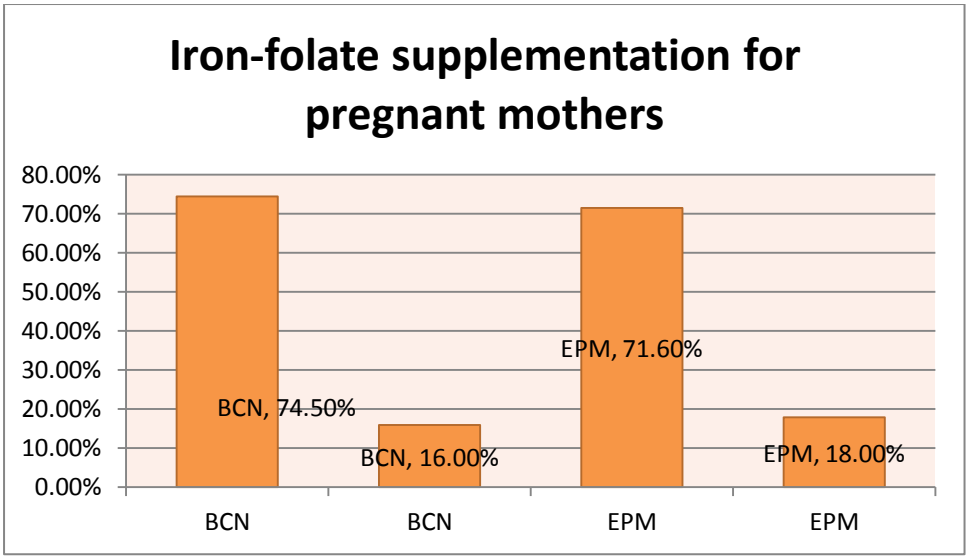
Appropriate ANC attendance of 3 or more visits during pregnancy is predictably higher in BCN at 79% than EPM (58%) as a result of HF distance and access. This disparity can be bridged by improving access to ANC through training of TBAs and CHWs on maternal health and nutrition as well as Community Strategy (CS).

Figure 6: Iron-folate supplementation for pregnant mothers:

[46] Cut off points for pregnant mothers and lactating mothers- MUAC < 21.0 for severe risk and <23.0 For moderate risk.
Cut off points for non- pregnant and non-lactating mother –MUAC < 18.5 for severe risk and <21.0 moderate risk.

[47] UNICEF, WHO & UNU. 2001. Iron deficiency anemia: assessment, prevention, and control: a guide for programme managers. WHO/NHD/01.3.

[48] DNOs and Health Facility Heads KIIs



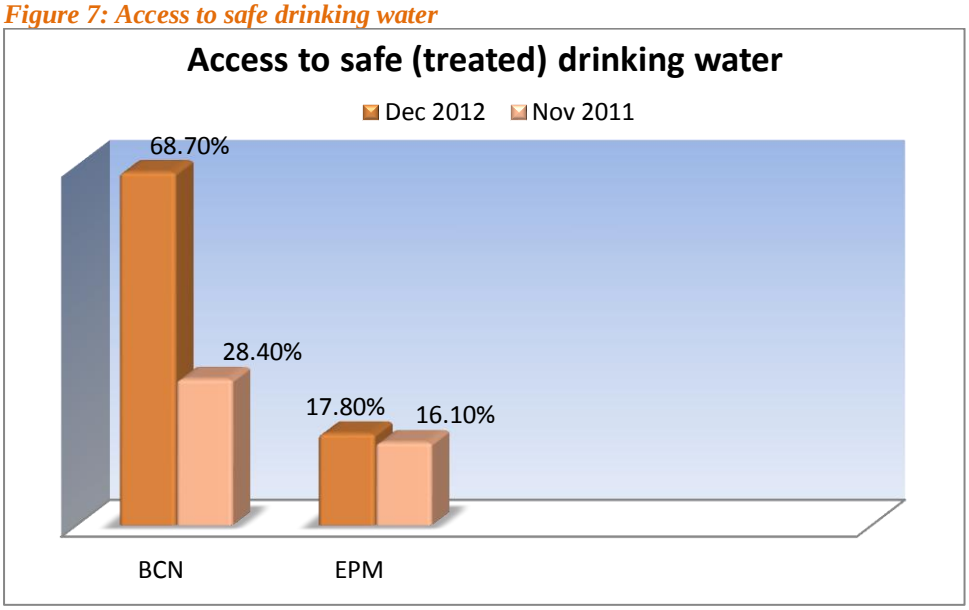
7.0 Hygiene and Sanitation Practices (HYSAN)

Table 27: Access to safe drinking water

	Baringo Central/North (BCN)		East Pokot / Marigat (EPM)	
Access to safe (treated) drinking water	**(320)**	**68.7%**	**(124)**	**17.8%**

7.0.1 Access to safe drinking water

Figure 7: Access to safe drinking water



There has been significant improvement (≈40%) to access to safe drinking water in BCN survey zone while EPM indicator has remained constant. This is attributed to access to water treatment chemicals (Aquatab), especially in Baringo Central as a HYSAN emergency mitigation after flooding in 2012. Also there is an improvement in practice (boiling) following health education. HYSAN education and HYSAN access needs to be reinforced in EPM. From Table 27 below, boiling was the method of treatment most used as effective treatment, followed by adding chemicals. With almost 80% not using any water treatment, cleary the role of untreated water as the main cause of childhood diarrhoea and subsequent levels of acute malnutrition cannot be underestimated, especially in BCN- whose statistics have remained consistent from 2011. The role of reinforced community-led total sanitation trainings in this zone cannot be underestimated. Access to safe water was computed from HH who treat drinking water by boiling and using water treatment chemicals. Trend analysis shows however, shows that there has been substantial improvement in water treatment since 2011 in BCN. Water treatment chemicals at HH level has been accepted after caretakers going through community-led total sanitation trainings and provision of Aquatabs during HYSAN emergency response. Boiling drinking water should also be encouraged being the most viable and cheap method as well as using 'Pur'/Aquatab/ 'Water guard'.

Table 28: Treatment of Drinking water

	BCN	BCN-2011	(EPM)	EPM-2011
	N= 607	N=591	**N= 703**	N=541
Nothing	**21.6%**	70.6%	**79.5%**	82.4%
Boiling	**47.1%**	25.9%	**14.1%**	13.5%
Filtering with cloth	**09.4%**	2.5%	**01.8%**	2.6%
Let it settle	**11.7%**	0.2%	**00.6%**	1.1%
Adding chemicals(Purr/Waterguard)	**09.2%**	0.7%	**04.0%**	0.2%
Adding traditional Herbs	**01.1%**	0.2%	**0.00%**	0.2%

7.0.2 Hand-washing

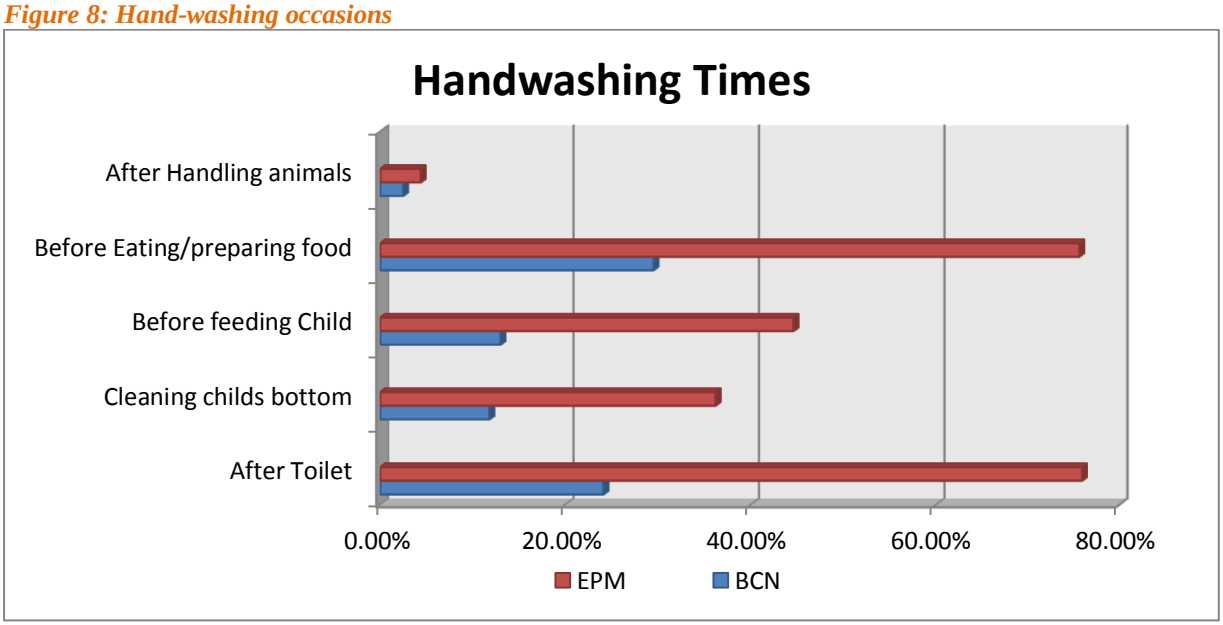
Table 29: Hand-washing

	Baringo Central/North (BCN)		East Pokot / Marigat (EPM)	
Caretakers washing hands appropriately (≥3 critical hand-washing instances)	**n=466 (178)**	**61.8%**	**n=698 (423)**	**60.6%**

	BARINGO CENTRAL NORTH (BCN)-DEC 2012	BARINGO CENTRAL NORTH (NOV 2011)	EAST POKOT/MARIGAT (EPM)-DEC 2012	EAST POKOT/MARIGAT (EPM)-NOV 2011
Critical times when hands are washed	**N= 466**	**N= 594**	**N= 489**	**N= 516**
After using the toilet	**24.10%**	**75.9%**	**11.80%**	**54.3%**
After cleaning child who has defecated	**11.80%**	**36.2%**	**10.70%**	**45.9%**
Before feeding a child(including BF)	**13.00%**	**44.6%**	**13.40%**	**48.6%**
Before eating/ preparing a meal	**29.50%**	**75.6%**	**30.10%**	**77.9%**
After handling animals	**02.5%**	**04.4%**	**18.70%**	**24.9%**

From Table 28, it is evident that a similar number of caregivers washed their hands appropriately (≈60) in both survey zones i.e. washed their hands in at least 3 of the hand-washing critical times. Though short of the HINI target of 80%, this is indicative of similar understanding and practice of the hand-washing messages, within the two zones.

Figure 8: Hand-washing occasions



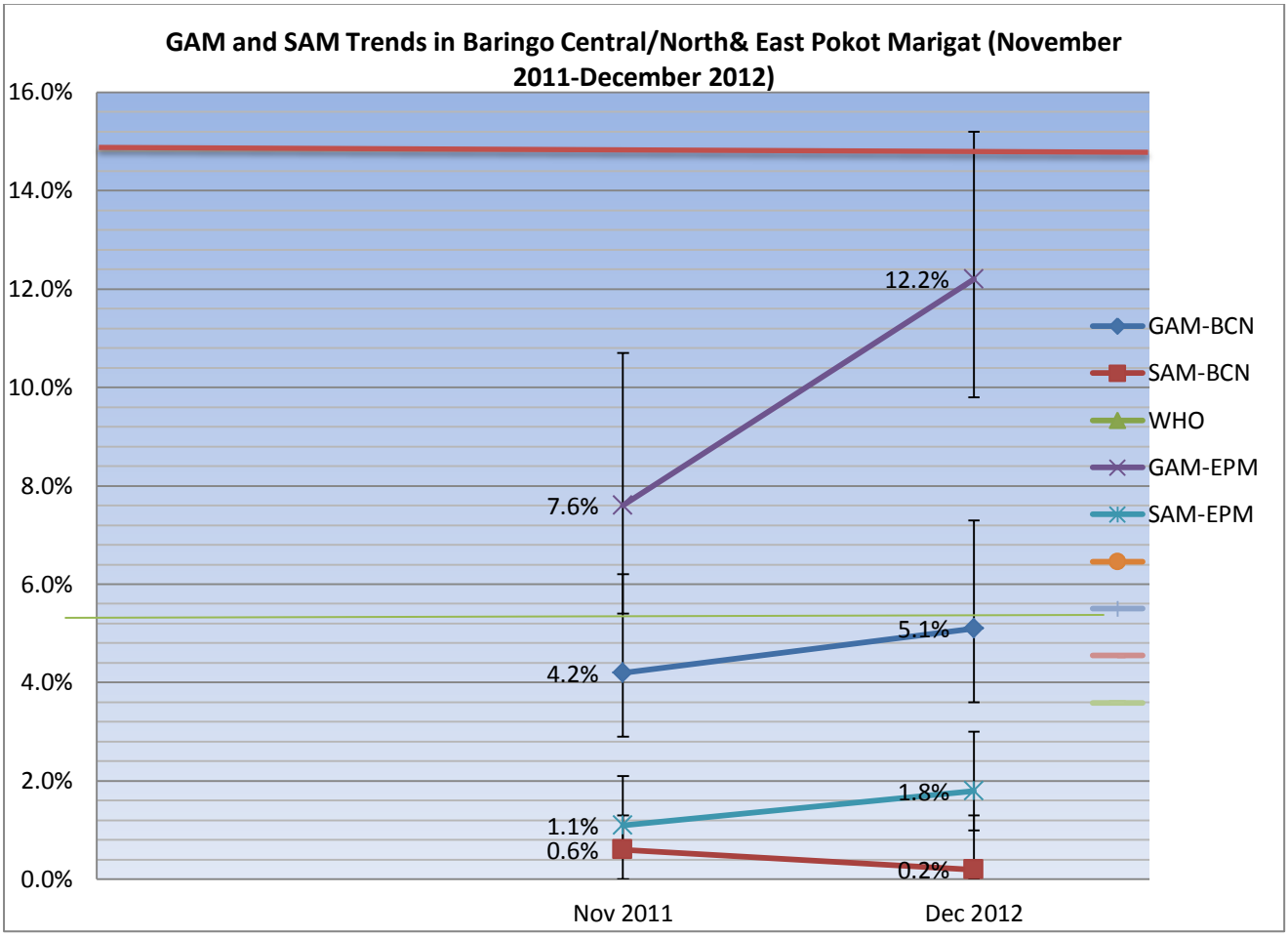
As indicated in Figure 8**,** all caretakers practiced basic hygienic hand washing practices, with most responses based on washing after visiting the toilet, before eating and preparing food. In order to prevent the spread of disease through contamination, SPHERE standards (2004) recommend hand washing always after defecation and before eating and food preparation and the users should have the means to wash their hands after defecation with soap or an alternative. Though the hand-washing results are not comparable to 2011(due to differences in multiple response computation), only ≈10% of the caretakers said that they wash their hands after cleaning a child's bottom and before feeding the child. This could be a contributor to spread of infection and diarrhea, impacting child malnutrition. HINI targets > 50% should have hand washing station at home. From qualitative date, the main mode of faecal disposal is use of bushes/open field with very few community members indicating knowledge and practice of the importance of hand-washing during the five critical times.

8. DISCUSSION

8.1 Nutritional status of 6-59months old in Greater Baringo District (WHO 2006)

In Baringo Central and North (BCN), the results indicate **poor levels of acute malnutrition** and are below the WHO critical levels set at 15% for GAM [49]. The SAM levels is 0.2% and below the emergency levels of >4%.
In East Pokot and Marigat survey zone, the results indicate **a serious level of acute malnutrition** but below WHO threshold set at 15% for GAM [50]. The SAM level is 1.8% and below the emergency levels of >4%.
The levels of underweight in all zones- 18.1%; 21.6% (highest in EPM) and stunting- 34.3%; 25.5%; (highest in BCN) are very high. The reported high rate of stunting shows the effects of cumulative chronic food insecurity and recurrent illnesses overtime. However, stunting and underweight results should be interpreted with caution as age data from both surveys cannot be verified and is thus not reliable. No incidence of oedema was reported in the survey.

Trends of Malnutrition



Trend analysis shows that there is deterioration in acute malnutrition levels (Weight for Height Z-score) compared to the November 2011 surveys of greater Baringo district, shown above. However, there has been no significant difference in GAM/SAM reported. This is deduced from overlapping confidence intervals and 2011 comparison with two survey calculator (CDC) which also indicates a non-significant difference (p=0.150; 0.5), with current survey.
Due to good harvests due to favourable weather in 2012, this has impacted behaviour of caregivers, with regards to health-seeking practice for malnourished children : *"In last two years ago many children were malnourished cause of drought also parents of malnourished children were hiding their children to came and get helped in facilities due to fear that fear they will be laughed with their friends ,but this year there is great change, cause of supplementary food in facility and food from shamba "*[51]
While there was relatively good food security in the current situation, these two surveys were carried out a month after the end of the short rains, and at the start of the hunger gap period (December-March) for both survey zones, when elevated malnutrition rates may be expected to rise.

[49] Global Acute Malnutrition (GAM): prevalence of GAM <5% termed as acceptable, 5-9% poor, 10-14% serious and >15% critical.
[50] Global Acute Malnutrition (GAM): prevalence of GAM <5% termed as acceptable, 5-9% poor, 10-14% serious and >15% critical.
[51] Women FGD from Kolowa-East Pokot

8.2 Causes of Malnutrition

Appendix 4 shows the Greater Baringo District Conceptual Framework for December 2012, with a summary of indicators, their interpretation and zonal ranking.

Though the long rains were good, a combination of landslides, flooding, leaching and suspected maize lethal necrosis disease (MLND) lead to a drop in maze harvest in the agro-pastoralist and mixed farming zones. About 75 % only of agro-pastorals planted maize & beans due to the late onset of the short rains. Household food consumption was also expected to remain favourable due to improved availability of other crops such as potatoes and beans.

With good pasture and browse and water availability during the survey period, livestock body condition had peaked, but is expected to deteriorate. This is due to the fact that the quality and quantity of forage deteriorated in all livelihood zones as well as outbreak of CCPP & PPR, causing decline of body condition in small stock. Food access indicators are also flagging as reflective of a deteriorating situation. Milk production declined drastically during the November owing to small stock condition. Subsequently, milk utilization also remained well below average compared to similar time last year.

Contextual Analysis:

Contextually, there are significant factors that indicate that the ***situation could deteriorate/is worse than prevalence shows***:

- **Trend analysis shows that there has been no significant difference in GAM/SAM reported for Baringo District since November 2011, taking into consideration seasonality: Two surveys were carried out in 2011-12, in Baringo Central/North and East Pokot/Marigat**
- **The Nov 2011 and Dec 2012 surveys show no significant difference (overlapping confidence intervals and 2011 comparison with two survey calculator (CDC) also indicates a non-significant difference (p=0.150; 0.5), with current survey.**
- **Very high prevalence of ARI incidence, especially BCN (65.9%)**
- **Children who have recently recovered (MAM and SAM) are likely to relapse when the water and food security situation deteriorates because the effect of the on-going hazards is likely to further lower the resilience of vulnerable groups. Poisson distribution WHZ -2, showed a slight significant difference (p=0.022) in cluster heterogeneity which matched the clusters/villages in EPM. This was expected because of heterogenity differences in nutrition rates between East Pokot and Marigat**
- **Continued relief response and the need for the GoK and its donor partners to increase non-food investments aimed at mitigating vulnerability to hunger.**
- **The threat of cattle-rustling incidents that traditionally increases during rite-of-passage season (December), increasing likelihood of insecurity.**
- **The statistical analysis of surveyed children (plausibility test) and graphical data below shows that there was a significant difference in age distribution (p=0.000) in EPM survey, which suggests that there are currently less children in some age groups than expected. This may be indicative of:**

1. **Incorrect age given**
2. **Older children not being present during the survey day because of pre-school attendance**

Community concerns and attributes of malnutrition were mostly related:

- Access to health facilities, especially for very rural areas in EPM
- Lack of training for livelihoods (e.g. Poor utilization available land due to lack of skills and knowledge)
- Alcoholism of both men and women leading to negligence of children
- Food shortage/Drought in 2010-11
- Livestock diseases
- Inadequate or scarce food due to high/increasing food prices.
- Poverty due to lack of employment.
- Poor family planning (e.g. Having many children and using money available to pay school fees)
- Poor sanitation in many people
- Unsafe drinking water
- Over population and congestion
- Disease e.g. malaria, URTI
- Poor exclusive breastfeeding practised because of high work load as well as poor feeding practice of young children

In the long term, drought preparedness systems need to be strengthened by government policy so that the community becomes better able to cope with persistent drought, the cause of chronic malnutrition. The shift to FFA is also a positive and sustainable step that hopes to curb dependence on food aid and strengthen livelihoods. The key is to help the community 'bounce back' from recurrent shocks.

Morbidity:

High morbidity rates (**45.0%; 51.6%)** were reported in the region, in the two weeks prior to the study. There was high incidence of reported ARI/ malaria/diarrhoea.

These levels were consistent with seasonal morbidity patterns recorded from the health facilities in the district. In addition, acute ARIs, diarrhoea, and malaria are endemic during this time of year (dry cool season)[52]. The association between illness and malnutrition was not significant in both surveys with. Qualitative data confirmed that health-seeking practices were found to be satisfactory with the majority population utilizing medical services. However, care-givers have not been seeking medical attention for malnutrition, thus reducing likelihood of early identification and intervention. This trend is slowly changing with caregiver education and awareness. It is important to note that with the current serious nutritional situation (EPM), malaria and diarrhoea can prove fatal. There is need to upscale and continue treatment of ARIs malaria and infectious disease particularly. Utilization of therapeutic zinc supplementation for diarrhoeal episode was not assessed due to fact that health facilities had not received supplies from KEMSA kit (zinc sulphate and ferrous-folate supplements) during that quarter. The main challenge currently is that while the number of operational health facilities has increased, staff are not adequately trained to implement HINI in the county with minimal partner support (staff turnover/absenteeism). For example, in BCN, only 2 out of the 13 health facilities in Kabartonjo are implementing IMAM.

At the community level, and especially in EPM, appropriate diarrhoea management is wanting for more than half of caretakers, and ¼ doing nothing during a diarrhoeal episode. A very small minority of HH have access to safe drinking water **(17.8%)**. The implication is that infection levels are set to increase in these conditions, impacting on malnutrition levels.

Growth monitoring indicators are poor **(26.7%; 20.2%)** and this is causes inability to track the growth and nutrition status of individual children robustly. In addition, without verifiable age data, it is difficult to categorize underweight and stunting status.

Programme Coverage:

Immunization and vitamin A/deworming coverage are basic health services and are a reflection of how the population accesses health services. The high immunization coverage rate (over 80-90%) is commendable. However, micronutrient supplementation and deworming coverage were below 80%.

Iron-folate supplementation for pregnant mothers and maternal health care indicators are relatively satisfactory, with the exception of appropriate duration of consumption of iron tablets with less than 20% of caregivers taking these for 3 or more months. ANC attendance in EPM is also rather low at 58%.

The SFP coverage rate is low for EPM **(44.4%; 54.5%)** for point and period coverage. SPHERE standards[18] also recommend a minimum 60% coverage for community nutrition intervention programmes, and this should be the target for the HINI program currently being implemented for both SFP and OTP. OTP coverage rates (**66.7%; 85.7%)** were satisfactory. High OTP programme coverage has been achieved mainly through sustainable methods of community mobilisation. The mobilisation efforts were integrated into existing Ministry of Health outreach system and other community based institutions. In addition, the community have started to take malnourished children for intervention, while previously, they had hidden them, for fear of stigma. Education and awareness of malnutrition signs and symptoms as well as observed benefits of timely intervention is likely to change this practice. After completion of IMAM training, Community volunteers and Community Health Workers (CHWs) role in routine health facility outreach activities would play a significant role in community mobilisation, absentee and defaulter tracing[53]. The identification of new SFP/OTP referrals in all zones during the survey period indicates that CHWs need to intensify their efforts in continuous case identification at the community level. Nutrition Surveillance in BCN has identified major differences in malnutrition rates between different livelihood areas. For example, areas like Isas, Kabasis, Osien, Seretonin, Kerio and Mosop in Baringo Central are quite agriculturally-productive areas, in contrast to Kapkelewa, Salawa and most of Baringo North. Thus, it is likely that when 'good' areas are assessed, they may 'dilute' the malnutrition rate of others. It has been suggested that these areas should be excluded from subsequent surveys. Assessment of SQUEAC[54] coverage of BCN to identify accurately areas of higher/lower coverage as well as barriers and boosters to coverage in the nutrition program would verify the validity of this.

Infant and Young Child Feeding and Care practices:

Some poor child care and feeding practices persist in Baringo district and have been associated with high levels of malnutrition. Of concern is the fact that 5, out of 8 breastfeeding and complementary indicators that are **unsatisfactory** in as shown below:

Poor breastfeeding and complementary feeding habits expose children to morbidity, malnutrition and even death.

Key breastfeeding indicators that require strengthening are EBF (including discouraging pre-lacteals and early introduction of complementary foods). Cultural practices that should be discouraged include not initiating BF until plain water or 'sakit' is given. IT has been established that there is a very strong traditional respect for use of sakit and plain water as an adjunct to breastfeeding.[55]- mothers thus lose the opportunity for EBF. These should be formulated into discussion points in MtMSGs.

[52] KFSSG Long Rains Assessment July 2012
[18] The SPHERE Project Handbook (2004). Humanitarian Charter and Minimum Standards in Disaster Response.
[53] NSO- Turkana County
[54] Semi-Quantitative Evaluation Of Access And Coverage
[55] Women FGDs- All livelihood Zones

There has been a vast improvement in dietary diversity and frequency because of the prevailing food access. Though the current situation is satisfactory in terms of DD and meal frequency, reduced food intake among the children can be expected in the following months, attributed to high food prices in the market and the reduced availability of milk and animal products due to as the hunger gap in both survey zones approaches.

IYCF Dietary Diversity (DD) and meal frequency has improved significantly since 2011 and this indicates the need for new strategies to maintain the gains made in these indicator statistics in the twozones. DD impacts on nutrition status of children under 24 months particularly stunting- with the mixed farming and irrigated cropping zone currently producing variety of nutrient-dense crops, HH utilization needs to be emphasized. MtMSG scale-up, where mothers can obtain knowledge and strategies to improve DD in their HH, may have an impact.

Water and Sanitation

With reference to EPM zone, poor sanitation (low latrine coverage)[56]and lack of access to safe drinking water could explain the high prevalence of diarrhoeal diseases in the children assessed, despite relative availability of water currently. Caretaker hygiene practices were investigated revealing that minority used recommended hand-washing practices **(≈ 60%)** but this was restricted to essential cleaning. This was, before eating/preparing food and using the toilet. **Less than 15%** practiced hygienic cleaning of hands before feeding the child and after cleaning child's bottom hence predisposing them to being agents of transmitting infections like diarrhoea. This was attributed to ignorance, high workload and inadequate water supply[57]. From qualitative date, the main mode of faecal disposal is use of bushes/open field with very few community members indicating knowledge and practice of the importance of hand-washing during the five critical times.

9. CONCLUSION

Overall the key underlying factors of nutrition status are morbidity, inadequate health programme coverage (vitamin A and deworming), IYCF practices- poor EBF, pre-lacteals, inadequate meal frequency and iron-rich food consumption. For EPM particularly, poor hygiene and lack of adequate and safe drinking water is evident. Integrated approaches should be undertaken to reduce risk factors such as sub-optimal childcare and feeding practices, unsafe drinking water and low access to essential nutrition services. U5 food DD & security is expected to reduce due to increasing food prices and reducing food stocks. In addition, forage depletion has affected milk availability (hence directly affecting the milk availability and income of the households)

A food deficit situation is expected, pending the hunger gap period until the long rain onset. The serious nutrition situation in EPM requires active case-finding and mitigation, to prevent it deteriorating further.

Measures to improve coverage of nutrition programmes (i.e. IMAM, vitamin A and deworming) would play a critical role in both preventing and treating morbidity and malnutrition. U5 illnesses are high, especially ARIs in BCN and malaria/diarrhoea in EPM. Morbidity and malnutrition rates likely to increase with depletion of water levels from safe sources, thus health interventions are imperative.

[56] Key Informant Interviews with DHMT

[57] Men and Women FGDs in both surveys

10. RECOMMENDATIONS

Intervention efforts that address both immediate needs for the acute malnutrition cases and chronic malnutrition in the vulnerable population should be mobilized. In addition, developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms are recommended. Specific recommendations include:

Immediate Recommendations

Nutrition and Health

Baringo Central North (BCN)

- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening (active case-finding). In addition, stablish in-patient services of SAM and MAM in dispensaries and PHCs.
- In light of the deteriorating situation, based on food security indicators, two surveys in April and December (long-rain and short-rain season) is recommended. Alternatively, timing of the surveys should coincide with onset of the hunger gap period (January-March) in both survey zones.
- Exclusion of productive areas (with consistent food access) from subsequent BCN surveys is recommended, for precarious areas to be sampled, giving a more robust estimate of areas of poor nutrition status. However, a coverage survey should be used to validate this (with cognizance of the fact that malnutrition is multi-causal) and not always linked to food access.
- To address increased coverage for Food for Assets (FFA) during hunger-gap period
- Establish the community strategy components of primary health care, with a focus on IMAM community-based component. IMAM and growth monitoring implementation in facilities should be tracked through OJTs.
- Addressing the high morbidity load among U5s and access to essential health and nutrition services by strengthening the integrated outreach component

East Pokot and Marigat (EPM)

- Observing the trends of malnutrition over the past 2 years, EPM is still recommended for targeted SFP and OTP for children age 6 to 59 months to address the micro-nutrient and macronutrient food gap, justified by the serious rate of GAM. This intervention would be most effective with a strong general food distribution system and good coverage for IMAM interventions. Relevant support mechanism should be installed immediately to facilitate this. As a contingency measure, households with children recently discharged from SFP programme should be targeted as beneficiaries of GFD (FFA), to reduce the relapse cases, due to HH food insecurity.
- Continuous MUAC screening for active case-finding as hunger-gap approaches and strengthen therapeutic targeted interventions with a focus on SFP
- Establish regular nutrition surveillance through nutrition surveys- at both seasonal periods (April & Dec)
- Addressing the high morbidity load among U5s and access to essential health and nutrition services by strengthening the integrated outreach component- primarily focusing on regular medical outreach camps/mobile clinic to improve access to the nomadic and remote populations..
- An immediate up scaling-up of both SFP and OTP interventions modelled on the community-based IMAM with a strong outreach component (beyond and in addition to health-facilities) to cover all divisions of EPM. Community Strategy (CS) and establishment of CUs will facilitate this. Following sub-normal long rains, failed planting season and high food prices, food security situation is likely to deteriorate pending onset of short rains-there is need to support identification and treatment of children with malnutrition.
- Training recruitment and motivation of additional CHWs to improve rehabilitation of acutely malnourished children through the existing selective feeding and outreach programs and active case finding until household food security is restored and critical public health issues are addressed. This will require capacity-building in IMAM implementation of CHWs and TBAs to appropriately identify and manage acutely malnourished children.
- Training of CHWs and TBAs to encourage ANC attendance

BCN & EPM

- Decentralize essential health components to improve access to health services by:
- ✓ Improve coverage of Vitamin A and deworming through targeting both ECD centres and mobilization of children during the Mass IMAM-GFD linkage
- ✓ Establish the community strategy components of primary health care, with a focus on IMAM community-based component.
- Strengthen programmes and strategies currently addressing infant and young child nutrition (IYCN) with a view to improving the protection, promotion, and support of optimal IYCF. Viable action points include:
- ✓ Systems strengthening would ensure facility and community level care for pregnant women and lactating mothers This would ensure key support for timely initiation of breast feeding and iron-folate/Vitamin A supplementation. Efforts such as the MtMSG, Community Strategy, Malezi Bora as well as outreach efforts should optimize the care for maternal, infant and young child nutrition.
- ✓ As the HINI program is rolled out there is need for continual monitoring of both facility and community based interventions to track progress while also documenting the process to assess the trends in the outcomes as well as impact

indicators. Provision of adequate data collection tools and training District Health Records Officers and health facility in charges on the same. Particular attention should go to Vitamin A supplementation and deworming, improved maternal nutrition, iron/folate supplementation during the prenatal period and ensuring ORS/zinc support for diarrhoea.

- ✓ CHW mentorship of PLW women to promote better nutritional practices and effect positive behavioural change.
- ✓ Delivery of key messages could use the following avenues: community-based promotion through CHWs, peer-led MtMSGs, and community groups/meetings and religious leaders. Key breastfeeding indicators that require strengthening are EBF (including discouraging pre-lacteals and early introduction of complementary foods). Cultural practices that should be discouraged include not initiating BF until plain water or 'sakit' is given. IT has been established that there is a very strong traditional respect for use of sakit and plain water as an adjunct to breastfeeding.[58]- mothers thus lose the opportunity for EBF. These should be formulated into discussion points in MtMSGs and community meetings.
- ✓ Training on IYCF counselling and support for HC staff to provide IYCF education to mothers at nutrition service points. Facility-based promotion would include- strengthening mother support groups in facilities and delivery of context and culturally specific IYCN messages. These messages will address key barriers for improved feeding practices as well as improved nutritional recommendations. Strengthening of the programme is recommended, based on poor IYCF practices. Recommended areas for key messages include: elimination of pre-lacteals, time of introduction of complementary foods, risks of early or late introduction of complementary foods, food choices and preparation of appropriate complementary foods. Use of national tools/job aids and local adaptation of community mobilization and sensitization strategies (including community level materials), for BCC.

- Improve coverage of Vitamin A and deworming through ensuring distribution during vaccination and outreach campaigns and concurrent recording in Mother/child cards. Since coverage is poorest n 24-59m age-group , additional distribution through ECD and during school feeding programs
- Emphasis of HINI key messages -including consumption of maternal micronutrient supplementation for at least 3 months during pregnancy & lactation(iron and folate),
- Advocacy for use and treatment of ITNs by U5s to prevent U5 morbidity and mortality from malaria.
- Ensuring prescription of zinc sulphate, with ORS for all diarrhoeal episodes, recorded appropriately and monitored using the DHIS
- Strengthen the reporting component especially for micro-nutrient supplementation, deworming and zinc sulphate as the MoH reporting tools currently do not have provision some of the indicators e.g. deworming and hence even when done, it is not recorded.
- Growth monitoring statistics are very poor, requiring emphasis during IMAM implementation. Reward systems can be explored to motivate appropriate growth monitoring in the HCs

Water and Sanitation

- Strengthening of hygiene practices to reduce the incidence of diarrhoeal disease associated with contaminated water in the household including health education to educate the community on domestic treatment of drinking water(especially in EPM) and effective hand washing (soap/ash) and use of latrines/toilets. The critical hand-washing times that need to be re-emphasized are washing after cleaning child's bottom and before feeding the child. In particular, a focus on longer-term strategies with a Behaviour Change Communication (BCC) component would help to translate knowledge to practice. The starting point to this would be a Knowledge, Attitude and Practice (KAP) for BCC. Utilization of CHWs to emphasize hygiene practices/toilet usage can impact knowledge.
- Recharge at water points was good following long rains. However, water stress is likely to heighten as boreholes dry up in the coming months. Maintenance of Gen-sets, submersible pumps and fuel subsidy for borehole supplies should continue for community owned boreholes to support free water distribution to communities as well as schools and health facilities.
- Implementation of mechanisms for regular water treatment at water points and establishment of a rota-system to separate human and animal use of earth pans concurrently, especially in pastoralist zone. This will improve access to safe water in all areas.
- Strengthen awareness-creation of total sanitation through cascading trainings of community management committees.
- Continue strengthening community-led total sanitation training and support timely and consistent provision of water purification chemicals for water treatment at Household level

Food Distribution, Food Security and Livelihoods Rehabilitation

- Continue GFD until start of short rains and upscale the food aid targets as recommended by KFSSG mid-season assessment considering the long rains performance. In addition, WFP, through World Vision can support the use of CSB Plus to ensure optimal micronutrient fortified foods for young children.
- Agropastoral/mixed farming zones to be given incentives to produce and HH utilization (particularly for U5)as well as selling of excess produce to purchase nutrient-rich foods.
- Social Support systems are positive coping mechanisms for vulnerable households, and these should be facilitated.
- Migration has began in search of pasture and water. The feasibility of providing fodder for the core breeding animals at these sites would be appropriate in the short term. In the medium-term, increase of fodder production and conservation to replace lost access to dry-season grazing areas, should be implemented in pastoralist areas
- For fisheries zones, training of sustainable fishing and maintenance of equipment (in addition to supply of equipment) should be strengthened. insecurity should be mitigated at targeted fish markets so as to enhance supply.

[58] Women FGDs- All livelihood Zones

- Placing livelihoods at the centre of emergency preparedness and planning is a critical base for the design of timely and appropriate programmes and policy responses that mitigate hazards. This shift is already being implemented in the county. FFA implementation is recommended continue as this provides positive coping mechanisms in lean times. HSNP should be scaled-up, to enable timely responses that protect livelihoods.

Long-Term Interventions

Baringo Central North (BCN)
Nutrition and Health

- Using livelihoods analysis for preparedness and response planning means that household coping strategies are more readily supported when a shock becomes evident. Analysing livelihoods also ensures that the underlying causes of food insecurity are addressed before and even during a crisis, and that targeting is effective and interventions are appropriate. Examples include livelihoods-based early warning systems employing Household Economy Analysis (HEA).
- Focus on programmes by relevant actors that improve and sustain dietary diversity and consumption of micronutrient.-rich foods. This can be led by assessing the seasonal availability and HH utilization of nutrient-dense foods . This would address improved complementary food access for children six months to two years.
- Maintain IMAM-trained CHW and community volunteers and reinforce growth monitoring and promotion, nutrition and IYCN key messages,
- Separate the BCN zone to high and low malnutrition rate areas for targeted intervention/resources
- Establishment of C.Us to cover both Central and North zones
- Twice yearly vitamin A supplementation and de-worming should be promoted; possibly though the MSGs and CHWs
- KAP barrier analysis for MIYCF indicators and consumption of maternal micronutrients.
- Standardized recording of zinc supplementation as well as monitoring for complete dosage administration
- Strengthen outreach health facilities PHCs and dispensaries, especially ensuring key messages on disease prevention;& growth monitoring
- Supporting and Strengthening C.S. with establishment of C.U.

East Pokot and Marigt (EPM)

- Strengthen outreach health facilities and community and mobile clinics/satellite services, and maintain IMAM-trained CHW and community volunteers, with priority in locations with low HC coverage.
- Establishment of C.Us to cover all areas of the zone

Water and Sanitation

- To address the issues of limited access to safe water, there is a need for rehabilitation/protection of water systems including the unprotected wells (e.g. capping of wells), to upscale water storage.
- Orderly and efficient resource utilization should be championed by water-use management committees (members selected by the community) to regulate and reduce conflicts at water points, especially during shortage periods.
- Advocacy/public health campaigns on domestic water treatment such as boiling of drinking water and use of purification chemical to minimise risks of water-borne diseases, should be carried out.
- Reinforcement of hygiene messages and water treatment, for disease prevention in through various channels like child to parent initiatives, outreach motivation-e.g. soaps and kiswahili/local vernacular radio.

Food Distribution, Food Security and Livelihood Rehabilitation

- Implementation of drought preparedness strategies as well as surveillance- data collection, monitoring and evaluation should be comprehensively done. Effective linkages and collaboration between the community and the DSG, an effective feedback system and coordination so as to enhance drought preparedness strategies
- In pastoralist zone, grazing committees to reinforce building reserves during abundant periods and ordered management of rangeland
- Support by relevant stakeholders to develop and sustain breeding herds and market other stock to increase resilience
- Since traditional animal husbandry is very vulnerable to drought, building of alternative and sustainable livelihoods to enhance resilience to drought, with a focus on gender empowerment should be encouraged. This is primarily targeted at increasing the household food security. Structured associations for marketing wild honey could expand its gains e.g. MtMsGs could couple as chamas. Another viable activity in mixed livelihood zones is poultry-keeping. This has the additional benefit of increasing HH dietary diversity diversity (e.g. consumption of eggs).
- The agropastoralist zones/mixed farmers requires strengthening of training for mixed cropping and enhanced varieties (drought-tolerant; early-maturing). Species diversification and splitting in dry season is also necessary to maintain vibrant crop market and food security.
- Revitalize markets for agro pastoralist & mixed farming zones (economic stimulus package/CDF)
- Use of MtMSGs and extension support to operationalize use of nutrient-dense foods and improved recipes for CF.
- Livelihoods programmes like FFA should continue to strengthen sustainable coping strategies during the lean times.

APPENDICES

APPENDIX 1: PLAUSIBILITY REPORTS

Indicator	Acceptable values/range	Baringo Central/North	East Pokot/Marigat	Comments
Digit preference - weight	<10	4	2	Excellent
Digit preference - height	<10	10	8	Good
WHZ(Standard Deviation)	0.8-1.2	1.05	1.03	Excellent
WHZ (Skewness)	-1 to +1	0.16	-0.08	Excellent
WHZ (Kurtosis)	-1 to +1	-0.21	-0.01	Excellent
Percent of flags WHZ	<3%	1.1%	1.4%	Excellent
Percent of flags HAZ	<10%	3.9%	4.3%	Good
Percent of flags WAZ	<5%	0.6%	1.3%	Excellent
Design Effect (D.E)		1.00	1.51	
Age distribution (%)				
Group1 6-17 mo	20%-25%	27.2%	30.8%	Problematic (Excess)
Group 2 18-29 mo	20%-25%	23.6%	26.0%	EPM-Problematic
Group 3 30-41 mo	20%-25%	21.3%	22.9%	Acceptable
Group 4 42-53 mo	20%-25%	18.5%	13.1%	EPM-Problematic(Deficient)
Group 5 54-59 mo	Around 10%	9.5%	7.2%	EPM-Problematic(Deficient)
Age Ratio : G1+G2/G3+G4+G5	Around 1.0	1.03	1.32	Larger 'Younger' group
Sex Ratio	0.8-1.2	1.0	1.0	Acceptable
General acceptability		2%	13%	BCN- Excellent EPM-Acceptable (Data quality distorted by skewed age ratio)

APPENDIX 2: CLUSTER ALLOCATION LIST

BARINGO *CENTRAL*/NORTH NUTRITION SURVEY QUESTIONNAIRE CHECK LIST

	Division	Date	Village	Cluster No	Team Leader Name	Team No.	QN.B	No. HH done (Anthro)	Children Assessed (Qnn C)	No. of 6-23 IYCF (Qnn D)	No. of 0-5 IYCF Children(Qnn E)
1	Kabartonjo	12/09/2012	Kapchepkor	37	Clement	1	10	16	11	5	6
2	Kabartonjo	12/09/2012	Tiriondonin	31	Rael Chesire	2	13	19	8	11	6
3	Kabartonjo	12/09/2012	Kaptere	33	Catherine	3	11	13	5	8	5
4	Kabartonjo	12/09/2012	Keiyo Mosop	30	Isaack Kimosop	4	13	17	11	6	7
5	Kabartonjo	12/09/2012	Lelian	29	Alice Boiwo	5	16	20	11	9	6
6	Kabartonjo	12/09/2012	Kaimugul	32	Rutto	6	17	17	9	8	6
7	Kabarnet	12/10/2012	Kituro	18	Clement	1	13	18	12	6	6
8	Kabarnet	12/10/2012	Morop	17	Rael Chesire	2	17	15	10	5	6
9	Kabarnet	12/10/2012	Kinyo	10	Catherine	3	15	22	15	7	7
10	Kabarnet	12/10/2012	Kewamoi	12	Isaack Kimosop	4	14	19	11	8	10
11	Kabarnet	12/10/2012	KaprokonyaA	13	Alice Boiwo	5	11	20	11	9	6
12	Tenges	12/10/2012	Bekibon	4	Rutto	6	13	16	10	6	6
13	Bartabwa	12/11/2012	Terik	23	Clement	1	12	19	11	8	6
14	Bartabwa	12/11/2012	Bartabwa	22	Catherine	3	8	17	11	6	8
15	Kipsaraman	12/11/2012	Kapkoiwo	24	Rael Chesire	2	12	18	11	7	6
16	Barwessa	12/11/2012	Keturwo	20	Isaack Kimosop	4	12	16	10	6	6
17	Barwessa	12/11/2012	Katibel	21	Alice Boiwo	5	12	17	11	6	7
18	Barwessa	12/11/2012	Kuikui	19	Rutto	6	10	18	13	5	6
19	Kabarnet	12/12/2012	Chebano	9	Clement	1	14	16	10	6	6
20	Sacho	12/12/2012	Kabasis	6	Rutto	6	12	16	10	6	6
21	Kabarnet	12/12/2012	Moloi	15	Catherine	3	15	18	12	6	7
22	Kabarnet	12/12/2012	Seretunin	16	Rael Chesire	2	14	20	13	7	8
23	Sacho	12/12/2012	Timboiywo	7	Alice Boiwo	5	13	17	10	7	7
24	Sacho	12/12/2012	Kaptich	8	Isaack Kimosop	4	14	17	10	7	6
25	Kipsaraman	13/12/2012	Isas	28	Clement	1	11	15	10	5	6

26	Kipsaraman	13/12/2012	Barketeiw	25	Rael Chesire	2	8	12	9	3	1
27	Kipsaraman	13/12/2012	Rondinin	27	Catherine	3	10	20	11	9	6
28	Kabartonjo	13/12/2012	Akorian	35	Isaack Kimosop	4	13	16	10	6	6
29	Kabartonjo	13/12/2012	Koroto	36	Alice Boiwo	5	9	15	10	5	6
30	Kipsaraman	13/12/2012	Sibilo	26	Rutto	6	10	15	10	5	6
31	Kabarnet	14/12/2012	Kaprokonya B	14	Clement	1	18	19	10	9	6
32	Salawa	14/12/2012	Kiboino	1	Isaack Kimosop	4	13	15	10	9	6
33	Sacho	14/12/2012	Kaptiriony	5	Alice Boiwo	5	7	16	9	7	7
34	Kabarnet	14/12/2012	Seguton	11	Rutto	6	12	15	10	5	6
35	Tenges	14/12/2012	Sorok	2	Catherine	3	9	20	14	6	8
36	Tenges	14/12/2012	Tenges	3	Rael Chesire	2	14	17	10	7	6
						TOTAL	**445**	**616**	**379**	**241**	**226**

EAST POKOT/MARIGAT NUTRITION SURVEY QUESTIONNAIRE CHECKLIST

	Division	Date	Village	Cluster No	Team Leader Name	Team No.	Qnn B	No. Households done (Anthro)	ChildrenAssessed (Qnn C)	No. of 6-23 IYCF (Qnn D)	No. of 0-5 IYCF (Qnn E)
1	Tangulbei	12/08/2012	Komolion	21	Dan Nyambaja	1	15	16	5	11	9
2	Mondi	12/08/2012	Chemiril	1	Ayapar	2	13	19	10	9	8
3	Mondi	12/08/2012	Paka	3	Amaya	3	15	20	9	11	9
4	Nginyang	12/08/2012	Chesakam	9	Rose Kamuren	4	17	11	2	9	8
5	Nginyang	12/08/2012	Nginyang W.	11	Sandra Sirma	5	20	20	11	9	9
6	Nginyang	12/08/2012	Maron	8	Maganga	6	7	16	7	9	9
7	Tangulbei	12/08/2012	Chemoigut	20	Clement N.	1	12	19	10	9	9
8	Tangulbei	12/08/2012	Orus	19	Rael Chesire	2	11	16	13	3	9
9	Mondi	12/08/2012	Kokore	2	Catherine	3	13	20	11	9	9
10	Mondi	12/08/2012	Tuwo	4	Isaack K.	4	16	15	6	9	8
11	Nginyang	12/08/2012	Kositei	10	Boiwo	5	14	15	9	6	6
12	Mondi	12/08/2012	Nakoko	7	Rutto	6	10	12	7	5	10
13	Marigat	12/09/2012	Perkerra A	32	Rose Kamuren	4	19	25	10	15	10
14	Marigat	12/09/2012	Perkerra B	33	Sandra Sirma	5	15	20	10	10	10
15	Marigat	12/09/2012	Kivumbini	34	Maganga	6	16	20	10	10	9
16	Mondi	12/09/2012	Kapeddo E. A	5	Dan Nyambaja	1	17	19	10	9	9
17	Mondi	12/09/2012	Kapeddo E. B	6	Ayapar	2	18	19	9	10	9

18	Nginyang	12/09/2012	Kapeddo N.	12	Amaya	3	17	19	10	9	9
19	Marigat	12/10/2012	Kimalel	31	Rose Kamuren	4	13	20	12	8	5
20	Marigat	12/10/2012	Loropil	36	Maganga	6	12	19	10	9	9
21	Marigat	12/10/2012	Endao	35	Sandra Sirma	5	17	20	9	11	9
22	Kollowa	12/10/2012	Kollowa A	22	Dan Nyambaja	1	16	19	10	9	10
23	Kollowa	12/10/2012	Kollowa B	23	Ayapar	2	14	20	11	9	9
24	Kollowa	12/10/2012	Chepkarerat	24	Amaya	3	15	19	10	9	9
25	Marigat	12/11/2012	Kaprongno	39	Maganga	6	11	19	10	9	10
26	Marigat	12/11/2012	Sandai	38	Sandra Sirma	5	14	20	11	9	9
27	Marigat	12/11/2012	Eldume	37	Rose Kamuren	4	27	35	17	18	15
28	Kollowa	12/11/2012	Kipnai	26	Dan Nyambaja	1	12	20	11	9	9
29	Kollowa	12/11/2012	Chepelion	27	Ayapar	2	14	20	11	9	9
30	Kollowa	12/11/2012	Barpello	25	Amaya	3	16	20	10	10	10
31	Marigat	12/12/2012	Sokotei	40	Rose Kamuren	4	15	20	10	10	11
32	Marigat	12/12/2012	Kapnarok	43	Sandra Sirma	5	15	20	9	11	9
33	Marigat	12/12/2012	Sosionte	48	Maganga	6	13	20	10	10	9
34	Ngoron	12/12/2012	Mirkisi	28	Dan Nyambaja	1	15	20	10	10	9
35	Ngoron	12/12/2012	Kapunyany	29	Ayapar	2	18	20	10	10	9
36	Ngoron	12/12/2012	Angortiang	30	Amaya	3	14	20	10	9	9
37	Marigat	13/12/2012	Kamailel	44	Rose Kamuren	4	14	20	11	9	15
38	Marigat	13/12/2012	Kimoriot A	45	Sandra Sirma	5	15	20	11	9	9
39	Marigat	13/12/2012	Kabarak	46	Maganga	6	15	19	10	9	9
40	Churo	13/12/2012	Putero A	15	Dan Nyambaja	1	12	20	10	10	9
41	Churo	13/12/2012	Putero B	16	Ayapar	2	17	19	10	9	9
42	Churo	13/12/2012	Churo	14	Amaya	3	12	19	10	9	9
43	Marigat	14/12/2012	Londiani	47	Maganga	6	12	19	10	9	9
44	Marigat	14/12/2012	Kapkechir	42	Sandra Sirma	5	17	20	10	10	9
45	Marigat	14/12/2012	Melewa	41	Rose Kamuren	4	16	20	10	10	10
46	Churo	14/12/2012	Tebelekwo	13	Dan Nyambaja	1	14	20	10	10	10
47	Churo	14/12/2012	Amaya	17	Ayapar	2	19	20	11	9	9
48	Churo	14/12/2012	Mukekamar	18	Amaya	3	13	20	11	9	9
					TOTALS		**712**	**928**	**474**	**453**	**444**

APPENDIX 3: SUMMARY OF INDICATORS OF MALNUTRITION AND CAUSES OF MALNUTRITION (CONCEPTUAL FRAMEWORK FOR GREATER BARINGO DISTRICT-DEC 2012)

The following table summarises the main indicators used for malnutrition and causes of malnutrition. The indicators and the interpretations are explained in relevant sections of the results and discussion

		Indicators used	Interpretation	Baringo Central/North	East Pokot/Marigat
Malnutrition		Children WHZ <-2SD (GAM)	Poor/Serious	5.1%	12.2%
		Children 11.5-<12.5cm MUAC (GAM)		1.8%	7.5%
		Children WHZ <-3SD (SAM)	Moderate	0.7%	1.2%
		Children <11.5 cm MUAC (SAM)		0.3%	1.2%
		Global Underweight	High	18.1%	21.6%
		Severe Underweight		3.3%	4.5%
		Global Stunting	High	34.3%	25.5%
		Severe Stunting		11.5%	6.8%
		Pregnant/lactating mothers : MUAC <21.0 cm	Satisfactory	0.0%	6.0%
		% Caretakers at-risk of malnutrition: MUAC <23.0cm	Moderate/High	11.7%	23.4%
Immediate causes					
	Food intake				
	Disease	Main composition of diet	Maize, beans, milk, oil, sugar/tea		
		Child milk consumption[59]	Lower due to low milk availability		
		Vaccination Coverage	>80% OPV1;OPV3 & Measles		
		Vitamin A Supplementation	<80%	40.7%	35.7%
		Deworming for 12-59 months	<80%	51.3%	36.6%
		Appropriate diarrhoea management	<50%	56.9%	43.%9
		Appropriate Iron Supplement consumption	≥ 3 months	16.0%	18.0%
		Morbidity-High prevalence of ARIs Malaria and Diarrhoea	High	45.0%	51.6%
		Very High ARI(BCN) and malaria(EPM)		65.9%	42.6%
Underlying causes					
	Current Household Food Security	Relief food distribution -June 2012 BSFP Cycle 5- ended in April 2012	None None		
		Growth Monitoring		26.7%	20.2%
		Milk availability	Lower than past months due to reduced forage		
		Pastoralist Purchasing power Agropastoral- Reduced harvests Urban/mixed farming- Higher food prices	Lower than previous months		
		Income source	Shifted to temporary sources; wealth		

[59] ARLMP DMB June 2012-Milk Consumption

			ranking: Poor (majority)		
		Livestock asset base	**Fair/Good**		
		Inadequate food access	**Moderate but deteriorating as harvest stocks deplete and animals migrate**		
		Main Shocks faced by HH	**Reducing water/food supply as hunger gap approaches**		
		Main Coping strategies used by HH			
	Health/Water/Sanitation	**Access to safe water sources**	**Satisfactory**		
		Access to safe (treated) drinking water		**68.7%**	**17.8%**
		Caretakers hand-washing appropriately		**61.8%**	**60.6%**
		Faecal Disposal	**Poor (Bush) increasing likelihood of water contamination**		
		Disposal of child's waste immediately and hygienically	**Medium/Low**		
		Health services/personnel/drugs	**Some stock-outs** **Inconsistent supplies in KEMSA kits**		
	Social Care Practices	**Use of prelacteals**	**plain/sugar water & 'Sakit'**	**42.4%**	**46.7%**
		Early introduction of complementary foods	**Poor**	**64.9%**	**57.8%**
		Feeding Colostrum to child	**≥ 80% (Satisfactory)**	**96.4%**	**98.9%**
		Timely initiation of breastfeeding	**≤ 80% (Poor)**	**79.0%**	**90.6%**
		Continued breastfeeding at 2 years	**≤ 80% (Poor)**	**88.8%**	**87.2%**
		Exclusive Breastfeeding	**≥ 50% (Satisfactory)**	**27.6%**	**32.1%**
		Introduction to solid and semi-solid foods	**≤ 80% (Poor)**	**97.6%**	**85.9%**
		Minimum dietary diversity	**≤ 80% (Poor)**	**90.9%**	**96.1%**
		Minimum meal frequency	**≤ 80% (Poor)**	**86.2%**	**77.7%**
		Minimum Acceptable diet	**≤ 80% (Poor)**	**87.7%**	**76.4%**
		Consumption of iron-rich foods	**≤ 80% (Poor)**	**19.8%**	**28.0%**
Basic causes					
	Economic social systems	Restricted mobility impacting on seasonal access to water and pasture and access to labour and trade			
		Lack (quantity and quality)of basic infrastructure and services: poor market linkages, increased cost of trade and limited access to functional public health, education and water			

		systems		
	Potential Resources: Technology	Inadequate marketing support for livestock, fisheries and agro-produce. Inadequate business training and micro-finance		
	Organizational Resources	Delayed regional support for appropriate policy and practice Funds are usually not available before a crisis, when mitigation interventions are required.		
		Lack of Livelihoods-based early warning to improve the sensitivity of monitoring systems to hunger and impoverishment (shocks/coping strategies).		
	Potential Resources: People	Increasing constraints to traditional coping, leading to new vulnerable groups emerging and slow implementation of pastoral policy		
		Rural to urban population shifts, concentration and growth: increase of ex-pastoralists engaging in unsustainable livelihoods (charcoal/firewood selling and brewing). Environmental degradation ensues, threatening the viability of natural resource-based livelihoods. Brewing reduces manpower productivity		
		Shifting wealth status impacting on kin support and traditional social support (insurance)		
	Cultural social systems (inadequate/inappropriate knowledge and discriminatory attitudes limit HH access to actual resources)	Restrictive elements of development: illiteracy; negative cultural barriers; low status of women in controlling HH resources: speed of change: low capacity of community to adapt, utilization of new species to enhance dietary diversity		
	Potential Resources: Environment	Declining access to rangelands and Rangeland degradation		
		Human, livestock and crop health risks		
		More extreme climatic variations -Increased frequency of drought reducing resilience of community to shocks: pastoral livelihoods are becoming less sustainable.		
	Political	Insecurity		

APPENDIX 4: QUESTIONNAIRES AND CALENDARS OF EVENTS

QUESTIONNAIRES B(FOOD SECURITY); QUESTIONNAIRE C(ANTHROPOMETRY); QUESTIONNAIRE D (IYCF 6-23MONTHS); QUESTIONNAIRE E(IYCF 0-5MONTHS):

FINAL SMART Questionnaire.xlsx

2012 CoEs.zip