

**Comprehensive
Food Security
and
Vulnerability
Analysis
(CFSVA)
and
Nutrition
Assessment**

**Kenya
High Density
Urban Areas**



**Data collected
in 2010**



Republic of Kenya



Kenya Urban Comprehensive Food Security & Vulnerability Analysis (KU-CFSVA) and Nutrition Assessment (2010)

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FOREWORD / ACKNOWLEDGMENT

The design, planning and implementation of the assessment was being led by the Data and Information Sub-committee of the KFSSG (DISK), chaired by the Government of Kenya (GoK) through James Oduor, the Drought Monitoring Coordinator of the Arid Lands Resource Management Project (ALRMP). The Urban food and nutrition insecurity assessment is being led by Joao Manja (WFP/VAM) assisted by other team members including Nancy Mutunga (FEWS NET), Tadesse Zerihun (FAO/Kenya) and Allan Kute (WFP/VAM). The DISK is indebted to other organizations and individuals who greatly supported the urban assessment process. Among the individuals who contributed to the process included Festus Kiplamai from Kenyatta University, who led nutrition data entry and analysis and Patrick Vinck, who carried out the causality analysis.

ACRONYMS AND ABBREVIATIONS

AIDS:	Acquired Immune Deficiency Syndrome
CDF:	Constituency Development Fund
CFSVA:	Comprehensive Food Security and Vulnerability and Analysis
CP:	Country Programme
CSB:	Corn Soy Blend
DISK:	Data and Information Sub-committee
EA:	Enumeration Area
ECDE:	Early Childhood Development and Education
EFA:	Education for All
FAO:	Food and Agriculture Organization of the United Nations
FCG:	Food Consumption Group
FCS:	Food Consumption Scores
FGD:	Focus Group Discussion
GER:	Gross Enrollment Rate
HDDI:	Household Dietary Diversity Index
HIV:	Human Immunodeficiency Virus
HP:	High Potential
IFAD:	International Fund for Agricultural Development
Kcal:	Kilo Calories
KGs:	Kilograms
KFSSG:	Kenya Food Security Steering Group
Kg:	Kilogram
KIHBS:	Kenya Integrated Housing and Budget Survey
KNBS:	Kenya National Bureau of Statistics
KSHS:	Kenya Shillings
LATF:	Local Authority Trust Fund
Lts:	Litres
LZs:	Livelihood clusters
MoH:	Ministry of Health
MT:	Metric Tone
MUAC:	Middle Upper Arm Circumference
NE:	North Eastern
NGO:	Non Governmental Organizations
NW:	North Western
PPS:	Probability Proportional to Size
SE:	South Eastern
UNDP:	United Nations Development Programme
UNICEF:	United Nations Children's Education Fund
UPE:	Universal Primary Education
VAM:	Vulnerability Assessment and Mapping Unit
WFP:	World Food Programme

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EXECUTIVE SUMMARY

The rapid growth and urbanization of Kenya's population has resulted in a changing poverty and food security environment in high-density urban areas. Urban dwellers represent an increasingly important share of the food insecure and malnourished. Little is known about the characteristics of urban food insecurity and malnutrition, however. The present study: Kenya Urban - Comprehensive Food Security and Vulnerability Analysis (KU-CFSVA) and Nutrition Assessment, was undertaken with the following objectives:

1. Characterize food insecurity, vulnerability and malnutrition patterns in low-income, high-density urban household settings;
2. Identify the main problems and priorities for addressing food insecurity and malnutrition within low-income, high-density urban households;
3. Evaluate on-going response activities and similar interventions, their scale, location, impacts and gaps;
4. Establish a hierarchy of key food security problems within urban high-density households and subsequently develop a response analysis;
5. Evaluate the dynamics of rural-urban migration in low-income, high-density urban areas;
6. Establish a baseline to inform future urban food insecurity and malnutrition monitoring, analysis and reporting, specifically devised for low-income, high-density urban households.

The present report presents the results of mixed method research that took place in 2010 to address these objectives. The research included a series of assessments, including key informant interviews, focus groups, market assessments, questionnaires and most importantly, a survey of 3,900 randomly selected households.

For this survey, households were selected at random to represent the population in high-density urban areas in nine livelihood clusters from across Kenya. In each livelihood cluster, enumeration areas were selected in high-density urban areas. In each enumeration zone, 20 households were randomly approached, either from a household list or by using a random, geographical approach. Interviews were conducted by trained interviewers using a structured questionnaire covering 14 sections related to food security and nutrition.

CONCLUSIONS AND RECOMMENDATIONS

Food insecurity and malnutrition prevail in all high-density urban areas included in the present study, highlighting the urgent need for a specific **food security and nutrition management strategy for urban areas**. In general, households in high-density urban areas of the North Western (NW) Pastoral and North Eastern (NE) Pastoral livelihood clusters were consistently found as performing poorly on a range of indicators. They were on average characterized by:

- Lowest school enrollment;
- Most frequent use of non-durable material for housing;
- Highest crowding index;
- Most frequent use of unimproved sources of water;
- Most frequent use of unimproved sanitation and waste disposal practices;
- Highest proportion of households in the poorest wealth quintile;
- Highest proportion of expenditures devoted to food and among the lowest absolute value of expenditures per capita;
- High proportion of households adopting a "dependents" livelihood strategy (begging, borrowing, remittances);
- Lowest immunization, vitamin A and deworming coverage;
- Most frequent untimely introduction of complementary foods for children;

- Lowest proportion of children meeting minimum dietary diversity;
- Yet, despite those similarities, there were significant differences in terms of livelihood outcomes:
- The NW Pastoral zone had the highest proportion of households with a poor Food Consumption Score (FCS), and the highest average score on the Coping Strategy Index (CSI). This zone also had the highest prevalence of children that were underweight, and a high prevalence of acute and chronic malnutrition;
 - The NE Pastoral zone households did not have, on average, worse food consumption scores than households in other zones. It had the highest prevalence of acute malnutrition, however.

These results suggest that a comprehensive strategy is needed for the two zones, with an emphasis on improving access to improved water and sanitation, poverty alleviation and livelihood /skills training for 'dependent' households. Immunization and care practices must be strengthened with the minimum objective of reaching the level achieved in other high-density urban areas.

While NW and NE Pastoral zones are identified as key priority zones, food insecurity and malnutrition prevailed elsewhere. The following are identified as priority zones:

- The **Coastal Marginal zone** has a high proportion of female-headed households and a higher proportion of households in the poorest wealth quintile compared to male-headed households. Both factors were shown to be associated with a lower FCS. The proportion of households with borderline FCS was among the highest in this zone. The zone also had a high prevalence of chronic malnutrition, underweight children and a high proportion of children affected by the untimely introduction of complementary foods;
- **Nairobi** had a high proportion of households engaged in poor, casual labour livelihood strategies, and few households engaged in food production. Both factors were associated with a lower FCS. Nairobi also had a high proportion of households with a borderline FCS and high rates of chronic malnutrition, highlighting the vulnerability of the population.
- The use of unimproved sources of water was frequent in the **Agro-Pastoral zone**. This zone also had a high proportion of households engaged in a poor casual wage labour livelihood strategies and high levels of acute and chronic malnutrition. Food prices for maize and rice were, on average, among the highest.

Interventions in the three zones cited above should be more targeted than the **comprehensive strategy recommended for the NE and NW Pastoral livelihood clusters**, targeting poverty in the coastal marginal zone, and providing support to poor casual wage labourers in Nairobi and the Agro-Pastoral zones. The sector-specific conclusions and recommendations are presented in the following section.

CONCLUSIONS

Livelihood Strategies and vulnerabilities

- Ten **livelihood profiles** were established based on the relative contribution of various activities to a household's livelihood. The largest groups included:
 - Poor casual wage labourers (25%)
 - Small businessmen / artisans (17%)
 - Private salaried (12%)
 - Non poor casual wage labourers (10%)
 - Public salaried (10%)
 - Petty traders/street vendors (10%)

- The highest proportion of households with a poor or borderline FCS, were found among the poor casual wage labourers and the Dependents (beggars, borrowers, remittances receivers). Poor casual wage labourer household profiles were most frequently found in **Nairobi, Agro-Pastoral, Mixed farming** and **NW Pastoral** livelihood clusters. Dependent households were most frequent in **NE Pastoral** livelihood cluster.
- A **Wealth index** based on asset ownership and housing construction material was used to assess household wealth. The highest proportion of wealth-poor households was found among the Dependents (42%) and the Poor casual labourers (30%). In those two groups, over 50 percent belong to the two poorest wealth quintiles. Across livelihood clusters, the highest proportions of households in the **poorest** quintile were found in the **NW (58%) and NE Pastoral (38%)** livelihood clusters.
- The **crowding index** averaged 3.2 and was highest among households in the **NE and NW Pastoral** zones. The crowding index was negatively associated with wealth and food consumption.
- Households' **expenditures** averaged a total of 16,000 KSH per month, with 48 percent of the expenditures allocated to food. In absolute values, expenditures were lowest in the NW Pastoral zone, and highest in the NE Pastoral zone. Both zones, however, had the highest proportion of expenditures devoted to food purchases (respectively 62% and 65%).
- The **Food Consumption Score (FCS)** was used as a proxy measure of food insecurity. In total, four percent of all the households in high density urban areas reported poor food consumption scores and nine percent reported a borderline FCS. The proportion of households with a **poor or borderline FCS** was highest in the **NW Pastoral** zone, followed by **Nairobi** and the **Coastal Marginal** zones which had a high proportion in the borderline FCS category.
- The **presence of illness** (morbidity) was reported for 20 percent of the population over a two week period prior to the survey. At the bivariate level, presence of illness was negatively associated with wealth and food consumption.
- The use of **coping mechanisms** during the one month period prior to the survey was most frequent in the **NW Pastoral** zone. A high coping Strategy Index (CSI) was negatively associated with food consumption.

Education

- **School enrolment** was high on average, with 95 percent of children aged between 5 and 18 enrolled in school. The proportion of children **not** attending school was highest in the **NE Pastoral** zone. Attendance was lowest among the poorest households.

Urban Agriculture

- **Crop Production.** About one-fifth of households engaged in **agricultural production** (21%), while 16 percent owned some **livestock**. Crop production was least frequent in NE and NW Pastoral zones, as well as Nairobi. Engaging in crop production was positively associated with food consumption.
- **Livestock Production.** Poultry and cattle were the main types of livestock species kept across the livelihood clusters, which implies that they were the species of choice for urban households. The highest livestock numbers (in TLU) was recorded in NE and NW zones, where large stocks are predominant.
- The main livestock products were milk (Mixed Farming and SE Marginal cluster), and eggs (Agro Pastoral zone). Despite low production, livestock products contribute to household food

consumption, to some extent. Constraints to livestock production included parasites and diseases, poor availability of feeds and insecurity or theft.

Water and sanitation

- Improved water sources (taps and boreholes) were accessible to the majority of urban households across livelihood clusters, with the exception of NW and NE Pastoral livelihood clusters. The main factors that restrict access to water include long waiting time at water points and the relatively high cost of water.
- Treatment of drinking water was poor, with nearly half of interviewed households indicating that they did not treat or boil water before consumption.
- Though the majority of households had access to toilet facilities, the number of such facilities vis-à-vis the population is significantly disproportionate. However, in the NE and NW Pastoral zones, a significant number of households do not have access to toilets. As a result, the risk of water-borne disease outbreaks is high, particularly during the rainy season.
- The practice of washing hands, especially with soap, before preparing food or feeding a child and after handling a child's faeces was poor.

Markets and Trade

- The key drivers of urban food insecurity with regard to markets are the high variability of commodity supply to remote markets, the frequent inability of traders to cope with increased demand and the high variability in prices.
- The most traded food commodities in the urban areas are maize meal, milk, sugar, wheat flour, pasta, rice and bread. These commodities are usually sourced locally across the livelihood cluster **except** in NW and NE Pastoral zones where most commodities are sourced outside local areas.
- Market food commodity availability is positively correlated to production seasons. While commodity sales usually peak in April, August and December across the livelihood clusters, traders in **NE and NW Pastoral zones reported inadequate supplies** in January, March and August.
- The study showed that food commodity prices vary greatly between livelihood zones, likely due to supply and demand dynamics. Food prices tended to be higher in Nairobi, Marginal Mixed Farming, NE and NW Pastoral livelihood clusters.
- Over the last two years, the demand for food commodities has either remained the same or declined across all livelihood clusters. Only half of interviewed traders indicated that they would be able to service a 50 percent increase in demand of food commodities. The main constraints to servicing increased demand included: Lack of capital, competitors or taxes; low profits; lack of credit; lack of supply; insecurity and lack of transport.

Health and nutrition

- The rate of **acute malnutrition** was within World Health Organization (WHO) acceptable rates (<5%) in all livelihood clusters with the exception of those in **Pastoral** livelihood clusters. By contrast, **stunting rates** were above WHO acceptable levels (<20%) with the exception of **NE Pastoral**. The high stunting rates may be indicative of the impact of chronic food insecurity and/or repeated infections.
- The prevalence of **child morbidity** was high. Though consultations were made appropriately in public health facilities for most children, they were not timely. An area of concern was the relatively high proportion of mothers/caregivers who sought assistance from shops/kiosks thus endangering the health of their children through self-prescription. About one-fifth of respondents did not seek assistance for sick children because they viewed the illness as mild, which may have

contributed to the lengthy periods of illnesses reported. The utilization of health services was constrained mainly by high costs and geographic inaccessibility.

- **Immunization coverage** was above the WHO recommended acceptable rate of 80 percent for all the antigens in all livelihood clusters, though **lowest in NE Pastoral**. **Vitamin A supplementation** was below the WHO cut-off-point of 80 percent in most livelihood clusters. The frequency of supplementation was adequate with the majority of the children aged 6-11 months old having received the supplement once as per WHO guidelines. **De-worming rates** were **low** with no livelihood cluster meeting the acceptable level of 80 percent.
- Infant and young **child feeding practices** were inappropriate for the majority of children. Many children stopped breastfeeding before the WHO-recommended duration of two years. Exclusive breastfeeding rates were low. Despite the timely introduction of complementary feeding for the majority of children, the frequency of feeding, particularly for children 9-23 months of age, was lower than recommended for many. The same was observed for minimum **dietary diversity** with less than half of children aged 6-23 months having received minimum dietary diversity.
- As is expected, children's morbidity, availability of toilets and socio-economic status of the households were associated with **child nutritional status**. Socio-economic status of households particularly in urban settings is more likely to influence nutritional status because the households' main source of food is purchase compared with rural areas where food is also sourced through own production.
- Informal **child day care centres** are a new concept in urban areas, responding to the needs of working mothers. Although few children are currently attending the centres, the numbers are likely to increase in future. Hygiene standards and the provision of more sleeping and playing facilities need to be improved.
- **Street foods** are fast becoming common in the dietary intake of households in urban informal settlements. They are readily available and relatively cheaper and therefore convenient for many people who have limited income and time to prepare their own meals. The major concern was the unhygienic conditions under which these foods are prepared and stored.
- At the bivariate level, nutrition indicators were associated with child morbidity, sanitation, ownership of specific assets and wealth.

RECOMMENDATIONS

Urban Agriculture

- Undertake a specific, comprehensive survey to evaluate the contribution of urban agriculture to food security in high-density informal settlements. The study should identify the key food security indicators to be monitored.
- The agriculture and livestock sector working group of the KFSSG should effectively participate in the formulation of urban and peri-urban policy on agriculture.

Markets and trade

- Carry out a comprehensive market study for urban high-density areas in order to better understand how the market structure, conduct and performance influences food insecurity in those areas.

- Establish a system for regular price monitoring of the main food commodities (maize meal, milk, sugar, wheat flour, pasta, rice and bread) in high-density urban markets and periodic monitoring of supply and demand indicators.
- Formulate specific interventions to address constraints that prevent traders from meeting effective demand and develop mechanisms for improving supply to remote urban markets.

Health and Nutrition

- Coverage and documentation of vitamin A supplementation and de-worming needs to be improved using child health cards. This is important to prevent unnecessary re-vaccination, reduce the chances of children receiving toxic doses of vitamin A and to facilitate monitoring. Lost cards should be replaced as soon as possible.
- Strategies to reduce morbidity prevalence in children should be put into place and/or up-scaled. These include provision of long-treated insecticide bed-nets to children under-five years of age and pregnant mothers for malaria prevention; and sensitization on the home management of illness symptoms, especially diarrhoea and fever.
- There is need to scale-up the ongoing sensitization and education of community members on the following aspects:
 - Health seeking behaviour of parents for sick children: Health education messages should re-emphasize the importance of seeking medical attention for sick children in a timely manner to avoid lengthening the duration of the illness episode. In addition, the dangers of self-prescription should be emphasized;
 - Optimal breastfeeding practices such as exclusive breastfeeding for 6 months and continued breastfeeding for 2 years.
 - Complementary feeding practices in terms of timely introduction, dietary diversity and frequency of meal consumption.
 - Personal hygiene practices such as hand washing with soap after visiting the latrine, before preparing food and before feeding children and after handling a child's faeces.
- Government guidelines for minimum conditions for the operation of child day care centres are needed. The centres should be required to register with a government body before opening and a system of supervision initiated to monitor activities.
- Street food vendors should be issued with licenses by the local authorities and should be regularly inspected to ensure appropriate hygiene standards are maintained. In addition, the food handlers should undergo medical tests and be declared fit to handle food before engaging in this industry. Sanitation should be improved and water availability assured.
- **Recommendations for monitoring indicators.** WFP should initiate a health and nutrition information database on the health and nutritional situation in urban areas and on the factors associated with the nutritional status of children. The following indicators are suggested for monitoring programme activities:
 - Growth monitoring promotion for children under-five: weight-for-age, height-for-age and MUAC;
 - Morbidity rates in children; diarrheal diseases, malaria, measles, parasitic infections, fever and acute respiratory infections;
 - Health service coverage; immunization, vitamin A supplementation and de-worming;
 - Maternal ante-natal and post-natal attendance; coverage of iron/folate supplementation for pregnant women; rate of health facility delivery; and, rate of vitamin A supplementation for lactating women;
 - Family planning coverage; and,

- Household food dietary diversity and food consumption patterns from results of surveys conducted in the informal settlements.

INTRODUCTION

In most developing countries, urban food and nutrition insecurity has been on the rise, particularly in Sub-Saharan-Africa (SSA) due to the rapid rate of urbanization. Furthermore, the urban populations have been hit hard by the food price crisis as compared with rural populations (von Braun 2008). Kenya is no exception. Currently, the urban population is more than eight times higher than the estimated 1.6 million in 1963 and represents 35 percent of the nation's population compared to only 7 percent in 1963 (KIHBS, 2005).

It is estimated that by 2020, about half of the population will live in cities and urban centres including unplanned urban settlements. The rapid urbanization poses new challenges to achieving food security. Recent studies suggest that the urban population is disproportionately affected by poverty and food insecurity compared to its rural counterpart. Furthermore, the situation is expected to have worsened following the recent global food price crisis that adversely affected net food buying households in both urban and rural areas alike.¹

Up to the present, most food security analyses in Kenya have focused on rural areas. In 2008, the Kenya Food Security Steering Group (KFFSG) conducted an assessment on food insecurity and nutritional vulnerability in the urban areas of Nairobi and Mombasa. The report showed that vulnerability to food insecurity exists in urban and peri-urban areas in various forms. Several explanations were given for urban food insecurity. These included: Income poverty; the need to allocate resources to non-food expenditures (e.g. rent); the high cost of food reflecting transportation costs; the volatility of food and non-food prices; social isolation; and, lack of safety net and coping strategies. The characteristics of urban food insecurity outside these two main cities remained largely unknown.

Against this context of rapid urbanization and deepening urban poverty and food insecurity in urban areas, it was decided to undertake the present Kenya Urban Comprehensive Food Security and Vulnerability Assessment (KU-CFSVA) and Nutrition Survey to measure the extent, depth, and underlying causes of food insecurity, vulnerability and malnutrition. This study was undertaken under the auspices of the Kenya Food Security Steering Group (KFFSG). This report presents the results from the assessment conducted in August and September 2010.

OBJECTIVES

The objective of the KU-CFSVA was to analyze the food security, nutritional status and vulnerability of the urban population of Kenya, to provide baseline information to the policy-makers and practitioners, and to identify interventions. For the purpose of this study, high-density, low-income urban areas only were considered.² The specific objectives were to:

1. Characterize food insecurity, vulnerability, and malnutrition patterns in the low-income, high-density urban household settings.
2. Identify the main problems and priorities for addressing food insecurity and malnutrition within the low-income, high-density urban households;
3. Evaluate the on-going response activities and similar interventions, their scale, location, impacts and gaps;
4. Establish a hierarchy of key food security problems within urban high-density, low-income households and subsequently develop a response analysis;
5. Evaluate the dynamics of rural-urban migration in low-income, high-density, urban areas;

¹ KFFSG (2008). The Impact of Rising Food Prices on Disparate Livelihood Groups in Kenya. <http://www.kenyafoodsecurity.org>

² Low density urban areas who do not share the usual characteristics of urban areas were eliminated from the sample universe. See the method section.

6. Establish a baseline that will inform future urban food insecurity and malnutrition monitoring, analysis and reporting specifically devised for the low-income, high-density, urban households.

CONCEPTUAL FRAMEWORK

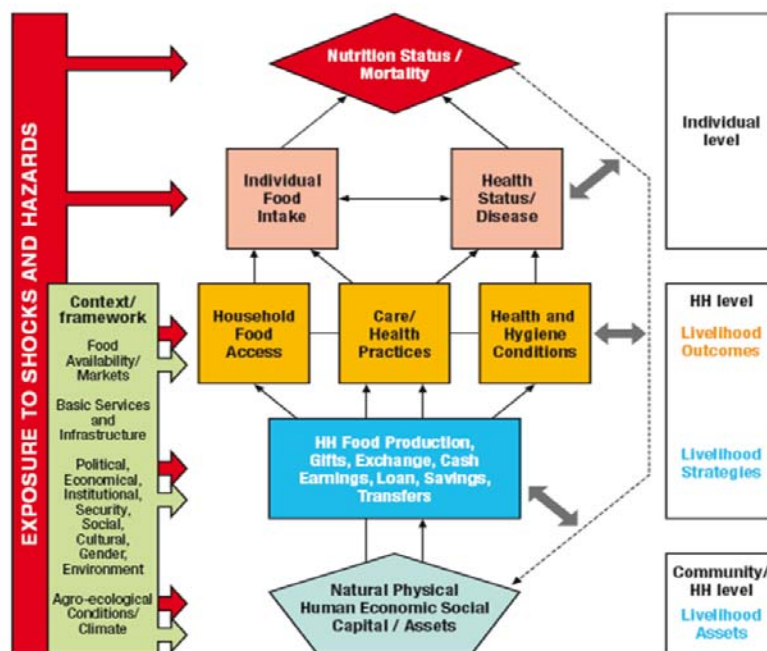
This study adopted the food and nutrition assessment framework proposed by WFP in 2008.³ The framework elaborates on the linkages between the three key food security pillars:

1. Food availability: the amount of food physically available to a household (micro level) or in the area of concern (macro) through all forms of domestic production, commercial imports, reserves and food aid;
2. Food access: the physical (e.g. road network, market) and economical (e.g. own production, exchange, purchase) ability of a household to acquire adequate amounts of food; and
3. Food utilization: the intra-household use of the accessible food and the individual's ability to absorb and use nutrients (e.g., function of health status).

The three pillars are rooted in various forms of assets or capital available to the household, including human, social, natural, physical and financial resources. How a household may employ those various assets define its livelihood strategy.

The report follows the same framework, starting with an analysis of the various forms of capital. It is followed by a discussion of the livelihood strategies adopted by the urban households, and an analysis of key livelihood outcomes, including food security and nutrition (Figure 1). Finally, underlying causes of both food insecurity and malnutrition are examined.

Figure 1: Food and Nutrition Security Conceptual Framework



Source: WFP

³ SOURCE

METHODOLOGY

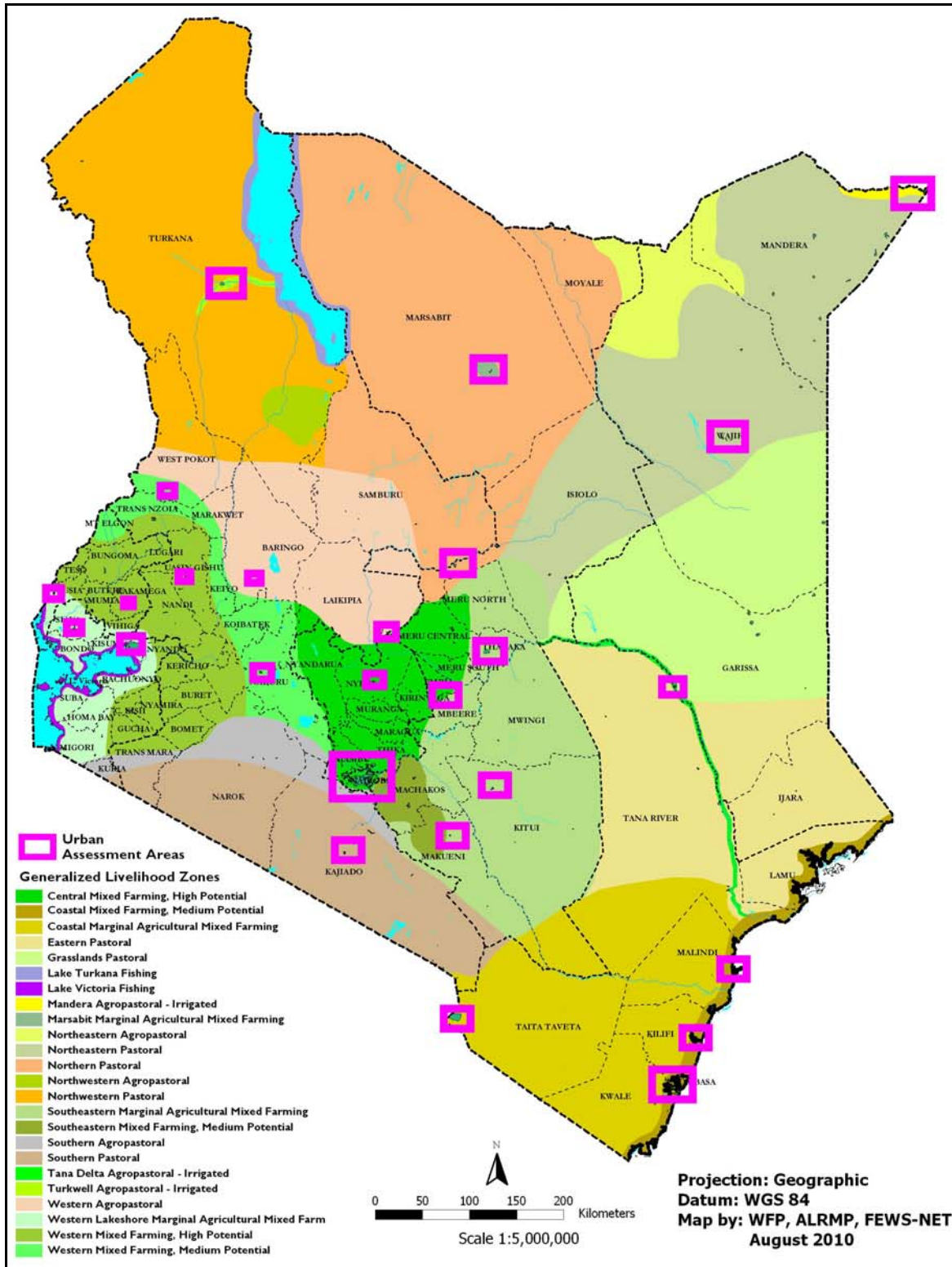
The report presents the results of a cross-sectional study conducted in August and September 2010. The analysis is informed by findings from a multiple methods approach, including key informant interviews, market surveys and a community-based questionnaire. It relies most heavily on the results of a large population survey of 3,900 households randomly selected in high-density urban areas. The survey method is described in this section.

Stratification

The urban population is frequently classified as one homogeneous group despite existing differences between populations of different cities and towns such as location, market specialization and proximity to a specific peri-urban and urban border. In order to provide a sub-national level assessment of urban populations it was decided to adopt the rural livelihoods surrounding urban settlements as the basis for the stratification of urban areas.

Nine livelihood clusters were identified for this assessment: (1) Nairobi as a stand alone livelihood cluster zone, (2) towns within Pastoral NW, (3) towns within Pastoral NE, (4) Agro-Pastoral (semi-arid) towns, (5) Towns within the South Eastern Marginal Agricultural zone, (6) Towns within the high potential Mixed farming zone (7) Towns within the high potential Dairy and Cereal zone (8) Towns within the Coast Marginal Agricultural zone and (9) Towns within the Mixed Farming Marginal zone. Figure 2 shows the specific towns that were identified for the study.

Figure 2: Kenya generalized zones and assessment towns



Source: KFSSG

Sample size

The sample size was computed using a proportion measurement formula. The selected variable to compute the sample size was the prevalence of malnutrition. Pre-study estimates of stunting at the livelihood cluster level were used, with a 0.05 significance criterion. The result provided an estimate of the number of children under-five to sample. To determine the number of households to be selected, a factor of 1.5 children per household was used, based on existing estimates of the average number of children under-five in urban households. The resulting household sample size was adjusted for a 10% non-response rate, reflecting past surveys conducted in Kenya. The sample size was also adjusted for a design effect of two for Nairobi, and 1.5 elsewhere, reflecting the complex sample approach. The difference in design effect reflected the fact that Nairobi is a more heterogeneous urban area than others. Using these parameters, the final sample size was estimated at 5,180 under-fives selected from 3,900 households (Table 1). Twenty percent of this sample was selected to participate in a detailed 24-hours recall interview.

Table 1: Required sample size for 24-hours recall interviews

Livelihood Clusters	Pre-study stunting prevalence	Required sample size for children (6-59 months)	Number of Household interviews required	Number of 24-hr recall interviews required (4 per cluster)	Number of Clusters/EAs in sample
Agro Pastoral	42.4	563	420	84	21
S.E Marginal	56.1	568	420	84	21
Coast Marginal	41.9	561	420	84	21
Pastoral N.W.	32.9	509	380	76	19
Pastoral N.E.	44.4	569	420	84	21
Mixed Farming H.P	39.1	549	400	80	20
Mixed Farming Cereal & Dairy	42.9	565	420	84	21
Marginal Mixed Farming	53.7	573	420	84	21
Nairobi	37.9	723	600	120	30
Total		5,180	3,900	780	195

Sampling Strategy

A multistage sampling procedure was adopted to randomly select the 3,900 households for interview throughout Kenya's urban areas. At the first stage, clusters or enumeration areas (EAs) were selected. At the second stage, households were randomly selected. Within each selected household, all the eligible children aged 6-59 months old were selected for the nutritional assessment.

- Stage 1:** In each strata or livelihood cluster, EAs were randomly selected from a list of all urban EAs using a systematic sampling proportionate to population size method. The number of EAs to select in each stratum was based on a planned 20 household interviews per EA, resulting in a total of 195 EAs. EAs that had a population density below the 20th percentile of population density were excluded to preclude areas that do not share the typical characteristics of the rest of the urban areas. The sample is therefore limited to high density urban areas.⁴
- Stage 2:** Two approaches were used to randomly select households within each EA. Where a comprehensive list of households was available, a simple random selection procedure was used. When such lists were not available, the EPI method was used. Interviewers moved to the mid-point of the settlement and randomly choose a direction and then randomly picked a start between one and the sampling interval. Thereafter, they would walk in this direction selecting every sampling interval household until a total sample of 20 was achieved for the EA.⁵

⁴ In some instances, EAs could not be uniquely identified when they had all been named after that settlement. When this occurred, boundaries and size of EAs were sketched and the EA to be assessed was then randomly selected.

⁵ The Sampling interval was obtained by dividing the estimated number of households in the EA by the sample takes of 20 households. The estimated number of households was obtained using a canvassing plus area segmentation using existing maps or sketch maps.

Instruments

The assessment used a combination of primary and secondary data along with expert opinion interviews. Several instruments were used, covering a wide range of information. The instruments that were used included the following:

- **Household survey:** Information on identification, demographics and education, health and care practice, migration and displacement, food consumption, formal food aid and other support programs, food shortage and coping strategies, food expenditures, non-food expenditures, main sources of income, urban agriculture, crop and livestock production, constraints to crop and livestock production, housing characteristics and assets, water consumption and sanitation.
- **Children’s health and nutrition assessment:** Conducted among all children in the households selected for survey. The assessment includes: identification and anthropometrics, immunization coverage and feeding patterns.
- **24 hours recall interview:** Detailed food intake assessment among a subsample of the household survey.
- **Discussion guidelines and questionnaire:** Focus groups and key informant discussion on health and nutrition.
- **Institution profiling questionnaire:** Covering activities, targeting, challenges and opportunities, future plans and vision, perception and self-evaluation and coordination.

Tools were developed by experts on food security and nutrition and built on KFSSG's previous field experiences. A detailed outline of key measurements is provided in the annex.

Data Collection and Analysis

Data was collected over a nine-week period from August 28, 2010 to September 10, 2010. The data was subsequently entered into a database for analysis. Adjustment weights were computed to provide results representative at country level. The household probability of selection is equal to the product of a household’s probability of being selected in a ZD by the probability of the ZD of being sampled. The inverse of this probability is the design weight. The design weight is divided by the product of the total number of households in the population divided by the number of sampled households. The result is a normalized weight factor which was used in all analyses. Table 2 shows the completion rate of the interviews, which indicates high achievement.

Table 2: Interviews completion rate

Livelihood Clusters	Sample target	Interview results			
		Completed	Incomplete	Did not participate	TOTAL
Agro Pastoral	420	405	11	4	420
S.E Marginal	420	477	3	0	480
Coast Marginal	420	413	7	0	420
NW Pastoral	380	376	3	1	380
NE Pastoral	420	406	12	2	420
Mixed Farming H. P	400	476	2	2	480
Mixed Farming & Dairy	420	413	5	2	420
Marginal Mixed Farming	420	348	68	4	420
Nairobi	600	457	3	0	460
Total	3,900	3,771 (96.7%)	114 (2.9%)	15 (0.4%)	3900

Limitations

All possible steps were taken to ensure that the results accurately represent the food security context and situation in high-density urban areas of Kenya. However, some limitations must be acknowledged;

- The results represent the geography and timing of the survey. High-density, low-income, urban locations only were included in the sample. The results therefore do not represent the rural population of Kenya, or the population as a whole.
- Results are representative at the livelihood cluster level (9 strata); therefore reliable estimates cannot be produced for individual high-density urban areas, except Nairobi which was an independent stratum.
- The survey took place between August and October 2010, representing a snapshot of the food security for that period. For some locations, this coincided with Ramadhan, (the Islamic fasting period) which may have had an impact on household food consumption.
- Inaccurate recall and quantitative estimates may affect the validity of the findings. The enumerators were trained to facilitate such recall and to collect accurate anthropometric data. It is possible that expectations for ulterior benefits influenced the results. Respondents were clearly informed, however, that no benefit was to be expected and that the interview was anonymous.
- This study was based on a single 24-hour recall which does not accurately show usual food consumption. Sample size for analyzing 24-hour recall was limited to 20 percent of the households and was therefore too small to disaggregate by livelihood clusters. The 24-hour recall analysis was done by household (per capita) and not by individual, which limits interpretation.
- The questionnaires were developed in English and administered in English. Careful training was conducted to reduce individual variations on how enumerators interpreted the questionnaire and understood the questions.
- Food security and vulnerability are complex concepts to measure. This report focuses on food consumption as a proxy measure of food security. The measure has the advantage to be reproducible and comparable over time and location.

HUMAN AND SOCIAL CAPITAL

Human capital is the productive wealth embodied in labour, skills and knowledge.⁶ At the household level, demographic characteristics, such as household size, age composition and education levels reflect human capital. Human capital directly influences livelihood choices and outcomes, including food security. This section discusses findings of the KU-CFSVA on human capital, as well as elements of social capital, the norms and social relations from which a household can draw to support its livelihood.

DEMOGRAPHICS

Urban population trends

The present study was undertaken to examine food insecurity, vulnerability, and malnutrition in Kenyan urban areas.⁷ Over the last four decades, Kenya has experienced rapid population growth and urbanization. From an estimated 10.9 million inhabitants in 1969, the population boomed to 38.6 million by 2009. Between 1999 and 2009 alone, Kenya added 9.9 million individuals to its population, resulting in an average growth rate of 3.4 percent⁸- higher than the average population growth rate for Sub-Saharan Africa (2.3%).

Estimates of the urban population as a proportion of the overall population vary, with the latest census (2009) establishing the rate at 32 percent of the total population. Other sources put the proportion of urban population anywhere between 22 percent (UNFPA) to 41 percent. The range of value may reflect differences in definition of urban areas. What all sources agree on, however, is the rapid rate of urbanization, estimated at five percent, which is faster than the population growth, resulting in rapid urbanization. According to the Government of Kenya, the proportion of Kenyans living in urban centres increased from about 5.1 percent in 1948 to 15.1 percent in 1979, 18 percent in 1989 and 34.8 percent in 2000. By 2001, there were about 194 urban centres in Kenya, with 45 percent of the urban population residing in Nairobi alone (GoK, 1989, 1996, 2001). In 2005, the urban population was estimated at more than eight times the estimated 1.6 million in 1963.

Kenya's rapid urbanization reflects a more general trend in Africa. It is estimated that by 2025, more than half of the African population will be urban, and during the next quarter century the urban population will be growing almost twice as fast as the general population, increasing by more than half a billion from 1990s levels. By 2020, Africa will have 11 mega-cities (5 million inhabitants or more) and almost 3,000 cities with populations of more than 20,000, an increase of almost 300 percent from 1990. As population growth and urban population growth have outpaced economic growth, Kenya and Sub-Saharan Africa are confronted with the challenge of addressing the need of a growing population that is increasingly vulnerable to poverty, food insecurity, and malnutrition.

Urban population demographics

According to the 2010 KU-CFSVA, the urban population is equally distributed between male (50%) and female (50%), with one in five urban residents aged five years old or less (21.5%), and nearly half aged

⁶ OECD definition, <http://stats.oecd.org/glossary>, accessed May 15, 2011

⁷ Urban centres are regarded as towns with a population of 2,000 or more inhabitants. See Olima, W.H.A. 2001: Community Participation in Urban Development Planning in Kenya in Guenter Kroes and Jonas Yaw Kokor (eds.), Community Development in Sub-Saharan Africa, Spring Research Series No. 31, Dortmund, Germany.

⁸ Computed using Kenya census data. Other sources estimate the population growth rate between 2.6% and 3.4%.

14 years old or less (45.4%). In other words, the urban population is, on average, relatively young, with an average age of 23 years. According to the census data, youths aged 14 or less represent 43 percent of the total population, which suggests that the low income, high-density urban population is not, on average, significantly younger than the overall population. Overall, the results are consistent with data from the 2009 national housing and population census as table 3 shows.

Table 3: Age distribution of household members

	0-2 year	3-5 years	6-14 years	15-59 years	60+ years
Male (50% of total)	14%	9%	25%	49%	2%
Female (50% of total)	11%	9%	23%	55%	3%
Kenya (Urban)	13%	9%	24%	52%	3%

Considering those aged below 14 and above 60 as dependents, the KU-CFSVA suggests a dependency ratio of 104 percent, in other words, about one productive adult for every dependent. Most of the dependents are school-age children. The high dependency ratio, reflecting the youth of the population, indicates vulnerabilities associated with the limited availability of labour, skills and knowledge to care for the dependents. As a result, the household ability to cope with illness or disability and other emergencies may be affected. The dependency ratio was highest in the Mixed Farming (120%), NE Pastoral (118%) and NW Pastoral (134%) livelihood clusters.

The gender ratio found among the interviewed household members was 50:50, consistent with the 2009 national housing and population census that reported the proportion of men to women to be 51 to 49 percent (KNHBS, 2010). In addition to household composition, the KU-CFSVA showed that the average size of the household was five individuals with a range of four persons in Nairobi and the South Eastern (SE) Marginal zones, to seven persons in the Coastal and the NE Pastoral livelihood clusters. Over one in four households was headed by a woman (27%), with most female-headed households located in the Coastal Marginal Agriculture zone.

EDUCATION

The Government of Kenya is committed to the provision of quality education and training for all Kenyans in accordance with Kenyan law and international conventions such as the Education for All (EFA) goal, and is developing strategies for moving the country towards the attainment of this goal. Since 2003, the government implements measures to attain universal access to basic education under Free Primary Education (FPE), with the objective of providing every Kenyan with basic quality education and training, including two years of pre-primary, eight years of primary and four years of secondary or technical education.

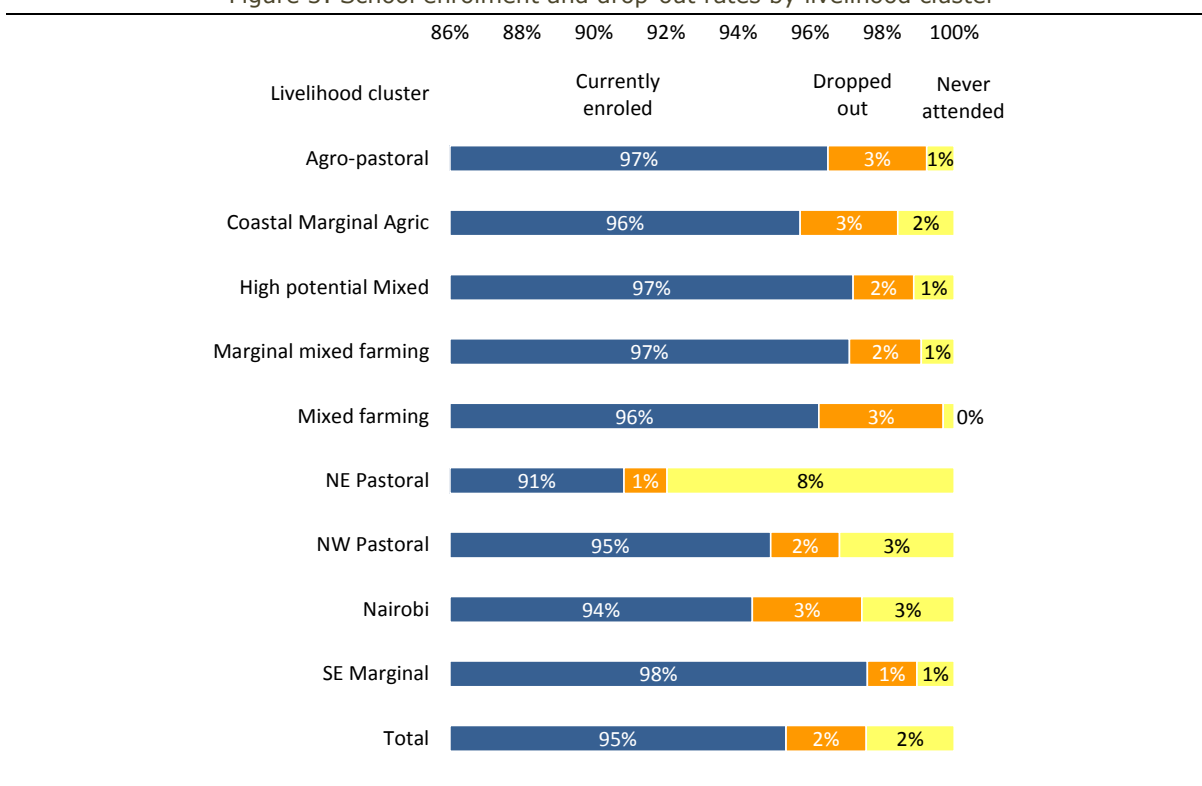
Estimates from Kenya's 2009 Housing and Population Census indicate that over 85 percent of Kenyans aged over 15 years can read and write with over 90 percent of men being literate as compared to 80 percent of women. Illiteracy is more frequent among the poor, particularly poor women who constitute 61 percent of the total illiterate population. Regional disparities also exist in literacy levels among adults, with women in the Coastal and NE clusters reporting literacy levels as low as 38 percent.

School enrollment

The focus of the KU-CFSVA was to assess children's enrolment in school. According to the KU-CFSVA, school enrolment among children between five and 18 years averaged 95 percent. Minor enrolment variations were observed across livelihood clusters with high enrolment among children in the High Potential Mixed Farming livelihood cluster (98%) compared with 91 percent in the NE Pastoral livelihood cluster. Similarly, school dropout rates varied across livelihood clusters, with the highest dropout rates reported in the Mixed Farming zone (3%) and the lowest reported in the High Potential Mixed Farming zone (1%). Importantly, about two percent of all children between five and 18 years in Kenya's urban

areas had never attended school (Figure 3). The proportion of children not attending school ranged from less than one percent in the Mixed Farming zone to eight percent in the NE Pastoral zone.

Figure 3: School enrolment and drop-out rates by livelihood cluster



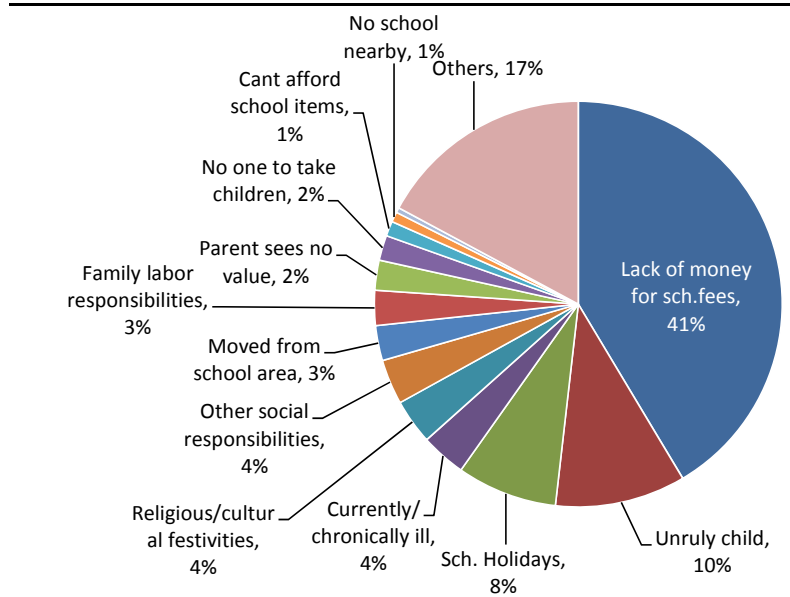
The KU-CFSVA results are consistent with previous studies showing increased enrolment over time, ranging between 88 percent and 99 percent over the 1999-2003 period. While literacy and enrolment show positive trends, more needs to be done to care for those with special education needs, estimated at 10 percent of the total population. Among them, 25 percent are children of school-age. It is estimated that 90 percent of the special needs children remain at home and are not schooled.

School enrolment rates also varied across wealth quintiles. On average, school enrolment among children varied from 90 percent in the poorest quintile to 98 percent in the richest quintile. The finding is probably not surprising considering that richer households are more likely to enroll their children in schools while poorer households might require their children to assist in income generating activities.

School attendance

While high-density urban areas offer good geographic access to schools, a percentage of children were found to have never attended school or had dropped out. The main reason attributed to school non-attendance, as shown in Figure 4 was lack of money for school fees as reported by 41 percent of respondents. While FPE abolished school fees from class one to eight, nursery school still has to be paid for. In most slum areas, parents find it difficult to pay nursery fees. Other reasons why children never attended school included unruly behavior (10%), illness (4%), religious reasons (4%), social responsibilities (4%), migration from school area (3%) and provision of family labour. Though school holidays should not be considered, eight percent of respondents mentioned it as a reason for non-attendance, probably implying school holiday tuition fees.

Figure 4: Reasons for not attending school



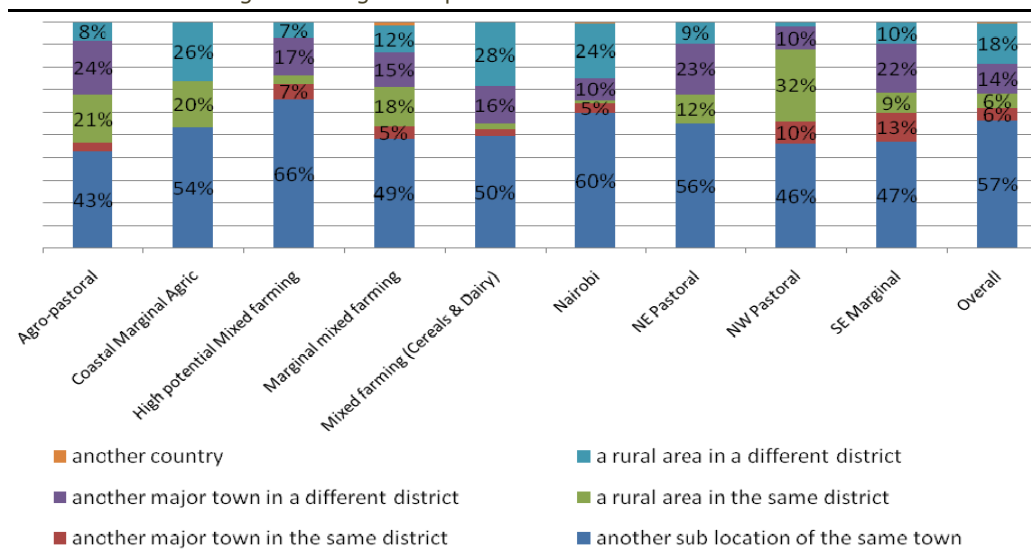
Additional reasons for non-attendance were identified during qualitative interviews including parents keeping children home for help; ignorance; lack of parental discipline, as well as the lack of security within the schools and in some neighborhoods. Food insecurity, poverty, as well as early pregnancy were all reasons frequently mentioned.

MIGRATION

Urban migration

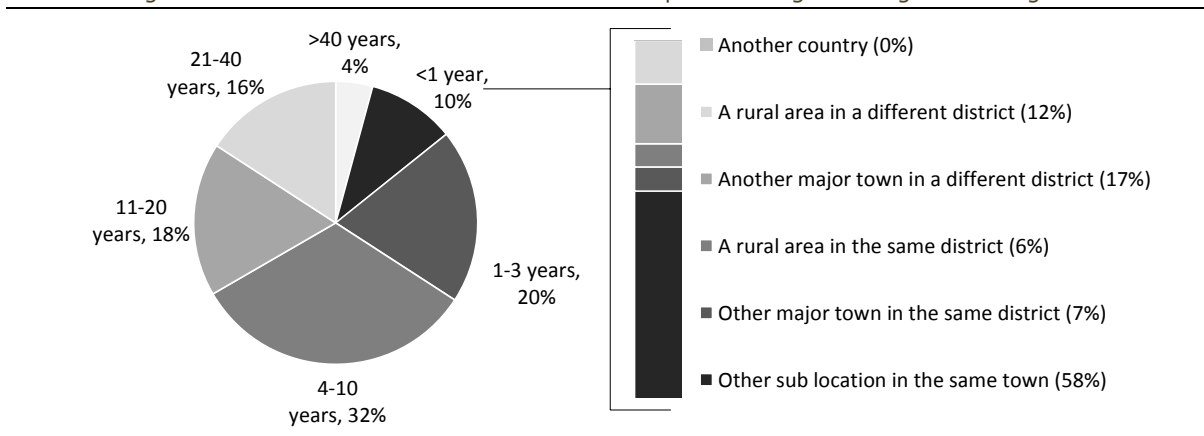
Kenyan population trends show a rapid increase in urbanization suggesting differences in economic development and job opportunities between rural and urban areas. As shown in Figure 5, migration from another sub-location within the same town is high across all livelihood clusters, accounting for 57 percent of all migrants. Urban to urban migration is therefore more prominent as opposed to the perceived rural to urban migration.

Figure 5: Migration patterns across livelihood clusters



According to the KU-CFSVA, 10 percent of households in high-density urban areas had lived in their current location for less than a year, compared to 20 percent, for one to three years; and 32 percent, four to ten years. As represented in Figure 6, households that had moved within the last year mostly came from a location within the same town (58%). In total, 18 percent came from rural areas, either in the same district (6%) or another district from their current location (12%). In other words, 18 percent of the 10 percent that lived in their current location for less than a year were rural-urban migrants, representing approximately 1.8 percent of the high density urban population. The rest, 8.2 percent, were urban-urban migrants.

Figure 6: Years lived in current settlement and place of origin among recent migrants



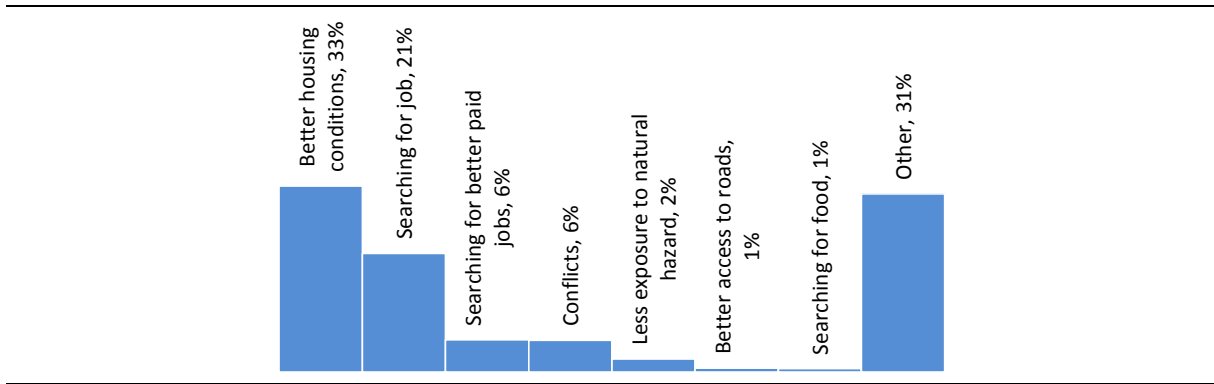
Of the households that migrated within the past year, 76 percent were male-headed households, while 24 percent constituted female-headed households. It emerged from the survey that most of migrant households were headed by persons aged between 25-39 years. The majority of the male-headed households (77%) had also migrated within the past year. The majority (52%) of the female-headed households were aged between 25-39 years as shown in table 4.

Table 4: Characteristics of households that migrated within the past year

	Gender Head of HH	<25 Yrs	25 -39 Yrs	40-59 Yrs	> 60 Yrs
Households that migrated in the past year	male	11%	77%	11%	1%
	female	26%	52%	18%	3%
	Total	15%	71%	13%	1%

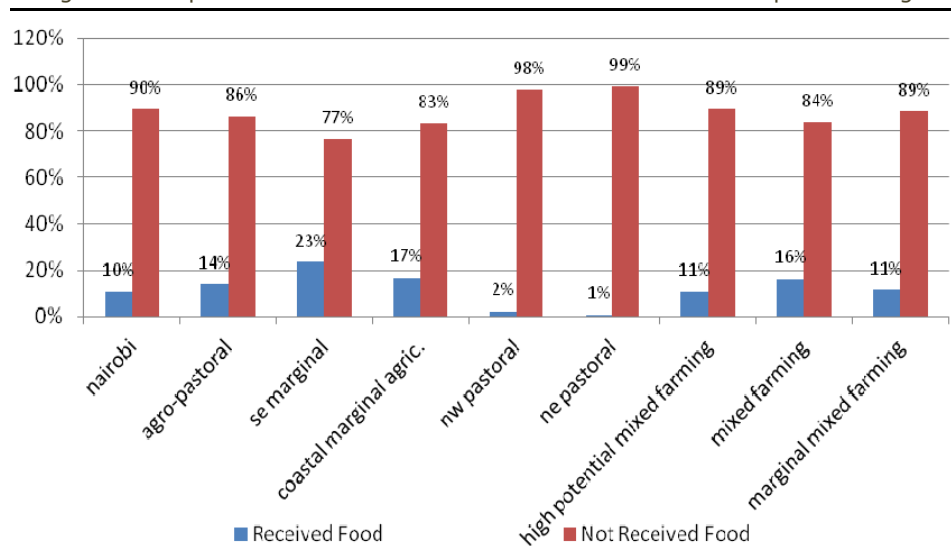
Migrant households identified several reasons for migration with the most significant being the availability of better housing conditions (33%), and opportunities to find work (21%). Other reasons included better paid jobs (6%), forced migration due to conflict (6%) and exposure to natural hazards (2%). Figure 7 shows the different reasons for movement and proportion of households involved.

Figure 7: Reasons for movement



Qualitative interviews conducted for the KU-CFSVA show that urban residents who migrated from rural areas maintain strong linkages with their relatives in rural areas. That relationship is likely to be mutually beneficial, with urban dwellers benefiting from direct access to agricultural commodities and rural dwellers benefiting from transfers (e.g. cash) from urban areas. As figure 8 shows, 10-20 percent of households receive food from their place of origin across livelihood clusters with the exception of NE and NW Pastoral zones, suggesting existing relationships.

Figure 8: Proportion of households that receive food items from place of origin



INSTITUTIONAL SUPPORT

The section on human and social capital focuses on institutional support that may be available to households residing in high-density urban areas. Urban households have the ability to draw on resources and support from a range of governmental and non-governmental organizations, including international organizations and religious groups. To better understand social capital, the 2010 KU-CFSVA included a short assessment of 143 organizations providing services in urban areas.

Types of institutions and concentration

Of the 143 institutions, 46 percent were Non-Governmental Organizations (NGOs) while Governmental Organizations (GOs) and Religious Organizations (ROs) accounted for 22 percent each, with 10 percent being private organizations. Two thirds of these were national organizations and the rest international

organizations. The institutions/organizations are spread in all urban areas across livelihood clusters. The Agro-Pastoral and High Potential Mixed Farming livelihood clusters have the highest organization concentrations of 15.4 and 14.7 percent, respectively. The Marginal Mixed Farming has the least concentration of organizations at 7.7 percent. Concentration of organizations in a particular livelihood cluster is closely associated with the magnitude of food insecurity, particularly organizations involved in food distribution. In addition, it is common for organizations to be concentrated in areas with favorable climatic conditions that may support some agricultural production but experience food insecurity. The concentration of “food distribution organizations” is higher in Nairobi urban areas as compared to average while “agricultural activities” organizations are to be found in the Marginal Mixed Farming and to some extent Coastal Marginal livelihood cluster. Priority interventions for organizations include food (57%), health care (51.4%) and nutrition (48.3%). Water and capacity building are also priorities.

Main activities of institutions

Notably, the focus on food is equally balanced between international and national organizations at 59 and 57 percent, respectively. Among international organizations, 32 percent undertake health activities as the main focus compared to only 10 percent of national organizations. Far less international organizations have “education for children” as a first area of focus (2% against 17% for national organizations) which can be explained by the Government’s efforts to improve education. In most cases, governmental organizations (38%) focus on education in equal weight to food in the areas of operation.

The KU-CFSVA found that a bigger proportion of the organizations in Nairobi (12%) focused on health interventions as shown in table 5. In the Agro-Pastoral cluster the focus was more on education for children (28%) while in the SE Marginal and NE Pastoral clusters, food interventions predominated (40%). In the NW Pastoral and High Potential Mixed Farming livelihood clusters, 50 percent of organizations were engaged in capacity building.

Table 5: Priority activities of institutions by livelihood cluster

Livelihood cluster	Food	Health	Nutrition	Water	Education for Children	Capacity building	Others
Nairobi	11%	12%	0%	0%	11%	0%	0%
Agro Pastoral	15%	19%	0%	0%	28%	0%	0%
SE Marginal	13%	8%	40%	0%	6%	0%	14%
Coast Marginal Agriculture	13%	4%	0%	0%	6%	0%	29%
NW Pastoral	13%	8%	20%	33%	0%	50%	14%
NE Pastoral	12%	12%	40%	0%	0%	0%	0%
Mixed Farming HP	12%	15%	0%	67%	17%	50%	0%
Mixed Farming	4%	15%	0%	0%	28%	0%	0%
Marginal Mixed Farming	6%	8%	0%	0%	6%	0%	43%

The majority of national and international organizations considered food to be one of their priorities and nearly half of organizations (44%) conducted targeted food distributions (e.g. for orphans, HIV/Aids patients etc.). Other activities included agriculture support (21%) including livestock support and support to crop production, small irrigation, sack gardening, seeds and other inputs, greenhouses, horticulture, indigenous crops, soil fertilizers among other crop and livestock husbandry practices.

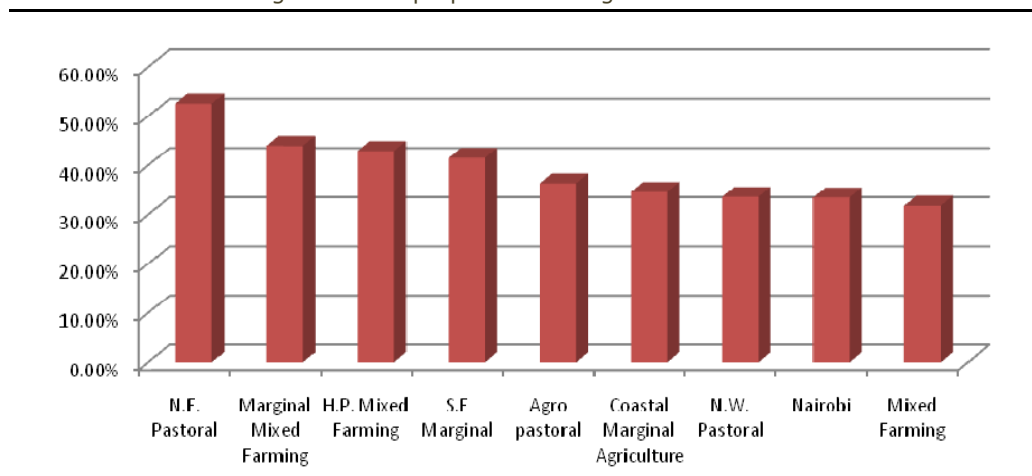
Coordination and targeting

Institutional coordination plays an important role, firstly by ensuring that there is no duplication of activities although this is not uncommon, and secondly, that coordination enhances cross-organizational learning. The KU-CFSVA found that most of the organizations surveyed do not have strong coordination with each other, with collaboration mostly limited to sharing reports (38%) and seldom oriented toward role sharing (11%) or operational coordination in logistics (4%). When considering targeting criteria for food security interventions, most organizations mentioned health status (15%), vulnerability (15%), self-

targeting groups (12%) and orphans (11%) as key target groups. Widows/ single mothers/ pregnant women were also mentioned, albeit less frequently. National organizations tended to focus on orphans more frequently than international organizations.

Half of the institution had changed their targeting because new program phases or projects were created (23%), to capture new categories of beneficiaries (17%) or to increase the number of beneficiaries (14%). Some mentioned an increase in demand for assistance (6%). Despite their notable presence within the different zones, the NE Pastoral zone had the highest proportion of targeted beneficiaries (53%) for interventions in relation to the population in need, followed by Marginal Mixed Farming (44%) and High Potential Mixed Farming livelihood clusters at (43%). Nairobi and the Mixed Farming livelihood cluster had the lowest proportion of beneficiaries at 34 and 32 percent respectively (Figure 9).

Figure 9: The proportion of targeted households



Perception of organizations on food security

Food insecurity was perceived as caused by low income levels, increases in food prices, unfavorable weather conditions and shortage of supply. Low/lack of income was identified by 30.1 percent of organizations as the key driver of food insecurity followed by inadequate food supply (16.5%) and lack of water (12.8%). Inadequate food supply or low availability was attributed to the reliance on rain-fed agriculture while the lack of water was attributed to the lack of infrastructure and awareness of water utilization practices. High market prices were identified by slightly over 17 percent of Agro Pastoral livelihood cluster as a food security concern. While the factors that underlie food insecurity are identified, their importance varies across the zones. For instance, the low income problem is more prevalent in the Coastal Marginal livelihood cluster according to 63 percent of the organizations. In NE Pastoral livelihood cluster, poor quality food or poor food availability were identified as important food security problems.

PHYSICAL CAPITAL

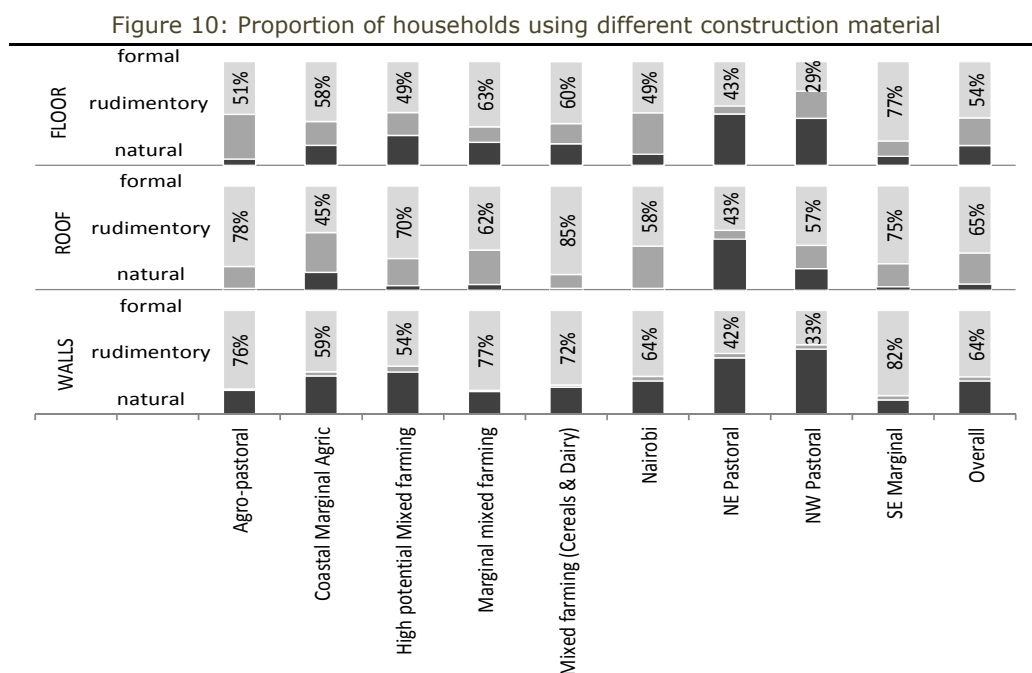
Physical capital refers to housing structures and facilities, quality of water and sanitation and asset ownership (Mills, 1994). The KU-CFSVA included a series of questions to examine living conditions, wealth and expenditures among the population as a proxy measure of poverty. The results are discussed in this section and the following chapter. This section also focuses on access to water and sanitation. Access to other services was not discussed in the survey. Key informant interviews show that unplanned

settlements in most Kenyan urban areas lack access to a proper road network, electricity and telecommunication services, while banking and financial services are limited. In cases where households in informal settlements are connected to the national electricity grid, the connections are illegal.

HOUSING STRUCTURE

Construction material and settlement location

The quality of materials used in a housing structure is a good proxy indicator of respondents' wealth. Based on the durability and quality of materials, three categories were established for the floor, roof, and wall namely; rudimentary, traditional/natural and formal/commercial. Most structures were made of formal/commercial material, across all livelihood clusters. On average, 65 percent of the respondents had the roof, 54 percent of floors and 64 percent of the walls made from formal/ commercial material (Figure 10).



There were some differences in construction materials across livelihood clusters, with the highest proportion of respondents living in housing with natural and/or rudimentary materials found in the NW Pastoral and NE Pastoral livelihood clusters. The use of rudimentary/natural materials in the Pastoral livelihood clusters may reflect a lifestyle that includes an annual/ frequent migration. Nairobi had above average rudimentary housing, possibly explained by high housing costs and the large number of unplanned settlements.

Almost all high-density urban settlements in Kenya are located in what may be referred to as informal settlements. These informal settlements are often located in road and railway reserves, electricity way leaves, pipeline reserves, under fly-overs, on river banks or flood plains and near power plants. The KU-CFSVA found that up to 20 percent of the dwelling places for the urban poor are located on land that has very steep gradients and that are not recommended for human habitation. In addition, 15 percent of the high density settlements are on riverbanks while another 13 percent are settled on garbage dumpsites (See table 6). Up to nine percent of the settlements are located on railway lines, electricity way leaves and pipeline reserves. These households are often exposed to hazards such as fires, vehicle and train accidents, landslides and pollution.

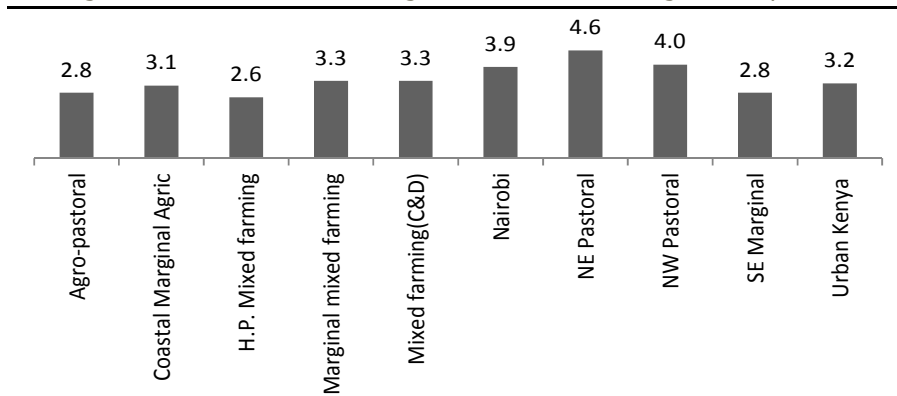
Table 6: Household dwelling location by zone

Livelihood cluster	Steep hill	River bank	Garbage pile	Rail road	Flood plain	Industrial pollution area	Landslide area	NExt to power plant	NEar flyover
Agro-Pastoral	18%	19%	7%	0%	11%	5%	4%	0%	0%
Coastal Marginal Agriculture	9%	2%	4%	5%	9%	6%	2%	0%	0%
High potential Mixed farming	41%	23%	8%	7%	8%	3%	7%	3%	1%
Marginal mixed farming	7%	14%	7%	1%	8%	1%	7%	2%	0%
Mixed farming(Cereals & Dairy)	14%	10%	9%	21%	21%	7%	6%	6%	1%
NE Pastoral	2%	11%	16%	0%	12%	3%	0%	4%	1%
NW Pastoral	22%	2%	4%	0%	7%	0%	7%	2%	0%
Nairobi	16%	18%	22%	14%	7%	3%	1%	0%	1%
SE Marginal	15%	8%	20%	2%	2%	1%	7%	0%	0%

Crowding index

The housing structures are on average small. nearly half (48%) of all the settlements were made of just one room and another 26 percent had just two rooms per household. Since the household size was established during the interview, it is possible to estimate a crowding index as the number of individuals per room. Among Kenya’s high density areas, the crowding index ranged from 2.6 to 4.6, and averaged 3.2, or three individuals per room. As shown in Figure 11, the highest crowding index was found in the NE Pastoral zone where on the average, five people share a room, possibly a reflection of prevailing cultural practices.

Figure 11: Household crowding index in the urban high density areas

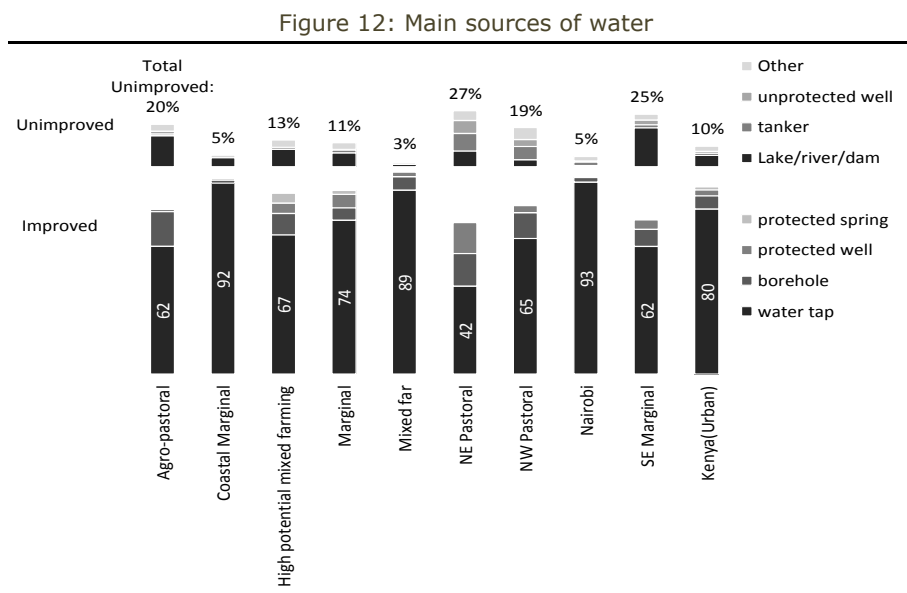


As expected, the crowding index decreases steadily with rising household incomes. A high crowding index of 4.6 was reported for the poorer NE Pastoral zone as opposed to a score of 2.6 in the relatively wealthier High Potential Mixed Farming zone. The high crowding index among households reporting low socioeconomic class, low educational attainment and no previous work experience, is consistent with literature that highlights the intricate association of crowding with conditions of low socioeconomic status in an urban setting.

WATER AND SANITATION

Water Sources

Urban households in Kenya’s high-density settlements have four main uses of water. These include: Human consumption, domestic use, agricultural production and livestock consumption. The major source of water for most urban households is a tap (80 percent). However, boreholes, rivers, protected wells and springs and tankers are also important. Figure 12 shows that about 20 percent of households’ access water from unprotected sources, which has an adverse impact on water quality.



Most tap water in high-density settlements is purchased from water kiosks and vendors since very few households have access to piped water. Within the urban areas, there are huge differences in water access. More than two thirds of poor households rely on water kiosks. The limited number of water kiosks in many settlements means that households still spend a significant amount of time fetching water. An average of 13.2 minutes is spent traveling to and from water sources while waiting time averages about 21.1 minutes.

For the majority of households (72%), tap water is the main source of drinking water. The highest proportion of households (over 80%), obtain drinking water from taps in Coastal Marginal, Mixed Farming Cereal and Dairy (C&D) and Nairobi, while the lowest proportions were in NE Pastoral (42%) and Agro-Pastoral (62%). Less than one-tenth (9%) of households across all livelihoods obtained drinking water from boreholes with the highest proportion (17%) in Agro-Pastoral. Other sources of drinking water for a relatively smaller proportion of households were rivers, protected and unprotected wells and tankers. As a whole, most households obtain drinking water from improved sources.

Sources of water for domestic use

The most common source of water for domestic use was tap water according to 62.3 percent of households across all livelihood clusters. The highest proportion of households (92.23%) obtain water for domestic use from water taps in Nairobi followed by Coastal Marginal (80.1%) while the lowest proportion was from NE Pastoral at 42 percent. Overall, 11.9 percent of households in all livelihood clusters sourced water for domestic use from boreholes, particularly in the Agro-Pastoral zone (20.4%). Rivers were also a common source of water for 8.9 percent of the households from all the livelihood

clusters, particularly in SE Marginal (23.36%) and Agro-Pastoral (21.8%). Other sources of domestic water were protected and unprotected wells, tankers and unprotected springs.

Sources of water for agricultural production

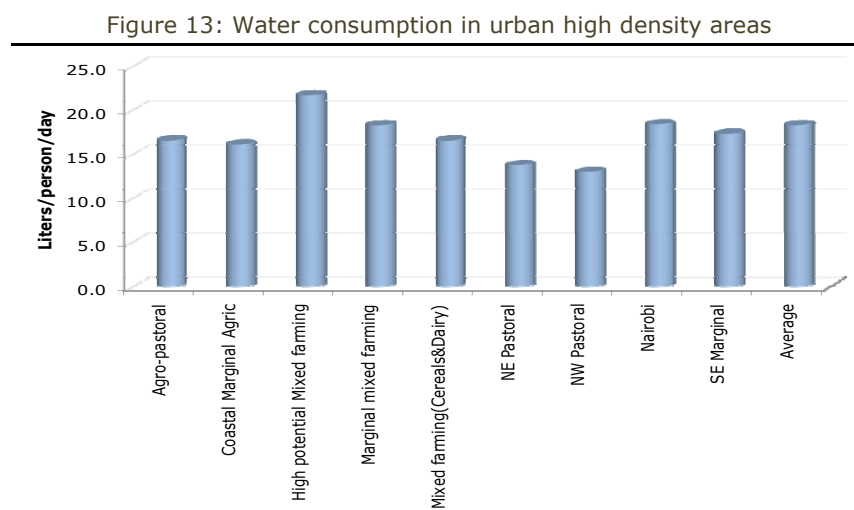
Water for agricultural production was mainly sourced from rivers with the highest proportion of households (11.9%) using rivers located in the Agro Pastoral cluster. Other sources of water were water tap, boreholes and protected/unprotected wells. There were hardly any households in NE Pastoral zone using tap water for agricultural production.

Sources of water for livestock consumption

The most common source of water for livestock production was tap water according to 11.5 percent of households. An analysis by livelihood clusters showed that the highest proportion of households using tap water for animal production was situated in the Agro-Pastoral, SE Marginal or NE Pastoral in equal proportions (17.4%), followed by Coast Marginal (15%) and lastly Marginal Mixed Farming (1.6%). The next most common source of water for livestock production was rivers according to 21.5 and 13.1 percent of households in the Agro-Pastoral and SE Marginal livelihood clusters. Other important sources were boreholes, protected and unprotected wells, though less households used these sources.

Water Consumption

Water consumption has been analyzed based on the four main uses of water in high-density urban areas. On average most household water (64.6 litres) was for domestic use across all livelihood clusters accounting for 42.1 percent of all water used. Other significant water uses were for crops (46.4 litres) and livestock (25.3 litres). The least amount of water used by households was for human consumption (17.1 litres). Highest household water use was recorded in urban areas of NE Pastoral at 185.8 litres while Nairobi had the lowest at 102.5 litres. Overall, water consumption in litres per person per day was above the emergency threshold of 15 litres per person per day with the exception of NE (13.7 litres) and NW Pastoral (13 litres) as figure 13 shows.



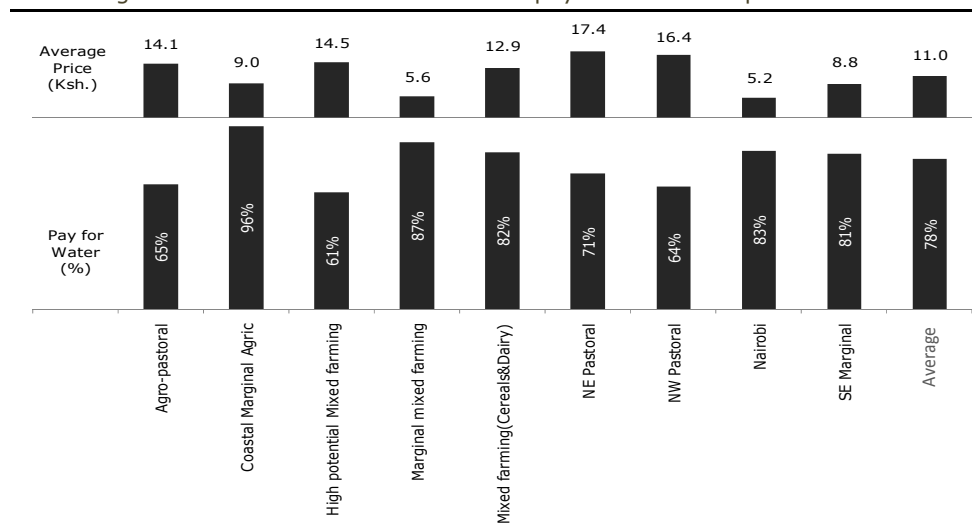
Cost of Water

As outlined above, Kenyan urban households mainly rely on improved sources of water. In most cases, water is purchased at water kiosks and vendors. As figure 14 shows, seventy-eight percent of households across all livelihood clusters pay for water at an average cost of Ksh. 11.0 per 20 litre jerrycan. The price of a jerrycan of water varied from an average of Ksh. 5.2 in Nairobi to Ksh. 17.4 in

NE Pastoral cluster. With average consumption estimated at 18 litre per person per day, the cost of water is a financial burden on urban households.

Supply at water kiosks (a major source) is unreliable and prices vary in times of water shortage and can reach Ksh. 100 per 20 litre jerrycan, (Agro Pastoral, SE Marginal, Coast Marginal, High Potential Mixed Farming and Mixed Farming clusters). On average, people in urban areas obtaining their water from a water kiosk pay two to five times more than the price paid for a direct connection.

Figure 14: Percent of households who pay for water and price of water



Water Quality

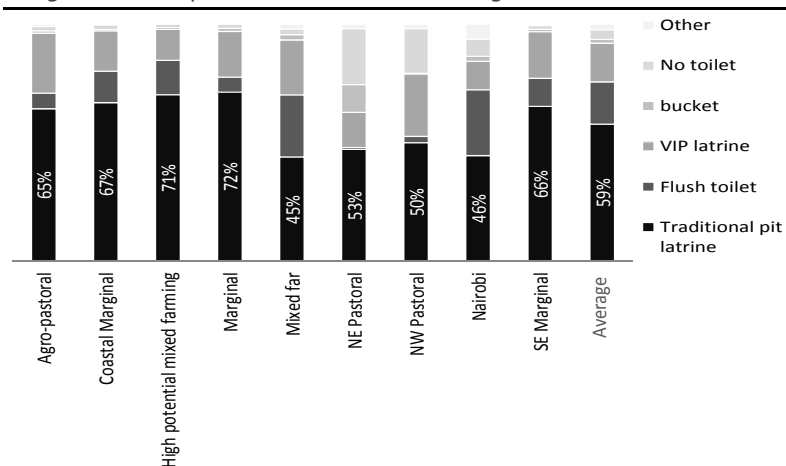
Overall, slightly over half of the households from all the zones treated their drinking water. The NW Pastoral and Coastal Marginal households reported treating their water in only 29.1 percent and 37.8 percent of all households. The most common treatment method employed was chemical use (28.2 percent). About 24.4 percent of households boiled water while the remaining 1.3 percent used other methods. The lowest use of chemicals for the treatment of drinking water (11.7%) was recorded in NW Pastoral. The highest proportion of households that boiled drinking water was recorded in Agro-Pastoral (46.6%) followed by Nairobi (34.8%) and only 5.7 percent in NE Pastoral. Treatment of drinking water should be encouraged to avoid outbreaks of water-borne diseases, particularly those that cause diarrhea.

Sanitation

Access to improved sanitation services in Kenya's urban areas was also examined. Most urban households (92.9%) reported having access to improved sanitation facilities, including 59.5 percent who were using traditional pit latrines, 19.4 percent using improved pit latrines and 12.4 percent using flush toilets as shown in figure 15. About 7.1 percent of household reported that they had no toilet facilities. The proportion of households without toilet facilities was highest in NE Pastoral (26.7%), NW Pastoral (18.8%) and Nairobi (7.4%).

Households living in high-density urban settlements mainly share pit latrines where they exist, and often share them with a large number of individuals due to the lack of facilities. When pit latrines become full, they are closed or demolished and new ones are constructed nearby, or they are emptied manually. It is reportedly not uncommon to see open areas used for excreta disposal, a serious health and water pollution risk.

Figure 15: Proportion of households using different toilet facilities



In addition to the disposal of human waste, the FGD showed that used water (e.g. soiled water from washing) is normally disposed of by throwing it outside the house. Drainage is generally shallow and poorly maintained leading to pools of stagnant water accumulating. Solid waste disposal is a similar problem in unplanned settlements. In most urban areas, solid waste is disposed of in open dumps or crude sanitary landfills and burned, or turned into compost. Garbage collection services are very poor. Most garbage is dumped in the streets, playing fields and in between houses. According to the 1994-1996 Development Plan, Nairobi City Council only collected a quarter of the approximated 340,000 tons of garbage generated in 1992, a situation that is likely to have worsened in subsequent years.

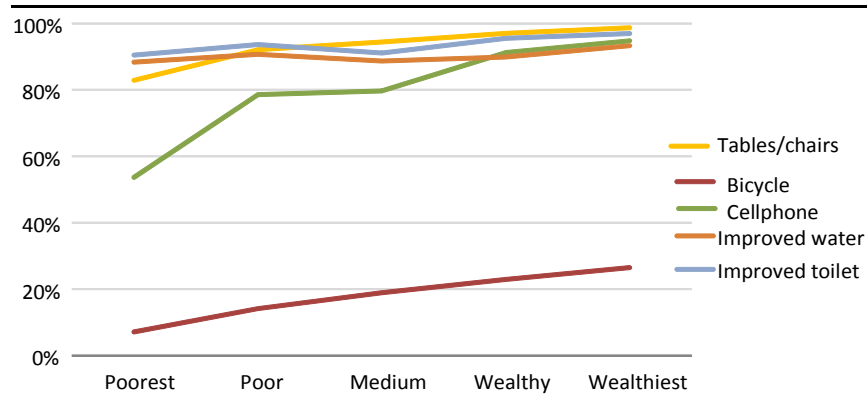
ASSET OWNERSHIP AND WEALTH INDEX

Although poverty in Kenya has largely been perceived as a rural phenomenon, the proportion of the urban poor has been rising steadily. Recent World Bank estimates suggest that by 2020, urban poverty will represent almost half of the total poverty in the country. Research by the United Nations Development Programme further indicates that in Kenya, the Gini coefficient for urban Kenya grew dramatically from 0.47 to 0.58 between the 1980s and 1990s, signaling a significant rise in urban inequality. The KU-CFSVA assessed asset ownership and wealth-related variables as a proxy measure of poverty.

Asset Ownership and Wealth Index

The KU-CFSVA survey asked households if they owned a series of 22 productive and non-productive assets. Figure 16 shows some of the common wealth indicators across livelihoods clusters by wealth group. It is important to note that most households across the wealth divide were in possession of cell phones, tables/chairs and had access to improved water sources.

Figure 16: Wealth indicators in the urban high density areas

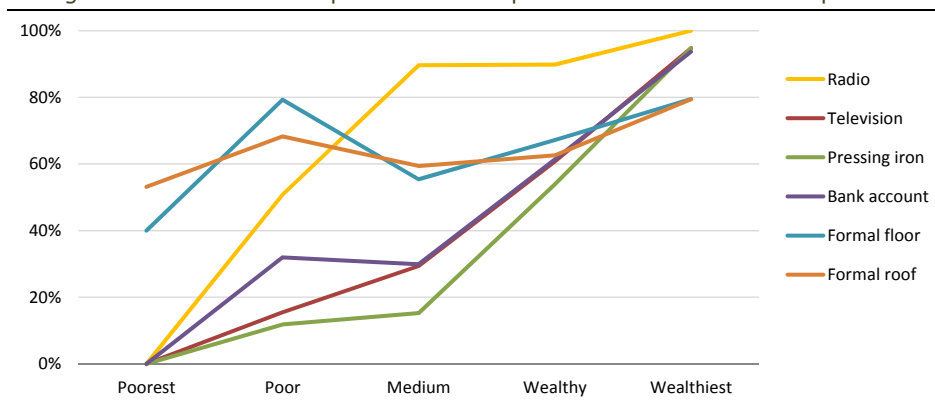


Across the 10 livelihood clusters assessed, the most common assets were household items including a mattress (96%), bed (95%), tables and chairs (93%), mosquito net (74%), a stove (72%), a cupboard (47%), and/or a pressing iron (35%). Cell-phone ownership was also widespread (80%). Radios and televisions were owned by respectively 40% and 67% of urban households. Few households owned transportation means, such as a bicycle (18%), a motorbike (3%) or a vehicle (4%). Other items included agricultural tools (20%) and seeds for planting (8%). In addition to tangible assets, less than half the households reported having a bank account (43%) or cash savings (30%).

Asset ownership varies across livelihood clusters for each asset, making comparisons difficult. To provide a comparative basis, an asset wealth index was computed. After careful screening, the following set of wealth-related variables was used to compute a wealth factor score using Principal Component Analysis (PCA):⁹ roofing material; flooring material; radio and TV ownership; pressing iron ownership; and, personal bank account.

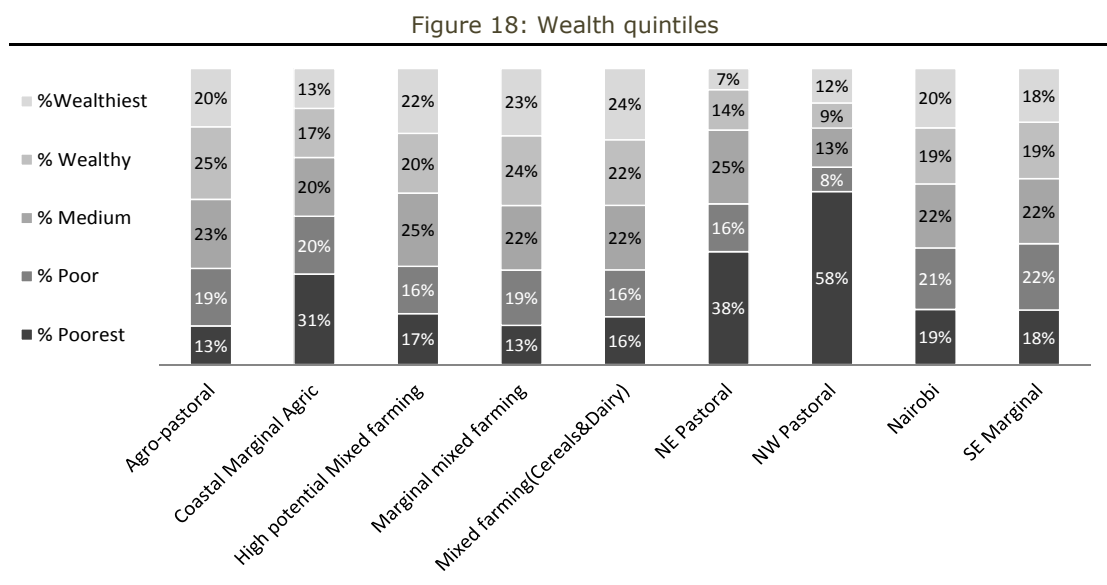
The first factor resulting from the PCA accounted for 30 percent of the original variance. It was selected as the wealth index. To ease interpretation, wealth quintiles were computed, resulting in five categories, ranging from poorest to richest as shown in figure 17. The variables that were selected for the wealth index and the wealth quintile are, by design, associated. All variables showed a progression as wealth increased, including ownership of radio, television, pressing iron and bank account. The relation between the wealth quintile and construction materials (roof and floor) was not linear, but nevertheless suggests a more frequent use of durable materials among the richest category.

Figure 17: Asset wealth quintile and computed wealth indicator components



⁹ Productive assets were excluded from the Wealth Index computation because the ownership of these assets reflects the livelihood activities of households rather than wealth. The variables with a poor contribution (i.e., component loading) were excluded from the final PCA.

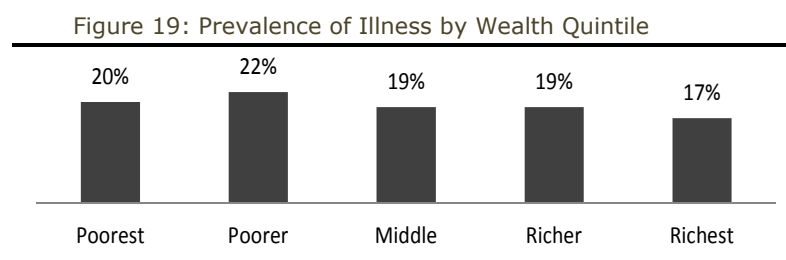
The wealth quintiles distribution shows major differences across livelihood cluster (Figure 18). The highest proportion of households in the poorest wealth quintile was found in the NW Pastoral (58%), NE Pastoral (38%), and Coastal Marginal (31%) clusters. Inversely, the smallest proportions were found in the Marginal Mixed Farming (13%), Agro-Pastoral (13%), Mixed Farming C&D (16%) and High Potential Mixed Farming (17%) clusters.



Other factors associated with wealth

The association between the wealth index and other variables often related to wealth were examined, with the following results:

- The proportion of **female-headed households** decreased with wealth. Among the poorest wealth quintile, 46 percent of households were female-headed, compared to 19 percent among the richest quintile's households. (Pearson $\chi^2 = 144051$, 4 df, $p < 0.01$)
- The proportion of **elderly-headed households** did not have a linear association with wealth. nevertheless, the proportion was highest among the poorest households (14%) and lowest among the two richest quintiles (8%). (Pearson $\chi^2 = 194021$, 4 df, $p < 0.01$)
- In addition, the **prevalence of illness** slightly decreased with wealth (Figure 20).



- Similarly, the use of **improved sources of water** and **improved sanitation** was least frequent in the poorest quintile and most frequent in the richest quintile, although the relationship was not linear.
- The proportion of households with **children who never attended school** is highest among the poorest quintile (6%) compared to two percent or less among all the other groups.

- Although **household size** did not appear to be associated with wealth, the **crowding index** decreased with wealth, suggesting more favorable living conditions regardless of the household size (Table 7). Among the poorest quintile, the crowding index averaged 3.75, compared to 2.53 among the richest quintile. The difference in means between groups was significant (F= 30539, 4 df, p<0.01).

Table 7: Household size and crowding index by wealth group

	Poorest	Poor	Medium	Wealthy	Wealthiest
Household size	5.12	4.95	5.01	5.40	5.08
Crowding index	3.75	3.50	3.27	3.18	2.53

Source: Kenya Urban CFSVA, 2010

- The **price paid for water** (jerrycan of 20l) increased with wealth (Table 8). The poorest households paid an average of Ksh. 9.6 compared to Ksh. 14.7 among the richest household. (F= 11168, 4 df, p<0.01).

Table 8: Price of water in Kenya shilling by wealth group

	Poorest	Poor	Medium	Wealthy	Wealthiest
Price of Water	9.6	9.3	10.1	11.8	14.7

ECONOMIC CAPITAL

The section presents a discussion of urban household's economic capital. Economic capital refers to a household's financial resources, including income, expenses, debts and access to credit.¹⁰ The KU-CFSVA focused on expenditures as a proxy of cash income and economic capital. Markets and trade were also analyzed in this section.

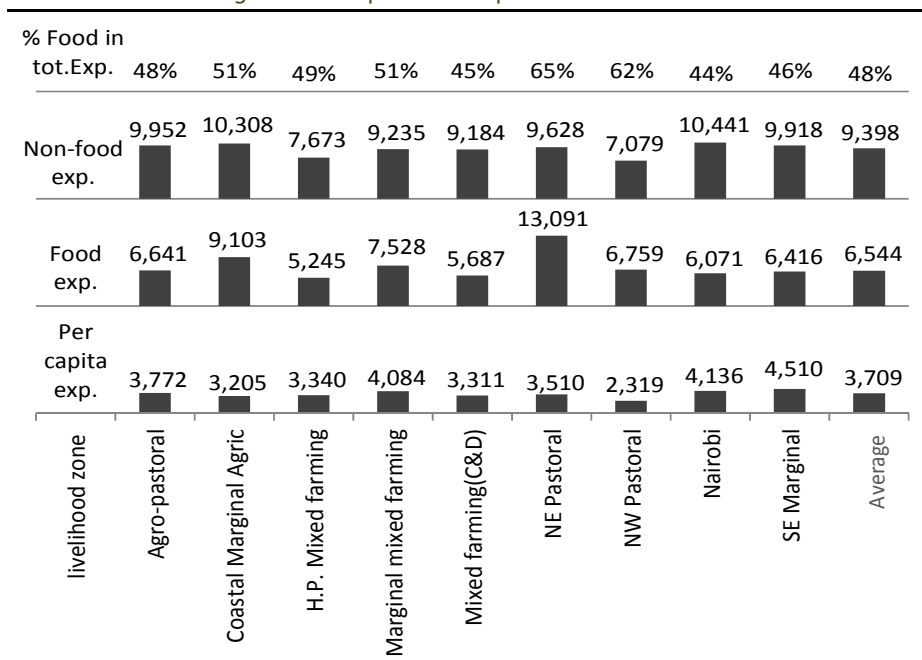
EXPENDITURES

Food and non-Food Expenditures

The KU-CFSVA collected information on cash and credit expenditures at household level for 22 food items and 17 non-food items. Food expenditures and short-term non-food expenditures were collected using a 30 day recall period. Expenditures on an additional 12 non-food items were collected using a six month recall. To standardize reporting, all expenditures were converted to monthly expenditures. Non-food and food expenditures were analyzed per household and per capita to adjust for differences in household size as shown in figure 21. Expenditure quintiles were computed to facilitate comparisons.

¹⁰ Mill, J. S., (1994). Principles of Political Economy. Oxford University Press Inc, New York

Figure 20: Expenditures per livelihood cluster

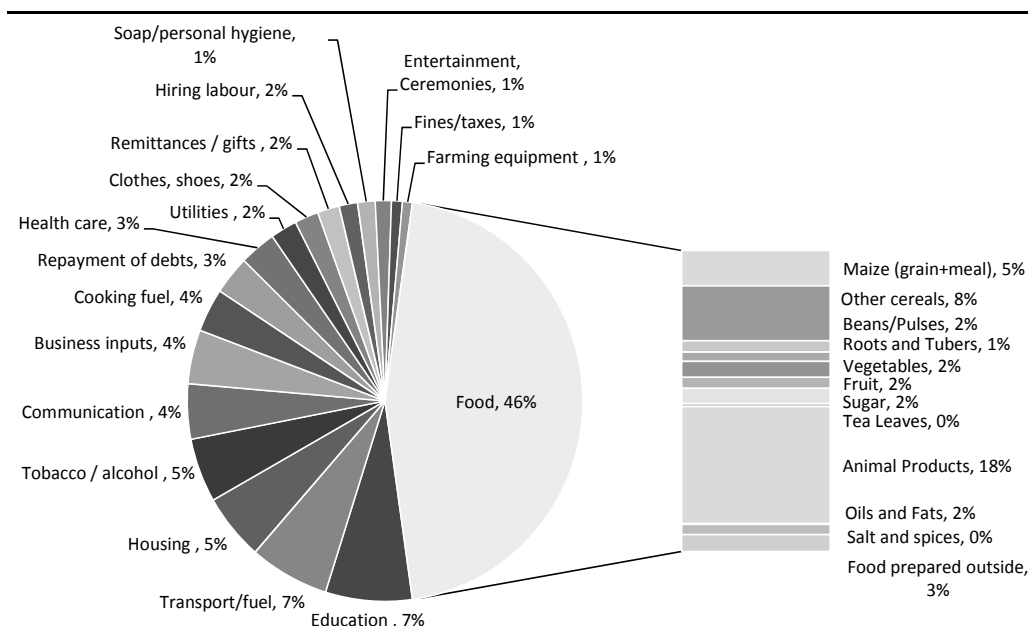


Urban households in Kenya had a mean per capita expenditure per month of Ksh. 3,709 and average food and non-food expenditures of Ksh. 6,544 and 9,398 per month as figure 21 shows. Per capita expenditures were highest amongst households in SE Marginal (Ksh. 4,510) and Nairobi (Ksh. 4,136). The lowest expenditures were reported by households in NW Pastoral (Ksh. 2,319). Overall, households reported that 46 percent of their monthly expenditures were spent on food items. However, there were variations across livelihood clusters with households in Nairobi reporting the lowest proportion of food expenditures (44%) while food represented the highest proportion of the total expenditures in NE and NW Pastoral (about 62% and 65% respectively).

An examination of specific expenditure lines¹¹ shows that there is a wide range of non-food related expenditures, with the main expenses being related to school/education (7%), transportation and fuel (7%), housing (5%), and tobacco/alcohol (5%) as shown in figure 22. Of the food items, maize and other cereals accounted for 13 percent of total expenditures and 28 percent of food expenditures. The largest food-related budget line was associated with animal products, including meat, fish, eggs, and milk, accounting for 18 percent of the total expenditures and 39 percent of the food expenditures.

¹¹ Small differences may appear in the proportion of food and non-food expenditures based on how aggregates are made.

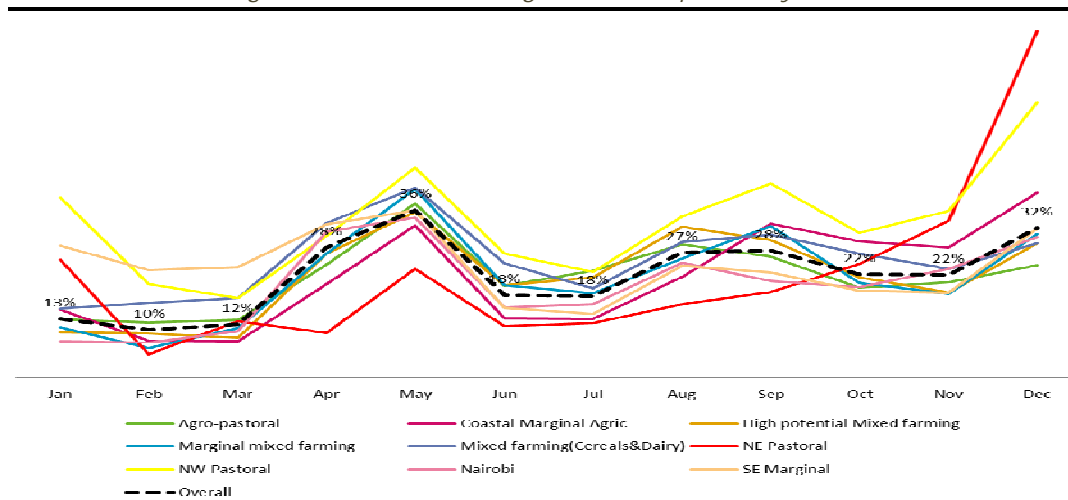
Figure 21: Itemized food and non food expenditures



Seasonality of expenditures

In addition to the item-specific information on expenditures, the KU-CFSVA assessed the time of the year during which households reported having most expenditures.

Figure 22: Months showing the most expenses by livelihood cluster



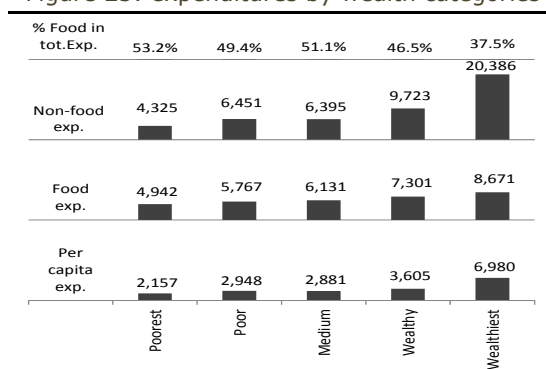
The results in figure 23 suggest three major periods of highest expenditures including the months of April-May, for 28-36 percent of households; August-September, for 27-28 percent of households; and December, for 32 percent of households. The trends for each of the livelihood clusters followed a similar pattern. In rural areas, expenditures typically follow the agricultural calendar. In the urban areas, further research is needed.

Wealth and expenditures

The KU-CFSVA shows that the share of food expenditures in the total household's expenditure decreased as wealth increased, while non-food expenditures increased with increased wealth. The share of food

expenditure for the poorest and richest quintile ranged from 53 percent among the poorest wealth quintile to 38 percent among the richest wealth quintile as shown in figure 24.

Figure 23: expenditures by wealth categories



MARKETS AND TRADE

The section discusses the role markets and trade plays in Kenyan urban household food security. Households spend nearly half (46%) of their resources on food and the proportion is higher among the poorest households (53%). As indicated in the livelihoods section, urban households across all livelihood clusters obtain between 97 and 100 percent of their food exclusively from market purchases.

Trade

The five main food items traded by majority of traders across all zones are maize meal, milk, sugar, wheat flour, pasta, rice and bread. Across all zones, the traders identified at least four major food commodities, with the exception of SE Marginal Agricultural, Coast and High Potential Mixed Farming where only three commodities were identified as important. Table 9 shows the main food commodities traded by retailers and other traders in each livelihood cluster depicting maize meal as the main staple.

Table 9: Main food commodities traded in urban high density areas

Livelihood zone	Most traded food commodity
Coast Marginal Agricultural	Rice, sugar and wheat flour
High Potential Mixed Farming	Maize meal, rice and sugar
NE Pastoral	Maize meal, sugar, wheat flour, pasta and rice
NW Pastoral	Maize meal, rice, sugar and wheat flour
Nairobi	Maize meal, milk, bread, rice and wheat flour
SE Marginal Agricultural	Maize grain

The majority of traders across the livelihood clusters (80%) operate at local level, while about 17 percent operate at national level. Nearly 60 percent of traders source commodities from within their districts, with the exception of NE and NW Pastoral where only 25 and 40 percent of the traded food commodities are sourced locally, probably due to high remoteness and low agricultural production.

While there are numerous traders at local level for all important food commodities across livelihood clusters, the number of traders decreases as one moves up the marketing levels. Indeed only rice appears to have trade spanning from local to international levels, likely due to importation to meet demand because of low domestic production. The majority of traders linked to the import market are situated in NE Pastoral and Agro Pastoral, highlighting the importance of neighboring countries as key sources of important food commodities.

Seasonality of trade

According to the traders, the bulk of commodity supply is normally sourced in January, April, August, November and December every year. However, the critical months for sourcing supply differ greatly by commodity source. For instance, supplies from local farmers follow typical seasonal production trends

across zones while imports and supplies from traders located outside the district are normally important during the lean seasons such as August-September across all livelihood clusters; April and August in the NE Pastoral; June-July in Nairobi; and October-November in NW Pastoral. Cross-border inflows are also an important source of supply in January-March particularly in NE Pastoral; and in September-December, in the Marginal Agricultural zone.

The months of the highest sales are mainly April, August, November and December. April and August are associated with peak lean seasons while there are festivities in November and December. In addition, sales seem to peak during school holidays. Across all the livelihood clusters, and in order of priority, households within local urban centres account for more than 60 percent of sales except in NE Pastoral where households within the district account for 43 percent of sales. In NE Pastoral, traders situated in urban areas also serve numerous satellite markets.

Supply and demand

Nearly 40 percent of traders indicated that in the last two years they faced inadequate supply of main food commodities in some months. The months when shortages were experienced are January to March and in August. The majority of traders (57%) reporting inadequate supply were mainly from NE Pastoral and NW Pastoral zones characterized as geographically remote and poor in infrastructure. Wholesalers and retailers were the most affected type of traders who experienced frequent supply shortages in the two livelihood clusters. The two years (2008 and 2009) were characterized by significant price and production shocks.

According to about 65 percent of traders, demand for food commodities either remained the same or declined in the preceding two years as table 10 shows. Only about 35 percent of traders indicated that demand for food commodities had increased. Significant decreases in food commodity demand (about 35%) were reported in SE and NE Pastoral. It is worth noting that the two zones experienced successive poor seasons while food prices were also high. About 50-60 percent of traders in Nairobi, High Potential Mixed Farming and Mixed Farming livelihood clusters observed that demand had not changed.

Table 10: Food commodity demand stability by livelihood cluster

Livelihood zone	Increase in Demand	Decrease in Demand	Same Demand
Agro Pastoral	32.9%	21.1%	46.1%
Coast Marginal	50.0%	23.5%	27.5%
H.P Mixed Farming	34.0%	2.1%	63.9%
Marginal Mixed Farming	49.6%	11.6%	38.8%
Mixed Farming	22.7%	12.1%	65.2%
NE Pastoral	25.0%	32.1%	44.6%
NW Pastoral	48.0%	10.7%	33.3%
Nairobi	24.8%	18.3%	57.8%
SE Marginal	38.6%	32.9%	38.6%
Average	37.4%	17.2%	45.9%

Where demand had increased, about 50 percent of traders noted that they were able to service the increased demand. In terms of capacity, about 70, 50 and 30 percent of traders indicated that they would be able to service a demand increase of 25, 50 and 100 percent respectively as table 11 shows. For example, more than 80 percent of traders from Coast Marginal, High Potential Mixed Farming and NE Pastoral indicated that they would be able to effectively meet a 25 percent increase in demand. Only 30 percent of traders indicated that they would be able meet 100 percent demand increase. However, in the SE Marginal Agriculture, 80 percent of traders indicated ability to meet a 100 percent demand increase, probably due to the strong relations with their suppliers. Furthermore, traders in the SE Marginal were found to deal in smaller quantities, which eased servicing a higher proportion of demand.

Table 11: Proportion of traders who are able to meet demand increase

Livelihood zone	25 Percent	50 percent	100 percent
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Agro Pastoral	37.29%	55.93%	40.68%
Coast Marginal	89.47%	66.17%	47.37%
H.P Mixed Farming	98.57%	32.86%	4.29%
Marginal Mixed Farming	62.20%	39.02%	20.73%
Mixed Farming	81.08%	29.73%	0.00%
NE Pastoral	93.48%	32.61%	28.26%
NW Pastoral	54.00%	40.00%	8.00%
Nairobi	65.93%	59.34%	40.66%
SE MARGINAL	53.85%	65.38%	80.77%
Average	70.65%	46.78%	30.08%

The traders used various methods to finance the extra procurement, particularly own capital; however, as table 12 shows, credit from banks was also important. On average, 25 percent of traders indicated having access to formal credit. Traders in the Coast Marginal livelihood cluster appeared to have more access to formal credit compared to other livelihood clusters. In NE Pastoral, access to credit by traders was constrained by religious tenets.

Table 12: Sources of financing extra demand by traders

Livelihood cluster	Unable to obtain credit	Credit from banks	Credit from friends	Credit from suppliers	Other	Own Capital
Agro Pastoral	33%	17%	0%	17%	0%	33%
Coast Marginal	29%	18%	6%	29%	12%	6%
H.P Mixed Farming	17%	8%	0%	8%	8%	58%
Marginal Mixed Farming	16%	5%	0%	26%	11%	42%
Mixed Farming	50%	25%	0%	13%	0%	13%
NE Pastoral	50%	0%	13%	0%	0%	38%
NW Pastoral	33%	8%	0%	8%	0%	50%
Nairobi	50%	6%	0%	31%	0%	13%
S.E Marginal	54%	8%	0%	8%	8%	23%

The main constraint to extra procurement was lack of capital. Other important constraints included low profit margins, government taxes, lack of access to credit, lack of supply, insecurity, lack of transport, poor quality of supplies and lack of storage as illustrated in table 13.

Table 13: Constraints to procurement for extra demand

	n/a	Insecurity	lack of storage	competitors / taxes	lack of credit	lack of capital	lack of supply	lack of transport	low profits	Poor quality	Other
Agro Pastoral	0%	0%	0%	0%	0%	58%	17%	8%	17%	0%	0%
Coast Marginal	7%	7%	7%	7%	14%	50%	0%	0%	0%	0%	7%
H.P Mixed Farming	20%	0%	0%	0%	0%	80%	0%	0%	0%	0%	0%
Marginal Mixed Farming	11%	11%	0%	6%	11%	33%	6%	0%	17%	0%	6%
Mixed Farming	14%	0%	0%	0%	0%	71%	0%	0%	14%	0%	0%
N.E Pastoral	0%	0%	0%	13%	0%	38%	0%	13%	0%	13%	25%
N.W. Pastoral	0%	11%	0%	22%	0%	44%	0%	0%	0%	0%	22%
Nairobi	14%	0%	0%	7%	7%	50%	7%	0%	7%	0%	7%
S.E Marginal	9%	0%	0%	9%	18%	45%	0%	0%	9%	0%	9%

Price trends of main food items

The study looked at price trends of various food items across the different zones. Detailed analysis was conducted for maize, maize meal and rice for 2008, 2009 and 2010. The results showed great price variations between livelihood clusters, probably due to supply and demand dynamics and high transport costs. Prices tended to be higher in the Marginal Mixed Farming, NE Pastoral, NW Pastoral and Nairobi livelihood clusters. The prices of maize grain and maize meal that are staples showed greater variability compared to rice prices. Over time, prices tended to increase between 2008, 2009 and 2010, which is consistent with overall national price trends.

Food prices generally start rising between November and April. However in NW and NE Pastoral prices usually peak in August during the lean season. In contrast, prices were lowest in August and September, particularly in the SE Marginal, Nairobi, Marginal Mixed and Mixed Farming, High Potential Mixed Farming and Coastal Marginal livelihood clusters. Prices were also relatively lower in May in the Agro Pastoral, High potential mixed and in SE marginal, likely due to the start of the long rain crop harvests.

The highest year to year rate of change for maize price was 60 percent, which occurred in the High Potential Mixed Farming livelihood. It is likely that the prices were transmitted from the High Potential Mixed Farming livelihood cluster, the grain basket, to markets in other livelihood clusters. Meanwhile, maize prices remained high, above Ksh. 40 per kilo over the three years in NW Pastoral. The lowest price for maize was recorded in the High Potential Mixed Farming livelihoods at Ksh. 7 per kilo. In general the lowest prices have been below Ksh. 20 per kilo, with the exception of Nairobi, NW Pastoral, Marginal Mixed Farming and Coastal Marginal livelihood clusters. Similar variation in maize meal prices were observed by households across all zones. However, all households reported a decrease in maize meal prices between 2008 and 2009. The decrease was highest in NW Pastoral (32%) and least in NE Pastoral (3%), which could be a pointer to diversity of food sources within the same livelihood cluster. Table 14 shows the average price of maize grain in the last three years.

Table 14: Average price of maize in the last three years

	Highest price 2008	Highest price 2009	Highest price 2010	Lowest price 2008	Lowest price 2009	Lowest price 2010
Agro-Pastoral	22	28	31	17	23	16
Coast Marginal	30	29	26	27	25	23
Mixed farming HP	17	40	20	7	10	16
Marginal Mixed Farming	35	36	29	34	29	26
Mixed Farming	25	30	29	20	22	18
NE Pastoral	70	60				
NW Pastoral	33	38	43	30	36	42
Nairobi	38	34	38	43	40	25
SE Marginal Agriculture	25	30	23	17	22	15

Rice prices only changed marginally in all zones. The trends are relatively consistent over the two tiers of prices. Rice price decreases were experienced in markets within the NW Pastoral (30%) and remained unchanged for the SE Marginal as shown in table 15. The highest recorded prices were in Nairobi and Marginal Mixed farming while the lowest were in NW Pastoral and Agro-Pastoral livelihood clusters. Rice prices were lowest in areas where it was not a main food commodity.

Table 15: Average price of rice in the last three years

	Highest price 2008	Highest price 2009	Highest price 2010	Lowest price 2008	Lowest price 2009	Lowest price 2010
Agro Pastoral	66	60	61	57	46	50
Coast marginal	59	62	68	55	59	64
Mixed Farming HP	66	65	63	60	57	58
Marginal Mixed Farming	79	69	68	70	64	63
Mixed Farming	57	59	65	54	53	58
NE Pastoral	75	64	71	53	54	54
NW Pastoral	70	60	62	48	53	63
Nairobi	71	79	69	51	63	65
SE Marginal Agriculture	56	56	59	54	53	55

Quality of main food commodities

The survey revealed that over 90 percent of traders dealing in maize grain, sorghum and beans conduct routine quality checks. The high level of awareness about quality and the desire to maximize profits through market segmentation were the main factors that motivated traders to conduct quality checks. Traders who did not conduct quality checks identified ignorance, lack of finances and indifferent customers as major reasons. In general, there were no differences between trader types as regards quality control.

Most traders indicated that the main attributes considered during quality checks were impurities, color, size, moisture content and breakages. About 90 percent of the traders were aware of aflatoxin infestation. Out of those, about 10 percent mentioned that aflatoxin was a problem in their respective markets. Higher prevalence of aflatoxin was reported in Nairobi, SE Marginal and NE Pastoral, particularly Tana River. The level of awareness of aflatoxin is higher for wholesalers compared to other categories of traders. nevertheless, more than half of the traders were unaware of the customer knowledge on aflatoxin problem.

NATURAL CAPITAL

Arguably, high-density urban area dwellers are far more removed from their environment than their rural counterparts yet the natural capital of urban populations remains an important factor associated with food security. The KU-CFSVA specifically sought to capture the extent of urban farming.

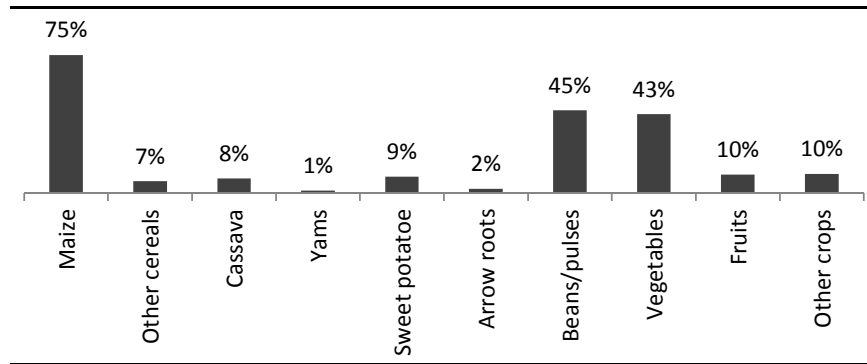
CROP PRODUCTION

Crop production is an important agricultural activity in Kenya's high-density urban areas. The KU-CFSVA survey indicated that one in every five households (21%) was involved in food production. However, there were differences across zones, with the highest proportion involved in both crop and livestock production being found in settlements outside major towns. Relatively little urban agriculture is practiced across the urban livelihood clusters. Much of the urban farming is found in the High Potential Mixed Farming, SE Marginal and Agro-Pastoral livelihood clusters and is mainly crop production. There seems to be a positive correlation with access to land and the level of crop production across the livelihood clusters except for the Coastal Marginal livelihood cluster which, despite having relatively high access to land, does not have a significant level of crop production.

Crop production and access to land

The survey indicated that the main crops grown were maize, beans, other pulses and vegetables as shown in figure 25. It was also observed that 11 percent of households engaging in crop production had more than one crop during that season. A large proportion of the crops produced were for direct consumption, with the remaining balance contributing to household income. In total, crop production in urban settlements contributed less than three percent to food and income in the urban settlements.

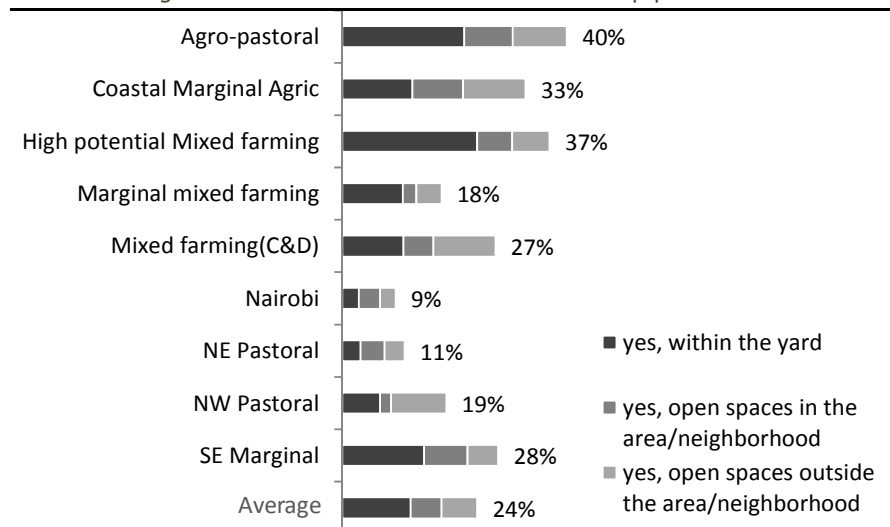
Figure 24: Proportion of urban households producing crops



Access to land

The ability to produce food reflects household land access. Access to land was most frequent in the Agro-Pastoral and High Potential mixed farming livelihood clusters. Out of 24 percent of households with access to land, most accessed land within their yard (12%), while six percent accessed open spaces in the local area and another six percent accessed open areas outside their neighbourhood as shown in figure 26.

Figure 25: household access to land for crop production



The results indicate that in all clusters, over 76 percent had no access to land for crop production, which implies that the majority of the households depend on food supplies from external sources and that total production is insufficient to sustain household food requirements. Food consumption groups in the informal settlements are determined by income levels which has a bearing on access to land for crop production. The survey results show that the poor and the relatively wealthy mostly have access within their yards. However, categories with middle level wealth status or borderline categories are likely to engage in livelihood activities that are off-farm. It was evident that the space available for crop production was minimal and as such the percentages involved across the food consumption categories would therefore not impact significantly on food security.

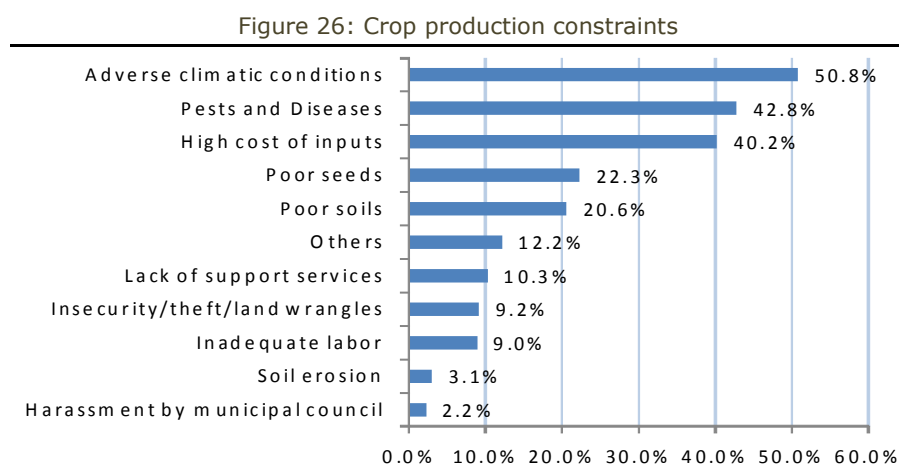
Gender disparity in access to land had an impact on exploitation of land for crop production. The survey indicated that, of those who had no access to land, females were the most affected and had least access to land for crop production. The differences in access were not very significant since the land involved for production was small. Over 60 percent of all households across all clusters practiced food production on legally owned or allocated land. However, between 10-40 percent practiced crop production on land

which was not legally owned or officially allocated, which implies that urban food production was likely to be affected by land use by-laws stipulated in urban areas.

The survey results shows that nearly 80 percent of maize, pulses and vegetable produced within informal urban settlements was consumed at household level. However, in volume terms, the amount was insufficient to sustain households for a significant length of time. About 20 percent of maize, pulses and vegetables produced within the Pastoral informal settlements were sold.

Crop production constraints

The crop production activities in informal settlements, though not significant, are affected by a number of constraints. Key among these is the adverse weather that characterizes most of the zones. Other constraints identified include; pests and diseases, high cost of inputs, poor seeds, poor soils, inadequate labour and insecurity besides policy and legal constraints. Figure 27 shows the major constraints to crop production.



LIVESTOCK PRODUCTION

Nationally, 11.4 percent of household expenditure (including purchases, monetary value of own produce, own stock and gifts) is spent on livestock-derived food items; 13.1 percent in rural and 9.7 percent in urban Kenya (KIHBS pp 40-41). Livestock production is quite important in Kenya’s high-density urban areas with goats, sheep, pigs, poultry cattle and camels raised. Small stock such as poultry, sheep and goats are often slaughtered for home consumption as opposed to large stock (cattle and camels) that are rarely slaughtered or sold.

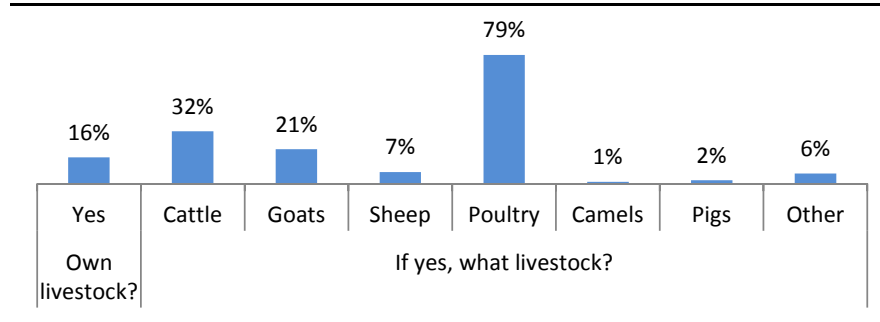
Livestock ownership

During the KU-CFSVA interviews, one in six household respondents (16%) indicated owning livestock as shown in figure 29. There were differences across livelihood clusters, with the highest proportion of households owning livestock in the NE Pastoral and Agro-Pastoral livelihood clusters with 31 and 29 percent respectively. The contribution of livestock to household income and food is significant in these livelihood clusters.

Livestock ownership by species

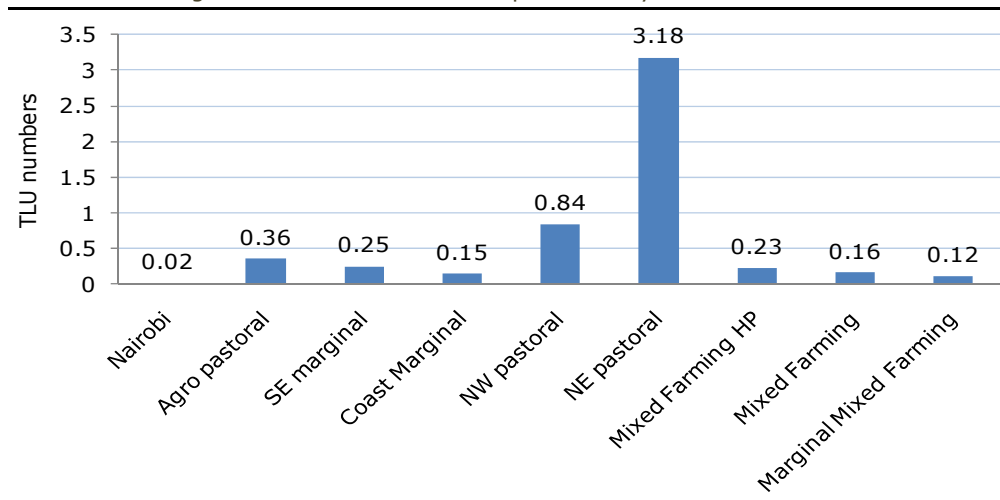
Poultry was the most commonly owned livestock (79% out of 16%), followed by cattle (32% out of 16%), and goats (21% out of 16%) as shown in figure 28.

Figure 27: Livestock and type of ownership



The limited number of households owning livestock (16%) is insufficient to statistically examine livestock distribution across livelihood clusters. In order to compare livestock assets across livelihoods, it is important to use a standardized measurement such as Tropical Livestock Units (TLU¹²) to better represent the asset value of various forms of livestock. The results in figure 29 shows that households in NE and NW Pastoral on average have a higher TLU score (3.18 and 0.84 respectively), which may reflect a higher ownership of cattle. Livestock may significantly contribute to food security in these clusters.

Figure 28: Livestock ownership in TLUs by livelihood cluster



Livestock products at household level

Main livestock products considered during the survey were milk, eggs, meat, butter and fats. The highest average amount of milk produced was in the Mixed Farming (77.6 litres) and SE Marginal (73.5 litres) and the lowest amounts of milk were produced in Nairobi and Marginal Mixed Farming with six and 14 litres, respectively. Nairobi and Marginal Mixed Farming clusters may be unable to access adequate milk in order to meet their nutritional needs. In terms of egg production, the highest quantity produced was in agro-Pastoral (42%) and the lowest was NE Pastoral cluster (7%). This indicates that there is a higher proportion of poultry keeping in Agro Pastoral cluster and a low proportion in NE Pastoral cluster. Butter, ghee and fat were mainly produced in Agro Pastoral and High Potential Mixed Farming livelihood clusters at 1.6 and 0.7 litres respectively. The highest average quantity of meat was recorded in Marginal Mixed Farming livelihood cluster (4kg).

Livestock production constraints

¹² One TLU is equivalent to one cattle of 250kg at maintenance. The summative scale used the following standard weights: cattle: 0.8, goat: 0.1, sheep: 0.1, pork: 0.3, poultry: 0.007, rabbit: 0.007.

Constraints identified included: Poor breeds, parasites and diseases, poor pasture, insufficient water, lack of land, low support from services, high cost of inputs, insecurity, adverse climatic conditions, land wrangles and harassment by municipal councils. On average, according to respondents, the main constraints were **parasites and diseases, poor pastures and insecurity at 64.2, 34.4 and 24.1 percent respectively** across clusters. The least problematic of all the constraints recorded was land conflicts (1.5%). Parasites and diseases were the major constraints in High Potential Mixed Farming, SE Marginal and Agro Pastoral by **81.2, 76.3 and 61.4 percent** of respondents respectively. The poor feeds problem was reported in NE Pastoral, Nairobi and Coast Marginal Agriculture by 50, 47.4 and 43.9 percent respectively. Although land wrangles emerged as the least mentioned constraint (1.5%), it is a major issue in the Coastal Marginal Cluster.

LIVELIHOOD STRATEGIES

Livelihood strategy choices result in part from the combination of all the forms of capital available to an individual or household. Knowledge of livelihood strategies and how households access income is crucial in determining the sustainability of household food security status. The section discusses the livelihoods profiles of urban households.

LIVELIHOOD PROFILES

Activities and livelihood profiles

The 2010 KU-CFSVA asked respondents to identify the main activities performed and, for each activity, its contribution to their household's livelihood. Most urban households reported basing their livelihood on diverse income sources which included salaried employment (50%), trade and business (45%), agriculture and livestock production (10%), and remittances from relatives (5%). Salaried employment included both public and private employment. The most common businesses undertaken by urban households included kiosks and restaurants, driving taxis and matatus/ local buses and running hairdressing salons and camera shops. Women tended to engage in petty trade, domestic labour and tea and coffee making.

Considering the range of activities, their relative importance and level of income for each household, livelihood profiles were established to facilitate comparison in the distribution of livelihood strategies across livelihood clusters. Principal component and cluster analysis were used to group together households that show similarities in the types of activities and the relative importance of these activities to overall livelihoods.

The final analysis resulted in the creation of ten livelihood profiles categorized as:

- Poor casual wage labourers (25%)
- Small businessmen / artisans (17%)
- Private salaried (12%)
- Non poor casual wage labourers (10%)
- Public salaried (10%)
- Petty traders/street vendors (10%)
- Shop owners, traders (4%)
- Crop producers (3%)
- Dependents: beggars/borrowers/remittance receivers (5%)
- Other activities (5%)

The categories were created in relation to the groups' main activities. The five main livelihood groups accounted for 84% of the urban population.

Distribution of livelihood profiles

Livelihood clusters were named after the rural areas surrounding the urban centres. The livelihood profiles therefore do not necessarily represent the characteristics of the livelihood clusters. While all livelihood profiles were found in all livelihood clusters, there were important differences in their distribution. The highest proportions of poor casual wage labourers were found in the Nairobi (34%) and Agro Pastoral (32%) zones (Figure 30). Small businessmen / artisans accounted for 17% to 22% of the population in all livelihood clusters except Nairobi (11%), NE Pastoral (12%) and NW Pastoral (5%). The proportion of dependents – a vulnerable group by definition- was highest in the NE Pastoral livelihood zone (13%) as shown in table 16.

Table 16: Distribution of livelihood profiles by livelihood clusters

	Poor casual wage labourers	small businessmen / artisans	private salaried	non poor casual wage labourers	public salaried	petty traders/street vendors	shop owners, traders	Dependents	crop producers	other activities
Agro-Pastoral	32%	17%	8%	11%	9%	4%	4%	3%	4%	8%
Coastal Marginal Agric.	20%	22%	10%	10%	6%	14%	2%	5%	3%	7%
High potential Mixed farming	20%	20%	11%	10%	12%	10%	2%	4%	8%	4%
Marginal mixed farming	17%	22%	7%	16%	16%	7%	4%	2%	1%	7%
Mixed farming(Cereals/Dairy)	27%	17%	14%	7%	9%	13%	6%	3%	3%	3%
Nairobi	34%	11%	17%	12%	8%	11%	4%	1%	0%	3%
NE Pastoral	22%	12%	5%	6%	14%	7%	12%	13%	3%	6%
NW Pastoral	25%	5%	3%	5%	12%	11%	11%	7%	8%	13%
SE Marginal	18%	19%	12%	8%	16%	7%	9%	2%	4%	4%
Average	25%	17%	12%	10%	10%	10%	4%	3%	3%	5%

Characteristics associated with the livelihood groups

In addition to their geographic distribution, the distribution of female-headed households and wealth quintiles across livelihood profiles, as well as the crowding index and expenditures were examined (Table 17):

- The proportion of **female-headed** households was highest among the Dependents (65%) and petty traders /street vendors (47%).
- It is also among Dependents that the highest proportion of households belonged to the **poorest wealth quintile** (42%). The proportion was also high among Poor casual wage labourers (30%), and Crop producers (28%).

Table 17: Characteristics of livelihood groups (1)

	Sex HH head (% women)	Wealth category				
		Poorest	Poor	Medium	Wealthy	Wealthiest
Poor casual wage labourers	27%	30%	21%	28%	15%	6%
Non poor casual wage labourers	24%	17%	21%	24%	18%	20%
Shop owners, traders	38%	17%	16%	21%	18%	28%
Public salaried	15%	6%	13%	17%	23%	42%
Petty traders/street vendors	47%	23%	26%	23%	16%	12%
Small businessmen / artisans	29%	14%	16%	20%	25%	24%
Dependents	65%	42%	16%	17%	19%	7%
Other activities	30%	19%	20%	19%	23%	20%

Crop producers	35%	28%	14%	22%	21%	15%
Private salaried	15%	7%	14%	21%	24%	34%

- The **crowding index** was highest among the Poor casual wage labourers (3.9), and shop owners/traders (3.5)
- Total **expenditures** were on average lowest among the Poor casual wage labourers (8,656/month). This group also had the highest proportion of food as a percentage of total expenditures (52%). Petty traders/street vendors and Dependents ranked second and third in terms lowest absolute value of expenditures and highest proportion of expenditures spent on food (50%).

Table 18: Characteristics of livelihood groups (2)

	Crowding index	Food expenditures	Non-food expenditures	Total expenditures	% food / total
Poor casual wage labourers	3.9	4,630	4,027	8,656	52%
Non poor casual wage labourers	2.9	7,984	11,012	18,996	45%
Shop owners, traders	3.5	8,674	12,945	21,620	45%
Public salaried	2.8	7,865	16,789	24,654	41%
Petty traders/street vendors	3.3	6,094	6,323	12,417	50%
Small businessmen / artisans	3.1	7,307	10,437	17,744	47%
Dependents	2.9	6,234	6,535	12,769	50%
Other activities	3.2	7,403	12,056	19,459	48%
Crop producers	2.4	5,789	10,795	16,584	49%
Private salaried	3.1	7,151	13,734	20,884	43%

The results in table 17 and 18 suggests that among the livelihood groups, the Poor casual wage labourers (25% of the population), Petty traders/street vendors (10% of the population), and Dependent households are the most likely to be vulnerable to food insecurity: they are on average poorer and spend less money than the other groups, and are more likely to be headed by a woman.

Sources of food

The main sources of food in Kenya's high-density settlements in order of importance were markets (purchase), own production and remittances (food aid/gifts) (Table 19). Food markets play an important role in food security. Through the well known classical functions of distribution and exchange, market avail food in areas characterized by production deficits and backwards to production, they stimulate subsequent production levels in agriculture. The effective functioning of markets and production is however guaranteed if the consumers can sustainably afford food items in the markets in order to avoid transitional and chronic shortages.

Table 19: Food sources for different livelihood groups by livelihood cluster

	Purchases	Own production	exchange	Food aid/gifts	Hunting and gathering	Other
Nairobi	100%	0%	0%	0%	0%	0%
Agro-Pastoral	99%	1%	0%	0%	0%	0%
SE Marginal	98%	2%	0%	0%	0%	0%
Coast Marginal Agric.	98%	2%	0%	0%	0%	0%
NW Pastoral	99%	0%	0%	1%	0%	0%
NE Pastoral	100%	0%	0%	0%	0%	0%
Mixed Farming HP	97%	2%	0%	0%	0%	0%
Mixed Farming	99%	1%	0%	0%	0%	0%
Marginal Mixed	99%	1%	0%	0%	0%	0%
Average	99%	1%	0%	0%	0%	0%

As mentioned earlier, the livelihood zones are characterized by different agro-ecological conditions that directly or indirectly dictate the major sources of livelihoods and agricultural production hence a profound

impact on the food and nutritional security in the specific areas. Due to this kind of specificity, markets and trade play an important role of availing the unavailable food items and at the same time, also as income generating for the sellers. In a majority of the livelihood zones covered, households practiced some minimal agriculture that provided food for own consumption. Finally, a majority of Kenya’s urban dwellers maintain very strong linkages with the rural areas and receive a substantial share of their food requirements from these rural areas.

HOUSEHOLD FOOD CONSUMPTION OUTCOMES

Household food security exists when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (World Food Summit 1996). Food security is complex concept reflecting availability, access and utilization of food. For the purpose of the KU-CFSVA, the household food consumption characteristics and dietary diversity measures are used as a proxy-measure of food security. The section discusses the food consumption characteristics of households in Kenya’s high-density urban settlements along with their food insecurity coping strategies.

HOUSEHOLD FOOD CONSUMPTION PROFILES

Food consumption score

Food consumption profiles were established using data collected on the number of days specific food groups were consumed over the one week prior to the survey (see method section). Figure 31 represents the average number of days that households consumed the various food groups. Cereals and tubers, vegetables, sugar and oil were all on average consumed over 6 days a week. Milk was also frequently consumed, on average 5.6 days a week. Consumption of animal proteins (e.g. meat, fish) and fruits was less frequent (average of 3 days a week), and the least frequently food group were pulses (1.7 days/week). Across livelihood clusters, the highest average FCS was found in the NE Pastoral livelihood zone, likely owing to the high level of consumption of animal protein (5.2 days a week compared to 3.1 on average). The NW Pastoral had the lowest average FCS, with the lowest average consumption of cereals, animal proteins, vegetables, fruits, sugar, and oil.

Figure 29: Average food consumption (number of days) by livelihood clusters

	Cereals and Tubers	Pulse	Anim. Prot.	Milk	Vegetables	Fruits	Sugar	Oil	AVERAGE FCS
Nairobi	6.6	1.3	2.8	5.5	6.1	3.4	6.4	6.7	66.3
Agro-pastoral	6.6	1.9	2.8	6.2	6.4	2.9	6.4	6.6	70.5
SE Marginal	6.0	2.0	3.3	5.8	5.6	3.2	6.4	6.8	69.4
Coastal Marginal Agric.	6.7	2.4	3.4	4.5	6.3	3.0	6.6	6.4	67.7
NW Pastoral	5.8	1.4	2.2	4.7	4.5	1.5	5.7	5.9	55.0
NE Pastoral	6.7	3.0	5.2	6.5	4.6	2.7	6.6	6.4	82.7
High Potential Mixed Farming	6.4	1.7	3.0	6.2	6.3	3.1	6.4	6.7	70.6
Mixed Farming (Cereals&Diary)	6.7	1.7	2.6	5.9	6.2	3.0	6.4	6.7	67.9
Marginal Mixed Farming	6.4	1.1	4.0	5.2	6.1	2.8	6.2	6.2	67.8
Average	6.5	1.7	3.1	5.6	6.1	3.1	6.4	6.6	68.3

Using the FCS score, households can be classified into three Food Consumption Groups (FCGs): Poor food consumption (FCS = 0-28), borderline food consumption (FCS = 28.5-42) or acceptable food consumption (>42) (WFP, 2008). Among the households in high density urban areas of Kenya, households in the poor consumption group consumed on average most frequently cereals and tubers (5.2 days), oil (4.6 days), vegetables (4.2 days) and sugar (3.4 days). The consumption of pulses, animal proteins, milk and fruits was close to null in that group. The cross-tabulation of the consumption of food groups with the FCS shows that cereals and tubers are the basis of all diets and, to a lesser extent, vegetables, oil, and sugar as well. This is an inadequate diet for a healthy active life and household members would have suffered from malnutrition.

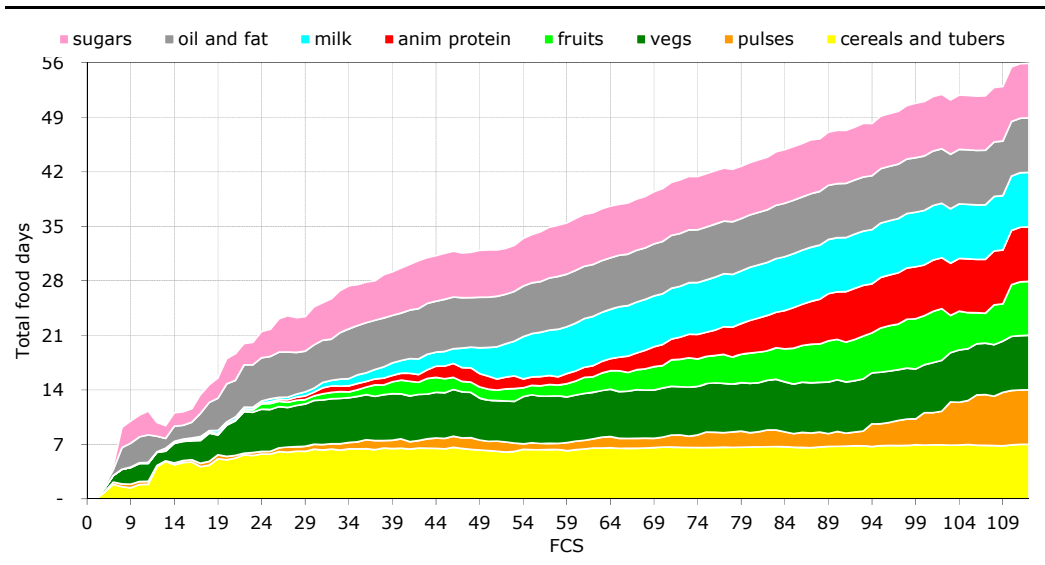
Among the borderline consumption group, consumption of all food groups increased, with cereals and tubers and oil being consumed over 6 days a week. Consumption of pulses, animal proteins, milk and fruits remain infrequent, at an average of one day per week. This indicates that the quality of the diet is a problem, lacking in both protein and micronutrients. Among households with an acceptable consumption score, consumption of all the food groups continues to increase, and most significantly, the consumption of animal proteins and milk reaches an average of three days a week as table 20 shows.

Table 20: Average food consumption (number of days) by FCGs

Food Consumption Categories	Average number of days food groups are consumed (*)								Energy intake		
	cereals & tubers	pulse	proteins	milk	vegetables	fruits	sugar	oil	FCS	Mean Kcal per capita per day	SD
Poor	5.2	0.4	0.2	0.3	4.2	0.4	3.4	4.6	21.7	1,792	±778
Borderline	6.4	1.0	0.8	1.2	5.8	1.2	5.3	6.0	36.3	1,756	±763
Acceptable	6.6	1.8	3.5	6.3	6.2	3.4	6.7	6.8	73.9	2,023	±934
Total Average	6.5	1.7	3.1	5.6	6.1	3.1	6.4	6.6	68.3	2,005	±926

Dietary assessment to assess energy intake based on 24 hour recall was done at household level and reported per capita (an average per person per day). The mean kilo-calorie (Kcal) intake per day was calculated for each member irrespective of age and gender. The dietary intake analysis was done on a 20 percent sub-sample and was, therefore, too small for disaggregation by livelihood clusters. The overall mean energy intake was 2005 Kcals (±926) indicating consumption slightly below the threshold of 2100 kcals. There was variation in consumption, however, given the large standard deviation. Cross-analysis with FCS categories showed that those in the poor and borderline categories were more likely to consume less kilocalories compared to those in the acceptable category. These differences were not statistically significant, however (p=0.085). In combination with dietary diversity above, these findings confirm that households in the poor and borderline consumption groups were lacking in energy as well as in quality (Figure 32).

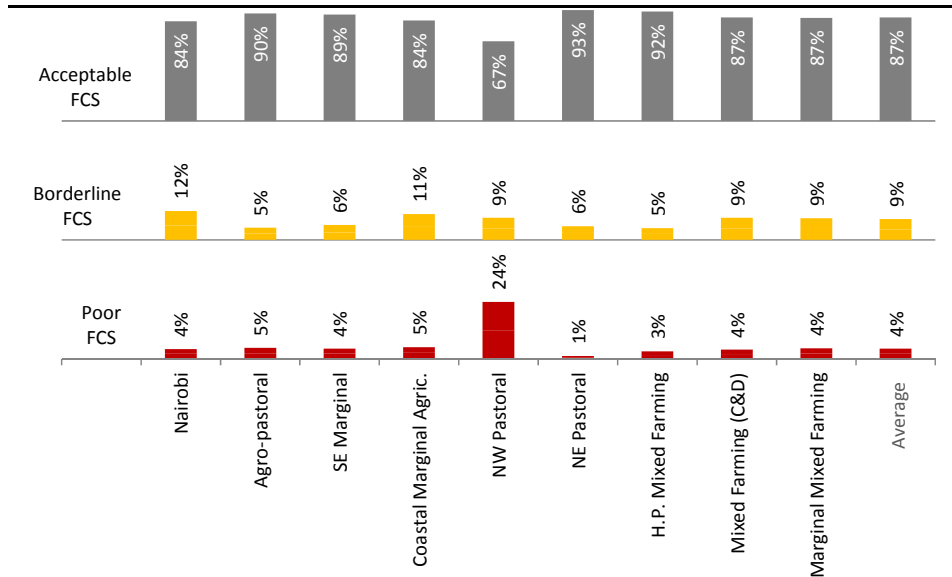
Figure 30: Average food consumption (number of days) by FCS



Distribution of food consumption groups

Survey results indicate that the proportion of households in the poor consumption group ranges from 1-5 percent in the entire livelihood clusters, except the NW Pastoral zone where the proportion was as high as 24 percent (Figure 33).

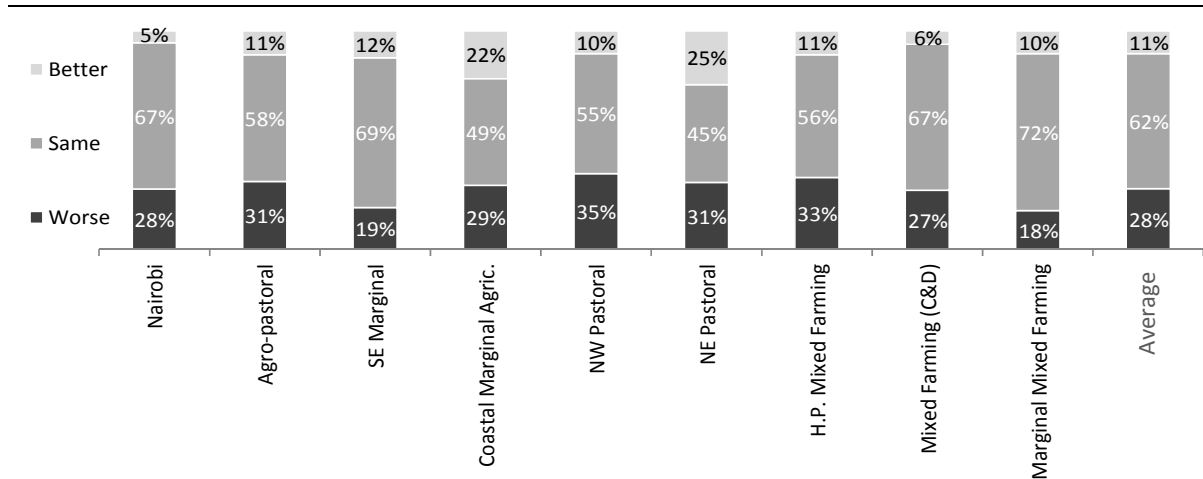
Figure 31: FCGs by livelihood clusters



The FCS relies on the results of a cross-sectional survey and therefore only provides information that represents food consumption at the time of the survey. An additional question was asked to estimate the current trend of food insecurity compared to the usual situation. For most households, food consumption at the time of the survey was similar to the usual situation (62%). Less than one in ten said their situation was better than usual (11%) and 28 percent said it was worse than usual (Figure 34). Despite the fact that over one in four households described their situation as worse than usual, few households were considered to have a poor FCS, suggesting that the normal situation is even more favourable. The exception remains NW Pastoral where the proportion reporting worse than usual food conditions was high

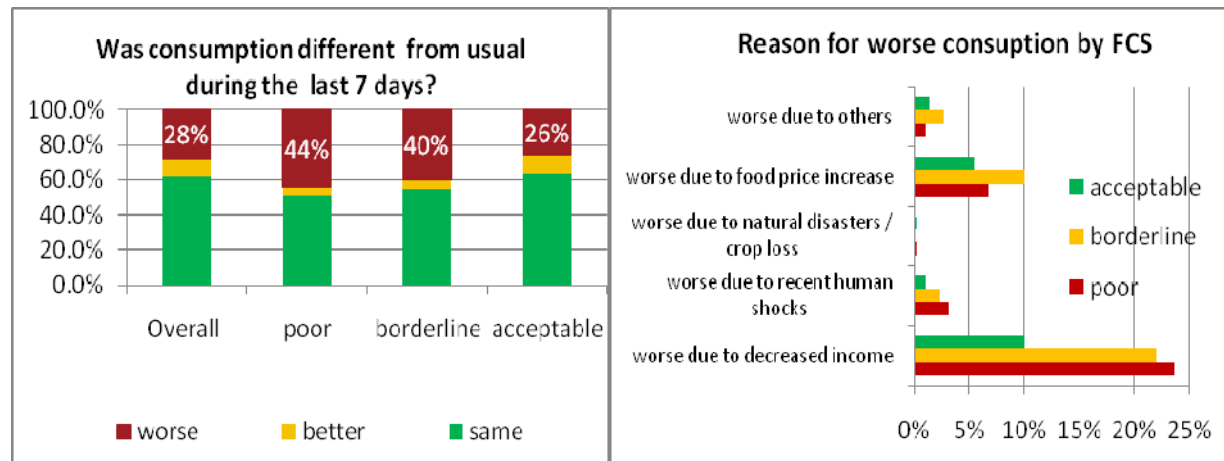
(35%) but not very different from other livelihood zones, suggesting that a high proportion of households with a poor FCS is usual.

Figure 32: Changes in food consumption across livelihood clusters



As figure 35 shows, the households with poor and borderline food consumption were more likely to have a worse food intake than normal compared with households with an acceptable consumption score. More than 40 percent of the poor and borderline households reported eating worse than usual. The reason for this is the same for all three FCS categories and is caused by reduced income. The second most common reason cited was increased food prices.

Figure 33: Change in consumption and reason for worse consumption

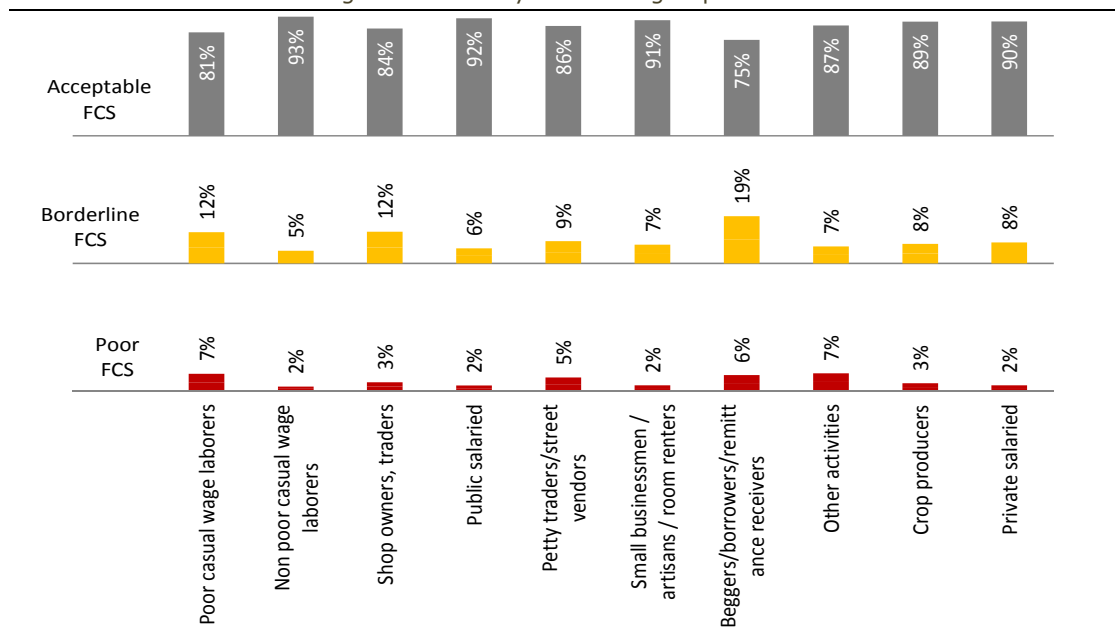


FACTORS ASSOCIATED WITH FOOD CONSUMPTION

In this section, bivariate association between Food Consumption and selected variables are examined in order to better understand characteristics associated with food insecurity. Several variables were found to be significantly associated with FCS/FCG.

- There were significant differences in the prevalence of food insecurity between **livelihood profiles**. As figure 34 shows, the highest proportion of households in the poor food consumption group was found among the poor casual wage labourers (7% poor FCS, 12% borderline FCS), and the beggars / borrowers / remittance receivers (6% poor FCS, 19% borderline FCS). (Pearson $\chi^2 = 79055$, 18 df, $p < 0.01$)

Figure 34: FCS by livelihood groups



- With regard to household characteristics, the prevalence of poor food consumption was significantly higher among **female-headed households** (6.5%) compared to male-headed households (3.3%). (Pearson $\chi^2 = 18636$, 2 df, $p < 0.01$)
- Similarly the proportion of households with a poor FCS was higher among **elderly-headed households** (6.9%) compared to non-elderly headed households (4%). Over 22 percent of elderly headed households had a poor or borderline FCS compared with 12 percent among other households. (Pearson $\chi^2 = 25068$, 2 df, $p < 0.01$)
- While the average **household size** did not vary significantly across FCGs, the **crowding index** decreased with improved FCS (Table 21). There was on average four individuals per room among households with a poor FCS, compared to 3.1 among those with an acceptable FCS. ($F = 29630$, 2df, $p < 0.01$)

Table 21: FCS by sex, age, household size and crowding index

	Gender of head		Elderly headed		household size	Crowding index
	male	Female	yes	no		
Poor FCS	3.3%	6.5%	6.9%	4.0%	5.5	4.1
Borderline FCS	8.6%	9.4%	15.2%	8.1%	5.6	3.9
Acceptable FCS	88.1%	84.0%	78.0%	87.8%	5.0	3.1

- The proportion of households with a poor FCS was highest in the poorest **wealth quintile** (11%). In the other wealth quintiles, fewer than five percent of households had a poor FCS as shown in table 22.

Table 22: Household FCS by wealth groups

	Wealth quintiles				
	Poorest	Poor	Medium	Wealthy	Wealthiest
Poor FCS	11.4%	3.6%	4.0%	1.6%	0.4%
Borderline FCS	13.4%	9.5%	9.5%	6.1%	5.7%
Acceptable FCS	75.2%	86.9%	86.5%	92.3%	93.9%

- The proportion of households with a poor FCS was also higher among households who used **unimproved toilets** (6.7%), as opposed to improved facilities (3.9%). (Pearson $\chi^2 = 7239$, 2 df, $p < 0.01$)
- Several livelihood related indicators were associated with food security (Table 23). Higher proportions of households with poor FCS were found among households who do not **produce food** and/or **cultivate less than two crops**, and among households who do not **own animals**.

Table 23: Household FCS and agricultural production

	Produce food		Produce food		Own livestock	
	yes	no	≤2 crops cultivated	>2 crops cultivated	Yes	No
Poor FCS	3.7%	4.4%	4.5%	2.1%	4.3%	3.8%
Borderline FCS	7.4%	9.2%	9.3%	5.1%	9.4%	5.7%
Acceptable FCS	88.8%	86.4%	86.2%	92.8%	86.2%	90.6%

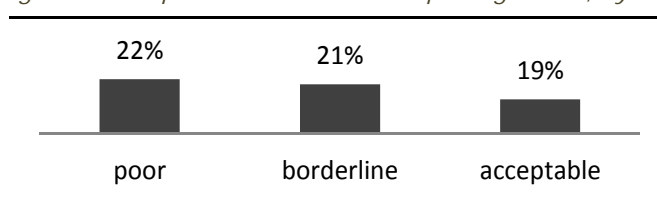
- Expenditures** in absolute value were significantly lower among households with a poor FCS (Table 24). Monthly food expenditures among households with a poor FCS represented less than half the value of the food expenditures among households with an acceptable FCS. Non-food expenditures among those with a poor FCS were also significantly lower than that of those with a borderline of acceptable FCS.

Table 24: Household FCS and expenditure

	Food expenditures (KSH)	Non-food expenditures (KSH)	Total expenditures (KSH)	Food as a % of total expenditures
Poor FCS	2,636	3,501	6,137	48%
Borderline FCS	4,014	5,563	9,577	46%
Acceptable FCS	7,041	10,139	17,180	48%

- Finally, the prevalence of illness slightly decreased as food consumption increased. According to KU-CFSVA data, 22 percent of individuals living in households with poor food consumption had been sick over the two-week period prior to the survey, compared to 19 percent among those who lived in a household with acceptable FCS (figure 37).

Figure 35: Proportion of household reporting illness, by FCS



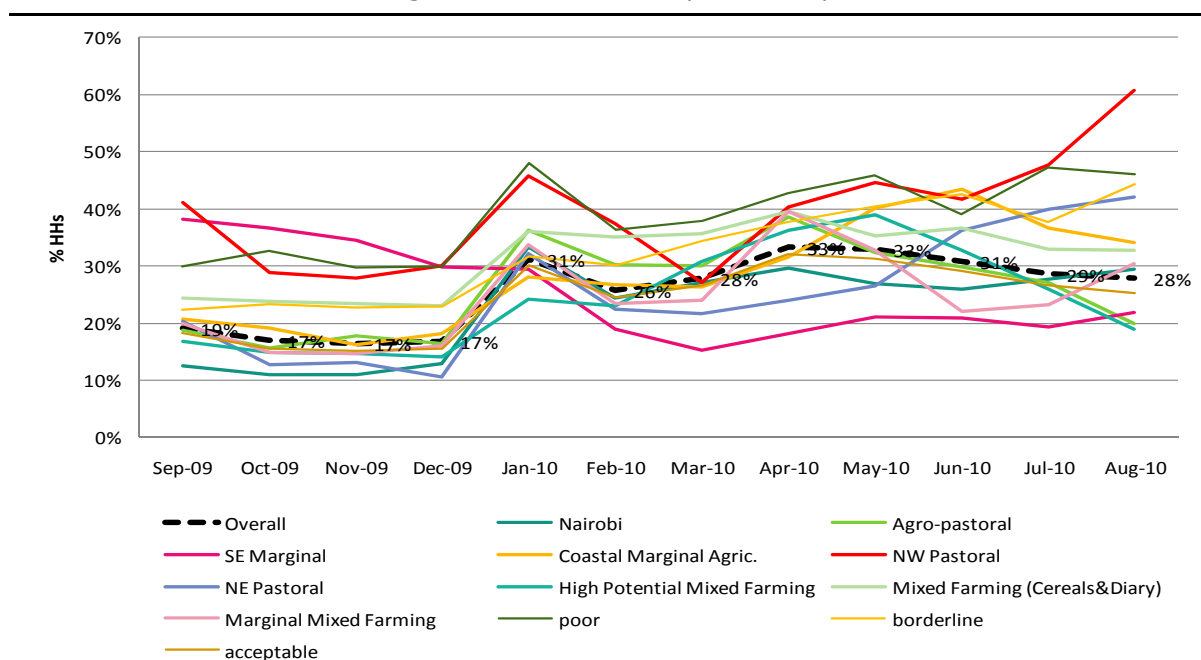
FOOD SHORTAGE AND COPING STRATEGIES

Food shortage

Food security is typically associated with cyclical and long term trends that affect availability and access to food. The KU-CFSVA asked respondents what months in the year prior to the survey they had most difficulty obtaining food. The results show that households with a poor FCS report more frequent difficulties to obtain food compared to households with a borderline or acceptable FCS.

The months during which a higher proportion of households reported difficulties in obtaining food are the month of January, and between April and July (figure 38). These periods corresponded with the months with the highest reports of expenditures (see expenditure section). The NW Pastoral livelihood cluster reported very high levels of difficulty in acquiring food especially in the months of Dec-Feb and between June and August.

Figure 36: Food availability seasonality

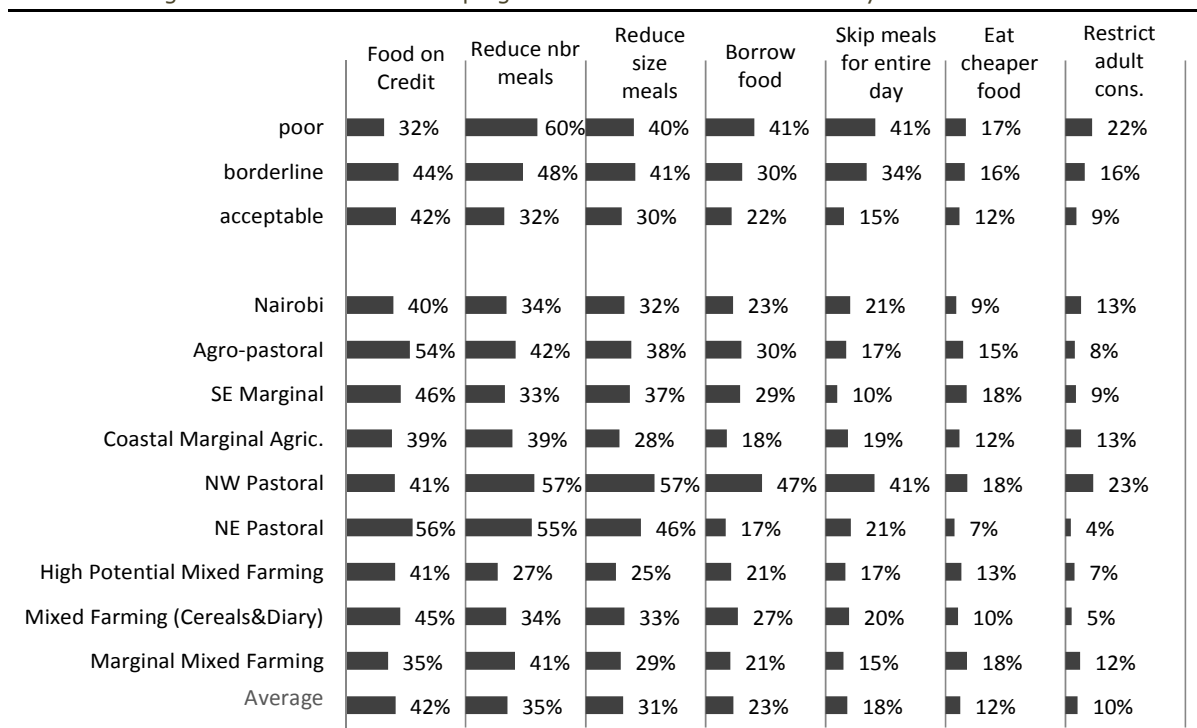


Looking at the overall picture (the black bold dotted line in figure 40) the months of December and January were the most difficult for the respondents to acquire food (31%). The trend was similar across the different livelihood clusters.

Coping strategies

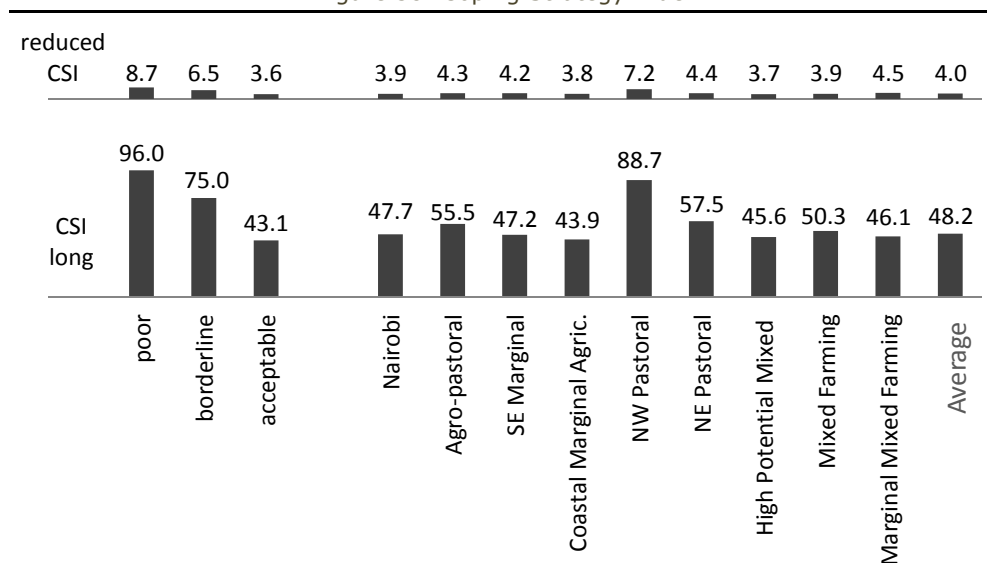
As the KU-CFSVA shows, 13 percent of Kenyan urban households are considered to have a poor (4%) or borderline (9%) FCS and many households indicate that their ability to obtain food was worse than usual. To adjust to the situation, households rely on various coping mechanisms. The KU-CFSVA assessed the use of 21 coping mechanisms over the one-month period prior to the survey. As shown in Figure 39, seven of the coping mechanisms were used by over 10 percent of the population: relying on credit to obtain food (42%), reducing consumption (fewer meals (35%), smaller meals (31%), skipping meals (18%)), restricting adult consumption or borrowing food (23%), and eating cheaper food (12%).

Figure 37: Most common coping mechanisms households use by livelihood cluster



To facilitate comparison across groups, two Coping Strategy Indices (CSI) were computed taking into account the severity and frequency of the coping strategies: One long version relying on all the items (CSI-long) and one reduced version relying on a subset of variables (reduced CSI). The results show that the average CSI, both long and reduced, decreased as food consumption improved. Across livelihood groups, the average CSI was highest in the NW Pastoral zone, at 88.7 for the CSI-long, and 7.2 for the reduced CSI. Elsewhere, the CSI-long ranged from 43.9 to 57.5, less than 15 point range, while the NW Pastoral CSI is 40 points over the national average (figure 40).

Figure 38: Coping Strategy Index



FOOD AND OTHER FORMS OF ASSISTANCE

Food assistance has been used as a response to food insecurity in Kenya. About 12 percent of the households reported having received food aid over the past year. The proportion of households receiving food aid was highest in the drier NW Pastoral livelihood cluster (40%), and lowest in the Marginal Mixed Farming zones (6%). About 14 percent of households in Nairobi's informal settlements were receiving food aid. Maize constitutes the highest form of food assistance, where the NW Pastoral livelihood cluster received the highest maize allocation for food aid (Table 25). The analysis showed that the elderly received more (20%) in food aid than those aged less than 59 yrs. Female-headed households also received more in formal food aid (19%) than male-headed households (9%).

Table 25: Food Aid Assistance and Average Quantities Received

	Receive food aid?	Maize (kg)	Other cereal(kg)	Pulses(kg)	vegetable oil (lts)	porridge flour(kg)	CSB (kg)	Others (kg)
Food Consumption Group								
Poor	24%	86	5	7	13	12	1	0
Borderline	15%	49	5	7	6	3	12	1
Acceptable	11%	35	10	9	7	2	3	4
Livelihood cluster								
Nairobi	14%	62	17	12	4	2	5	0
Agro-Pastoral	18%	15	4	2	1	0	0	3
SE Marginal	12%	34	2	27	22	1	12	37
Coastal Marginal Agric.	9%	8	6	1	10	0	0	1
NW Pastoral	40%	185	19	24	32	21	17	1
NE Pastoral	19%	69	35	12	10	10	9	3
High Potential Mixed	10%	11	2	2	7	0	0	1
Mixed Farming	12%	11	1	3	0	1	2	0
Marginal Mixed Farming	6%	8	0	1	0	1	0	0
Age category of Head								
adults (<59 yrs)	11%	41	10	8	5	2	4	3
Elderly	20%	42	5	6	22	5	3	0
Sex of Head								
male head	9%	51	8	8	7	3	4	2
female head	19%	29	10	9	8	2	4	5
TOTAL	12%	41	9	8	7	3	4	4

The quantity of food aid received by households across livelihood clusters was also examined. Major food-aid items included maize, pulses, vegetable oil, porridge flour, corn soy blend (CSB) and other food items. On average, households who benefit from food assistance received per year: 57 Kgs of maize, 8 Kgs of pulses, 9 litres of vegetable oil and 5 Kgs of CSB. Though female-headed households received more food aid than male-headed, the female headed households received on average lower quantities of maize (21%) than male headed households (51%).

Besides food aid, high-density urban areas also accessed support from development programmes such as the youth development fund, bursary funds, higher education loans board and Constituency Development Fund (CDF). Others included the women development fund, Local Authority Transfer Fund (LATF) and food for work programmes (Table 26). Except for bursary funds and work for youth, accessed by slightly higher than one percent of the households, the other development programmes benefited less than one percent of households. It is important to note that on average, only nine percent of non-food assistance programmes support livelihoods in high-density urban areas.

Table 26: Presence of Non-food assistance Programme by livelihood cluster

	Nairobi	Agro-Pastoral	SE Marginal	Coastal Marginal Agric.	NW Pastoral	NE Pastoral	HP Mixed Farming	Mixed Farming (C&D)	Marginal Mixed Farming	Overall
Youth development fund	0.5%	0.9%	0.5%	0.0%	0.0%	0.0%	0.9%	0.1%	0.7%	0.5%
Bursary fund	0.7%	1.7%	1.7%	2.3%	3.5%	3.6%	1.0%	0.6%	0.8%	1.2%
Higher educ. Loan	0.0%	0.0%	0.8%	0.5%	0.0%	0.5%	0.1%	0.3%	0.0%	0.2%
CDF	0.4%	2.3%	0.6%	1.3%	5.9%	2.1%	1.1%	0.5%	0.7%	0.9%
Women development fund	0.8%	1.6%	1.7%	0.9%	1.6%	0.0%	0.3%	0.8%	2.1%	0.9%
Women enterprise fund	0.1%	2.5%	0.3%	0.4%	1.5%	0.0%	0.0%	0.3%	0.6%	0.3%
Agric extension services	0.1%	0.6%	0.2%	0.5%	0.1%	0.0%	0.4%	0.3%	0.0%	0.3%
Livestock restocking	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LATF	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%
Work for youth	0.8%	2.0%	0.4%	1.6%	0.7%	0.7%	3.9%	1.5%	0.7%	1.7%
OVC programme	0.8%	0.6%	0.0%	0.9%	1.5%	0.4%	0.9%	0.5%	0.0%	0.7%
Older people programme	0.2%	0.1%	0.0%	0.0%	1.5%	1.8%	0.1%	0.0%	0.3%	0.2%
Other programme	4.0%	2.5%	7.4%	1.4%	1.4%	0.5%	0.3%	0.0%	0.8%	2.1%

CAUSAL ANALYSIS OF FOOD INSECURITY

A multivariate stepwise (forward) linear regression was conducted to explore individual level predictors of food insecurity. The dependent variable was a continuous variable indicating the food security status defined as a poor food consumption score. The variables that were found to be significantly associated with the outcome at the bilateral level were all included as possible predictors. The analysis relies on a cross-sectional survey. Therefore true causality cannot be confirmed. After adjusting for the other variables, the following model emerged, with a r^2 of 0.264

- The FCS decreased with age by a factor of -0.146 for each one year increase in the age of the household head;
- The predicted FCS among women was 2.17 pts lower than that of men;
- A higher CSI is associated with a lower FCS, in other word, for each additional point on the CSI, the FS decreases by a factor of -0.55;
- The wealth index, a continuous variable, was used to examine the association between wealth and the FCS. For each increase in wealth of 1 point, the FCS grew by 3.054;
- All the livelihood groups had a significantly higher FCS compared to those among the poor casual wage labourers.

The results of the regression analysis are presented in the table 27.

Table 27: Multivariate analysis

	Un-standardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	66.8	0.1		1057.3	p < 0.01
Age of household head in yrs	-0.1	0.0	-0.1	-177.5	p < 0.01
Gender of household head (female vs. male)	-2.2	0.0	0.0	-93.9	p < 0.01
Reduced CSI	-0.6	0.0	-0.2	-332.4	p < 0.01
Tropical Livestock Units	0.1	0.0	0.0	34.9	p < 0.01
Wealth index factor score	3.1	0.0	0.2	269.4	p < 0.01

Livelihood (compared to poor casual labourers)					p < 0.01
Non poor casual wage labourers	4.2	0.0	0.1	110.8	p < 0.01
Shop owners, traders	4.6	0.1	0.0	84.8	p < 0.01
Public salaried	2.7	0.0	0.0	68.8	p < 0.01
Petty traders/street vendors	4.6	0.0	0.1	124.2	p < 0.01
Small businessmen / artisans / room renters	4.5	0.0	0.1	140.6	p < 0.01
Beggars/borrowers/remittance receivers	4.1	0.1	0.0	66.0	p < 0.01
Other activities	3.8	0.1	0.0	74.8	p < 0.01
Crop producers	5.1	0.1	0.0	84.1	p < 0.01
Private salaried	2.1	0.0	0.0	58.0	p < 0.01
Monthly food expenditure (+ 1000 KSH)	1.0	0.0	0.3	622.0	p < 0.01
Monthly non-food expenditure (+ 1000 KSH)	0.1	0.0	0.0	71.1	p < 0.01

NUTRITION, HEALTH, AND HYGIENE

Nutritional vulnerability of urban households was determined by the nutritional status of children under-five years of age. Nutrition status of children of this age is a good indicator for community malnutrition because the impact of deprivation is first seen in their nutritional status. Three indicators of malnutrition were used in this survey; acute malnutrition (weight-for-height index and or bilateral pitting oedema), chronic malnutrition (height-for-age index) and underweight (weight-for-age index).

- Acute malnutrition indicates a deficit in tissue and fat mass compared with the amount expected in a child of the same height or length and sex. It indicates current malnutrition resulting from failure to gain weight or from actual weight loss. Causes include inadequate food intake, inappropriate infant and young child feeding practices, disease and or more frequently a combination of these factors. The index is appropriate for examining short-term effects such as seasonal changes in food supply or short-term nutritional stress brought about by illness. Very often seasonal episodes of wasting, related to variations in either food supply or disease prevalence, can develop very rapidly and under favorable conditions can be restored very quickly.
- Stunting signifies low length or height-for-age resulting from a slowing in skeletal growth. Stunting is a slow process and indicator of past growth. It is associated with poor overall economic conditions, especially mild to moderate, chronic or repeated infections as well as inadequate nutrient intake. Prevalence increases over time especially between 24-36 months because the process of retardation has been going on for a long time. Once established, stunting and its effects typically become permanent. Stunted children may never re-gain the height lost as a result of stunting, and most children will never gain the corresponding body weight. Scientific evidence demonstrates stunting can lead to impaired mental functions. Studies have consistently demonstrated that stunted children and adolescents perform poorer in cognitive, educational and psychosocial tests than their non-stunted counterparts (Crookston Penny and Alder, 2010 & Mendez and Adair, 1999).
- Underweight means having low weight for a specific age and sex. The index reflects both past (chronic) and/or present (acute) malnutrition, although it is unable to distinguish between the two. Weight-for-age is sensitive to changes and is thus used for monitoring growth of children.

In addition the presence of pitting oedema was assessed. Oedema is the retention of water in the tissues of the body. Bilateral pitting oedema is a sign of kwashiorkor, a severe form of acute malnutrition. The WHO Standards 2006 was used in interpreting the nutritional status of children 6-59 months of age.

CHILD MALNUTRITION

Prevalence of acute malnutrition (weight-for-height Z scores)

The prevalence of global acute malnutrition (GAM) among children in high-density urban areas of Kenya was 5.0 percent (95% CI: 3.1 – 8.0). The finding concurs with that of the most current national urban GAM rate at 5.3 percent (Kenya Demographic and Health Survey - KDHS 2008-09). Severe acute malnutrition (SAM) rate was 1.3 percent (95% CI: 0.8- 2.1) the same as rate as it was in 2008 (KDHS 2008-09).

Table 28: Prevalence of Acute Malnutrition (Weight for height/length)

Livelihood zone	Global Acute Malnutrition (GAM) <-2 Z-score and/or oedema % (95% CI)	Severe Acute Malnutrition (SAM) <-3 Z-score and/or oedema % (95% CI)
Agro-Pastoral	8.2 (5.1-11.3)	2.4 (0.9-3.9)
Coast Marginal	4.1 (1.9-6.3)	1.3 (0.1-2.6)
Mixed Farming HP	2.6 (0.8-4.4)	1.0 (0.1-2.1)
Marginal Mixed Farming	2.7 (2.0-4.4)	0.6 (0.2-1.4)
Mixed Farming (Cash Crop & Dairy)	3.3 (1.4-5.2)	0.6 (0.2-1.4)
Nairobi	2.4 (0.9-3.9)	0.7 (0.1-1.5)
NE Pastoral	10.7 (7.0-13.0)	2.7 (1.1-4.3)
NW Pastoral	7.1 (4.4-10.0)	1.1 (0.0-2.2)
SE Marginal	3.8 (1.7-6.0)	1.4 (0.1-2.7)
OVERALL (N=3016)	5.0 (3.1 – 8.0)	1.3 (0.8 – 2.1)
URBAN (National level)*	5.3	1.3
RURAL	7.0	2.0
NATIONAL (Urban + Rural)*	6.7	1.9

Source: Kenya Demographic Health Survey (KDHS) 2008-2009

The prevalence of GAM and SAM was highest among the Agro-Pastoral and NE Pastoral livelihood clusters. The three zones that registered GAM levels higher than the WHO acceptable rate of <5 percent (WHO, 1995) and also above the national urban rate (5.3%) were: NE Pastoral 10.7 percent (95% CI: 7.0-13.0) followed by Agro-Pastoral at 8.2 percent (95% CI: 5.1-11.3) and NW Pastoral at 7.1 percent (95% CI: 4.4-10.0) (Table 28). The nutrition situation in the Agro-Pastoral and NW Pastoral livelihood clusters is considered 'poor' while that of NE Pastoral is considered 'serious' based on the WHO guidelines.¹³ The findings may reflect the fact that the urban areas are located in arid and semi-arid lands (ASAL). Apart from the chronic food insecurity because of prolonged chronic drought, the areas have poorly developed infrastructure particularly in NW and NE Pastoral livelihood clusters. Availability and accessibility to a variety of foods and to health services is limited.

In three of the livelihood clusters, the GAM rates were within acceptable levels and less than the most current national urban rate. The GAM in Coastal Marginal was 4.1 percent (95% CI: 1.9-6.3) with a SAM of 1.3 percent (95% CI: 0.1-2.6). In South East Marginal the GAM was 3.8 percent (95% CI; 1.7– 6.0) and a SAM rate of 1.4 percent (95% CI: 0.1–2.7). In Mixed Farming C&D livelihood cluster, the GAM was 3.3 percent (95% CI: 1.4 – 5.2) whereas the SAM was 0.6 percent (95% CI: 0.2-1.4).

In the rest of the livelihood clusters, the GAM rates were more or less similar. In the Marginal Mixed Farming, the rate was 2.7 percent (95% CI: 2.0-4.4) and in the High Potential (HP) Mixed Farming 2.6

¹³ WHO cut off points for wasting using Z scores (<-2 Z scores in populations: <5% acceptable; 5-9% poor; 10-14% serious; >15% critical).

percent (95% CI: 0.8-4.4). The livelihood cluster with the lowest burden of malnutrition was Nairobi with a GAM of 2.4 percent (95% CI: 0.9 – 3.9) and SAM rate of 0.7 percent (95% CI: 0.1-1.5), which may be partly explained by the fact that Nairobi being the capital city, there are more opportunities for casual employment. In addition, there is better availability of foods coming from many parts of the country.

Overall, the findings imply no change in acute malnutrition since 2008 when the KDHS was last conducted (KDHS 2008-09). There was however, variability in nutritional vulnerability across the different livelihoods with the Pastoral livelihood clusters being at a greater risk.

Prevalence of chronic malnutrition (Height-for-age Z scores)

The global stunting rate for all livelihood clusters was 26.5 percent (95% CI: 22.3 – 30.2). This compares with that of the national urban rate at 26.4 percent and suggests little change since 2008 (KDHS 2008-09). The severe stunting rate of 9.2 percent (95% CI: 7.7-10.9) was slightly higher than the national urban rate at 8.7% (KDHS 2008-09) (Table 29).

The highest stunting rates (>30.0%) were observed in the Mixed Farming (C&D) livelihood zone at 32.5 percent (95% CI: 27.0 – 37.0) with severe stunting at 13.6 percent (95% CI: 9.4-16.6). Coastal Marginal recorded a stunting rate of 30.7 percent (95% CI: 25.0-35.0) and a severe stunting level of 10.3 percent (95% CI: 6.7-13.3). The third livelihood cluster with a stunting rate of over 30 percent was Nairobi, 30.5% (95% CI: 27.0-37.0) and severe stunting at 9.7 percent (95% CI: 6.9-12.5). Agro Pastoral livelihood cluster had a stunting rate of 29.6 percent (95% CI: 23.8-34.2) with severe stunting at 7.9 percent (95% CI: 4.8 – 11.0). The nutrition situation in these four livelihood clusters is considered “serious” based on the WHO cut-off-point of 30.0 – 39.0 percent.¹⁴ Stunting may be attributed to several factors including; chronic illness, chronic food insecurity, poor IYCF practices and inadequate access to maternal and child health services. Four of the livelihood clusters registered stunting levels between 20.0 – 29.0 percent and can therefore be categorized as having “poor” nutrition situation. These were: High Potential Mixed Farming, Marginal Mixed Farming, North West Pastoral and SE Marginal. It was in only one livelihood cluster, NE Pastoral, that the rate of stunting was within acceptable levels (<20%) according to WHO guidelines.

Table 29: Prevalence of chronic/ stunting malnutrition

Livelihood zone	Global Chronic Malnutrition <-2 Z score % (95% CI)	Severe Chronic Malnutrition <-3 Z score % (95% CI)
Agro-Pastoral	29.6 (23.8-34.2)	7.9 (4.8-11.0)
Coast Marginal	30.7 (25.0-35.0)	10.3 (6.7-13.3)
Mixed Farming HP	28.8 (23.0-33.0)	9.7 (6.4-13.0)
Marginal Mixed Farming	20.7 (15.8-24.2)	8.0 (5.1-10.9)
Mixed Farming (Cash Crop & Dairy)	32.5 (27.0-37.0)	13.6 (9.4-16.6)
Nairobi	30.5 (25.6-34.4)	9.7 (6.9-12.5)
NE Pastoral	16.3 (12.3-19.7)	6.9 (4.3-9.5)
NW Pastoral	22.7 (17.7-26.3)	7.1 (4.3-9.8)
SE Marginal	28.5 (22.9-33.1)	9.7 (6.3-13.1)
OVERALL (N=3028)	26.5 (22.3 -31.2)	9.2 (7.7 -10.9)
URBAN (National level)*	26.4	8.7
RURAL	37.1	15.3
NATIONAL (Urban + Rural)*	35.3	15.3

Prevalence of underweight

¹⁴ WHO cut off points for stunting using Z scores (<-2 Z scores in populations: <20% acceptable; 20-29% poor; 30-39% serious; ≥40% critical).

The global underweight rate for all the livelihood clusters was 13.1 percent (95% CI: 10.4-16.5). The rate was higher than the national urban rate at 10.3 percent (KDHS, 2008-09). Five of the livelihood clusters had underweight rates above the national urban level. These were: NW Pastoral with a global underweight rate of 18.6 percent (95% CI: 14.0-22.0); followed by Coastal Marginal 17.3 percent (95% CI: 12.9-21.1); Agro Pastoral 16.0 percent (95% CI: 11.8-20.2); NE Pastoral 14.9 percent (95% CI: 10.5-17.5) and SE Marginal 13.5 percent (95% CI: 9.2-16.8). The rest of the livelihood clusters registered global underweight rates below the national rate of 10.3 percent. The lowest global underweight rate of 6.7 percent (95% CI: 4.1- 9.3) was recorded in Nairobi (Table 30).

Table 30: Prevalence of underweight by livelihood cluster

Livelihood zone	Global Underweight <-2 Z-score and/or oedema %	Severe Underweight <-3 Z-score and/or oedema %
Agro-Pastoral	16.0 (11.8-20.2)	6.1 (3.4-8.9)
Coast Marginal	17.3 (12.9-21.1)	3.8 (1.7-5.9)
Mixed Farming HP	9.4 (6.1-12.7)	1.9 (0.4-3.4)
Marginal Mixed Farming	6.7 (4.1-9.3)	0.6 (0.1-2.1)
Mixed Farming (Cash Crop & Dairy)	12.4 (8.5-15.5)	3.0 (1.2-4.8)
Nairobi	10.1 (7.1-12.9)	1.7 (0.5-3.0)
NE Pastoral	14.9 (10.5-17.5)	1.6 (0.3-2.9)
NW Pastoral	18.6 (14.0-22.0)	4.2 (2.1-6.3)
SE Marginal	13.5 (9.2-16.8)	2.0 (0.4-3.6)
OVERALL (N=3037)	13.1 (10.4-16.5)	2.7 (1.7-4.3)
URBAN (National level)*	10.3	1.2
RURAL	17.3	4.1
NATIONAL (Urban + *Rural)	16.1	3.6

*Kenya Demographic Health Survey (KDHS) 2008-2009

The overall prevalence of severe underweight for all the livelihood clusters was 2.7% (95% CI: 1.7-4.3), higher than the most recent national survey that found a rate of 1.2% (KDHS 2008-09). The highest rate of severe underweight was observed in Agro-Pastoral livelihood cluster at 6.1% (95% CI: 3.4 - 8.9) and the lowest in the High Potential Mixed Farming 1.9% (95% CI: 0.4-3.4).

Compared to rural areas, the nutritional status of the children in the urban areas is better based on the three indices (weight for height, height for age and weight for age), which may be attributed to; better access to healthcare, higher income levels, increased availability and accessibility to a variety of foods due to better infrastructure and market integration in urban areas.

Prevalence of acute malnutrition based MUAC

MUAC was also used to determine the nutritional status of children 6-59 months of age using the WHO cut-off points (<11.5 cm) for severe malnutrition. MUAC is an indicator that is used to estimate mortality risk. The overall prevalence of acute malnutrition was 2.3 percent. NW Pastoral zone had the highest prevalence (4.0%) and Agro-Pastoral zone at 3.2 percent (Table 31). The lowest prevalence (1.3%) was observed in High Potential Mixed Farming livelihood clusters.

Table 31: Prevalence of acute malnutrition based on MUAC

Livelihood zone	Severe <11.5cm %	Moderate 11.5-<12.5 cm %	Total malnourished %	At risk12.5- <13.5 cm %	Total malnourished/ or at risk %
Agro-Pastoral	0.7	2.5	3.2	10.0	13.3
Coast Marginal	1.3	1.0	2.2	10.2	12.4
Mixed Farming HP	0.0	1.3	1.3	10.0	11.4

Marginal Mixed Farming	0.6	0.9	1.6	7.5	9.1
Mixed Farming (Cash Crop & Dairy)	0.0	2.8	2.8	7.5	10.3
Nairobi	0.3	1.5	1.8	7.3	9.1
NE Pastoral	0.3	2.0	2.3	7.2	9.5
NW Pastoral	1.2	2.8	4.0	15.1	19.1
SE Marginal	0.3	1.4	1.7	7.6	9.3
OVERALL (N=3035)	0.5	1.8	2.3	9.1	11.4

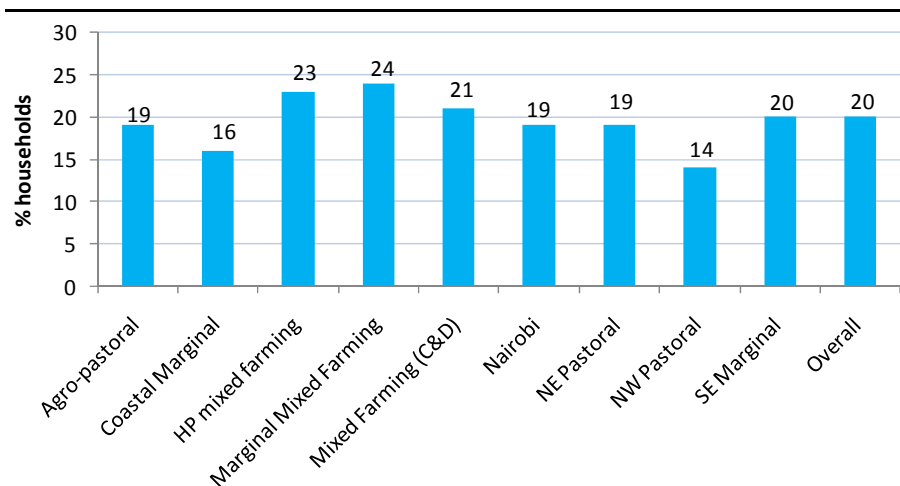
*MUAC cut-off-points based on WHO guidelines

MORBIDITY AND ILLNESS

Morbidity among individuals ≥ 5 years

The survey assessed morbidity among the high-density urban population. The two-week period morbidity prevalence showed that one in five individuals experienced some form of sickness over the two weeks period prior to the survey. This was highest in the Marginal Mixed Farming livelihood cluster (24%), and lowest in NW Pastoral (14%) (Figure 41).

Figure 39: Morbidity among individuals over five years of age in a household



Acute respiratory infections (ARIs) were most prevalent in all livelihood clusters except NW and NE Pastoral zones, where malaria was most prevalent.

Table 32: Morbidity prevalence during the past 2 weeks for individuals above 5 years

	Cough	Malaria	Diarrhea	Fever	Infections (eye & skin)	Abdominal pain	Severe headache	Other
Nairobi	36.1%	25.7%	3.7%	13.6%	5.8%	9.9%	18.8%	31.4%
Agro-Pastoral	32.7%	15.6%	4.7%	13.6%	5.1%	11.7%	20.2%	49.0%
SE marginal	22.0%	28.9%	4.3%	25.9%	7.3%	14.7%	15.9%	34.5%
Coast Marginal	37.4%	14.6%	4.1%	15.6%	3.7%	7.8%	20.1%	45.6%
NW Pastoral	25.6%	31.8%	6.3%	20.6%	9.0%	12.6%	15.7%	31.4%
NE Pastoral	17.7%	33.3%	5.2%	26.7%	6.6%	10.8%	21.2%	38.5%
Mixed Farming HP	28.2%	24.6%	2.5%	11.3%	4.9%	13.0%	15.5%	35.9%
Mixed Farming	34.1%	14.6%	4.2%	11.8%	7.3%	8.0%	19.2%	40.1%
Marginal Mixed Farming	18.8%	30.3%	4.7%	13.7%	7.6%	8.3%	19.5%	36.5%
Overall	27.9%	24.1%	4.4%	16.9%	6.3%	10.6%	18.6%	38.5%

Healthcare

A majority ($\geq 65\%$) of the individuals identified as having been sick over the two weeks prior to the survey did seek medical attention (Figure 42). The reason for not seeking healthcare was most frequently the mildness of the illness. However, the cost of care was the main constraint for 37 percent of those who did not seek care (about 10% of all those who were sick) (Figure 43).

Figure 40: Proportion of those reporting sickness who sought healthcare

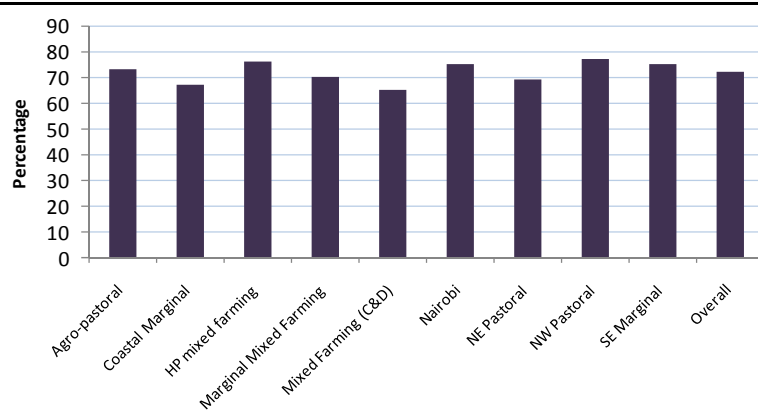
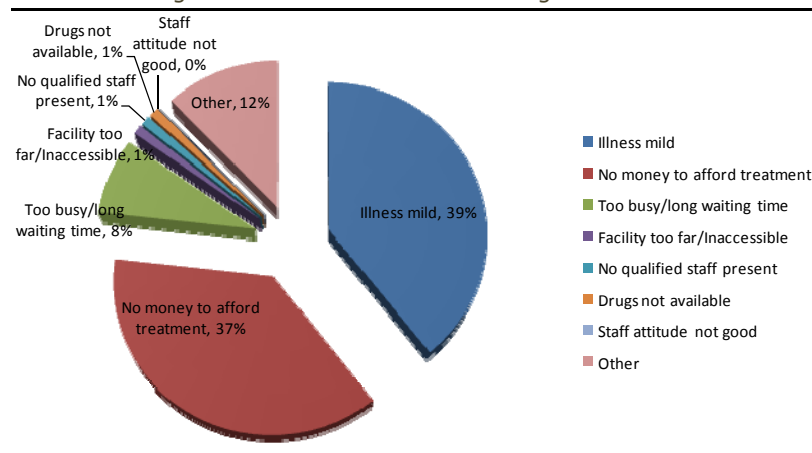
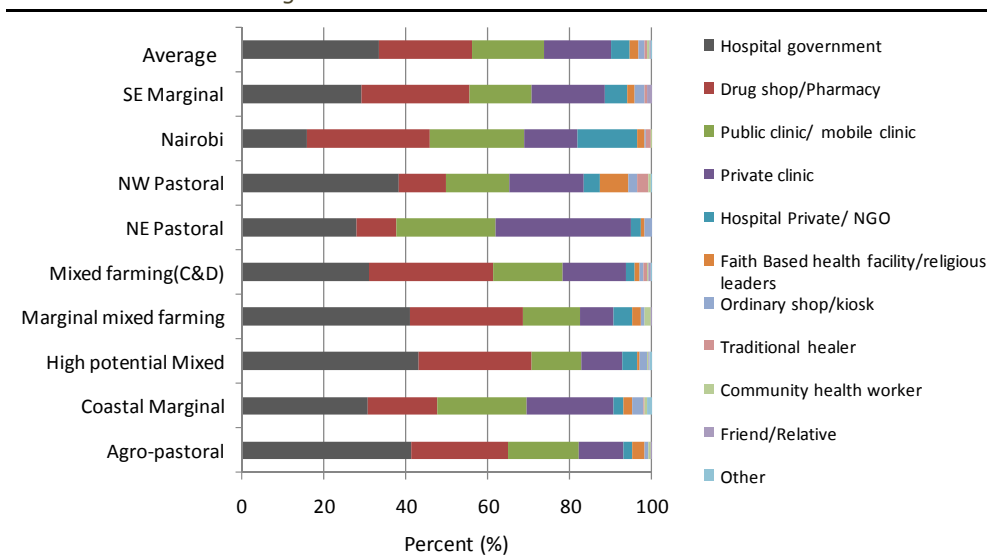


Figure 41: Reasons for not seeking healthcare



Those who sought care frequently went to a government hospital (33%), a pharmacy (23%), a public clinic (18%), or a private clinic (16%). There were variations across livelihood clusters, likely reflecting the type of facilities available. In Nairobi, pharmacies accounted for 30 percent, more than anywhere else (Figure 44).

Figure 42: Location of household consultation for health care



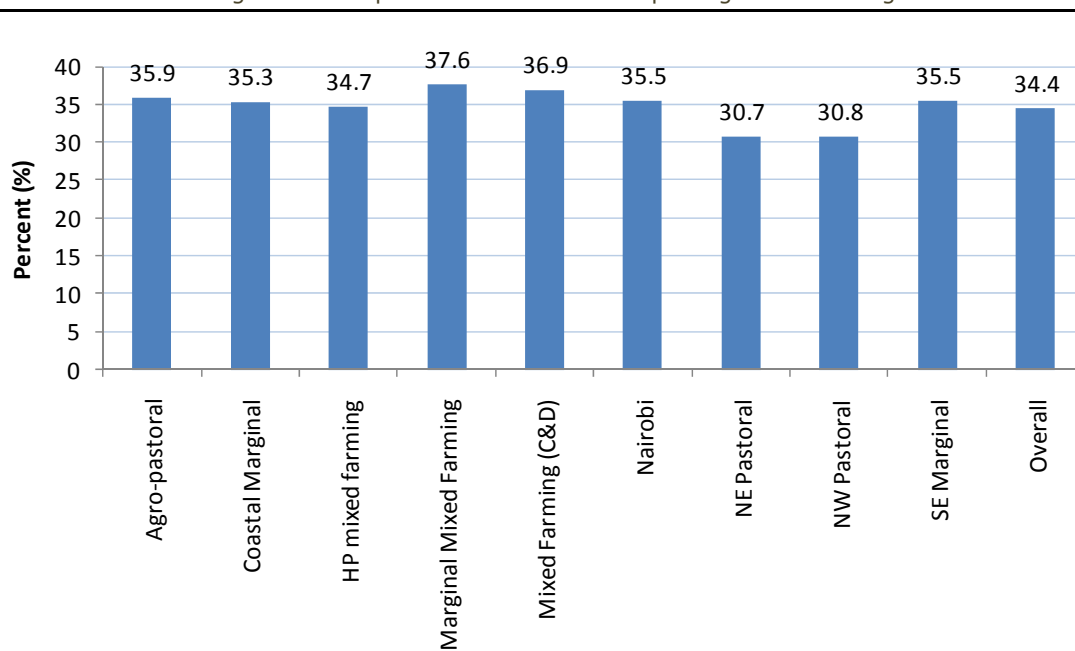
Morbidity prevalence for children 0-59 months old

Infection is categorized by UNICEF as an immediate determinant of malnutrition among children (UNICEF, 1999). Infections cause a deterioration of nutritional status by depleting the critical body stores of protein, energy, minerals and vitamins. The loss of body stores of these nutrients consequently compromises the immunity status of the children rendering them more prone to infection. This cycle: [malnutrition - infection - further nutritional deterioration - more infections] is a powerful pathway. The interactions are synergistic; the combined effects of malnutrition and infections are more profound than the sum of the individual effect of either one alone (Scrimshaw, Taylor & Gordon, 1968). A dual response on nutrition and infection is therefore needed for an optimal response in improving and preventing the nutritional status of children from deteriorating.

Prevalence of child morbidity

The prevalence of child morbidity was determined by two-week recall; inclusive of the day of the survey. The prevalence was based on the mother's or caregiver's self-reported information based on her perception of illness without verification by medical personnel and may therefore be biased. The morbidity burden was high in all the livelihood clusters. Overall, about one third (34.3%) of the children from all the livelihood clusters were reported sick. Disaggregation by livelihood clusters showed limited variation in the prevalence of illness, ranging from 37.6 to 30.7 percent. The highest burden of morbidity (37.6%) was reported in Marginal Mixed Farming, followed by Mixed Farming (C&D) at 36.9%, and then Agro-Pastoral at 35.9 percent. The lowest prevalence of morbidity was recorded in NE Pastoral (30.7%) and in NW Pastoral at 30.8 percent (Figure 45).

Figure 43: Proportion of households reporting illness among children



Prevalence of Common Childhood Illnesses

Acute respiratory infections (ARI) are defined as common cold, flu, difficulty in breathing and pneumonia. ARI is one of the leading causes of childhood morbidity and mortality throughout the world. Early diagnosis and treatment with antibiotics can prevent a large number of deaths caused by ARI. The most prevalent childhood illness was ARI. Overall, over one-quarter (26.5%) of the children suffered from ARI, which was a much higher prevalence than 7.0 percent, national urban rate reported in 2008 (KDHS 2008-09)¹⁵. Disaggregated by livelihood clusters, the highest prevalence of ARI was reported in Coast Marginal and the lowest in NE Pastoral (table 33).

Table 33: Prevalence of common childhood illness by livelihood cluster

Livelihood zones	Common Illnesses						
	Diarrheal Diseases*	Malaria and/or chills	Fever	ARIs**	Measles	Parasites	Others
	%	%	%	%	%	%	%
Agro-Pastoral	8.8	9.5	16.1	32.1	0	2.2	31.4
Coast Marginal	13.7	6.9	22.5	35.3	0	2.9	18.6
Mixed Farming HP	4.6	25.9	17.6	32.4	0	2.8	16.7
Marginal Mixed Farming	12.3	18.7	22.2	18.2	0.5	3.9	24.1
Mixed Farming (Cereal & Dairy)	12.9	11.7	14.7	32.5	2.5	2.5	23.3
Nairobi	18.1	11.5	19.8	27.5	1.1	2.7	19.2
NE Pastoral	9.7	31.9	23.0	15.0	0	2.7	17.7
NW Pastoral	19.6	30.8	6.5	24.3	0.9	0	17.8
SE Marginal	11.5	22.1	22.1	25.0	1.0	2.9	15.4
OVERALL	12.6	17.9	18.5	26.5	0.7	2.6	21.1

* *Acute, chronic, watery and bloody diarrhea. Diarrhea \geq 3 loose stools per day (WHO definition);**ARIs (Common cold, flu, difficulty in breathing, and pneumonia).*

The most common diseases/symptoms included:

¹⁵ The KDHS data was collected from November 2008 to February 2009 (just before the long rains) and the data for this survey was collected in August and September 2010 (just before the short rains)

- Fever; a symptom of acute infections in children. Fever contributes to high levels of malnutrition and mortality. The prevalence of fever (alone or in combination with other illnesses) was 18.5 percent for all the livelihood clusters, which was an improvement from the national urban rate of 22.0 percent in 2008 (KDHS 2008-09). The prevalence of fever varied from 23.0 percent in NE Pastoral to 6.5 percent in NW Pastoral (table 32).
- Malaria contributes to high levels of malnutrition and mortality among children. Because malaria is a major contributor to death in infancy and childhood in many developing countries, it is important that effective malaria treatment be given promptly to prevent the disease from becoming severe and complicated. Overall, the prevalence of malaria was 17.9 percent. Analysis by livelihood clusters showed the highest burden of this disease in North West Pastoral (30.8%) and the lowest in Coast Marginal at 6.9 percent (table 32).
- Dehydration caused by severe diarrhea is a major cause of morbidity and mortality among young children, although the condition can be easily treated with oral rehydration therapy (ORT). In interpreting the findings it should be remembered that diarrhea prevalence varies seasonally. Prevalence is usually highest during the rainy season. The overall prevalence of diarrheal diseases was 12.6 percent. The rate was lower than the 16.8 percent national urban rate in 2008 (KDHS 2008-09). The highest prevalence (19.6%) was reported in NW Pastoral and the lowest 4.6 percent in High Potential (Mixed Farming).
- Intestinal parasitic infections contribute to childhood morbidity is a risk factor associated with poor nutritional status among children. A relatively smaller percentage of children (2.6%) had parasitic infections.

Duration of illness

Illness can cause grave consequences to the nutritional status of a child. The longer the duration of the illness, the higher the chances of the child's nutritional status deteriorating with greater mortality risk. Rehabilitating and treating such a child is likely to take longer and be more costly. Long episodes of illness, particularly of diarrheal diseases, ARI and malaria have scientifically been demonstrated to compromise the nutritional status of children.

On average, the duration of the last episode of illness was long; about one week (6.8 days, sd 4.1) from all the livelihood clusters (table 34). There was minimal variation from one livelihood cluster to another. The highest duration of illness was recorded in Nairobi 7.2 days (sd 4.3) and Coastal Marginal at 7.2 days (sd 4.2) and the lowest in NE Pastoral at 6.2 days (sd 3.4). The findings indicate that the children were ill for long periods of time placing them at higher risk of malnutrition and mortality.

Table 34: Mean duration of illness episode among children 0-59 months old

Livelihood zone	Mean (SD) number of days illness lasted
Agro-Pastoral	6.7 ± 4.2
Coast Marginal	7.2 ± 4.2
Mixed Farming HP	6.4 ± 4.2
Marginal Mixed Farming	7.0 ± 4.4
Mixed Farming (Cereal & Dairy)	6.5 ± 4.0
Nairobi	7.2 ± 4.2
NE Pastoral	6.2 ± 4.0
NW Pastoral	6.8 ± 4.4
SE Marginal	6.6 ± 4.0
Overall	6.8 ± 4.0

SEEKING OF HEALTH SERVICES

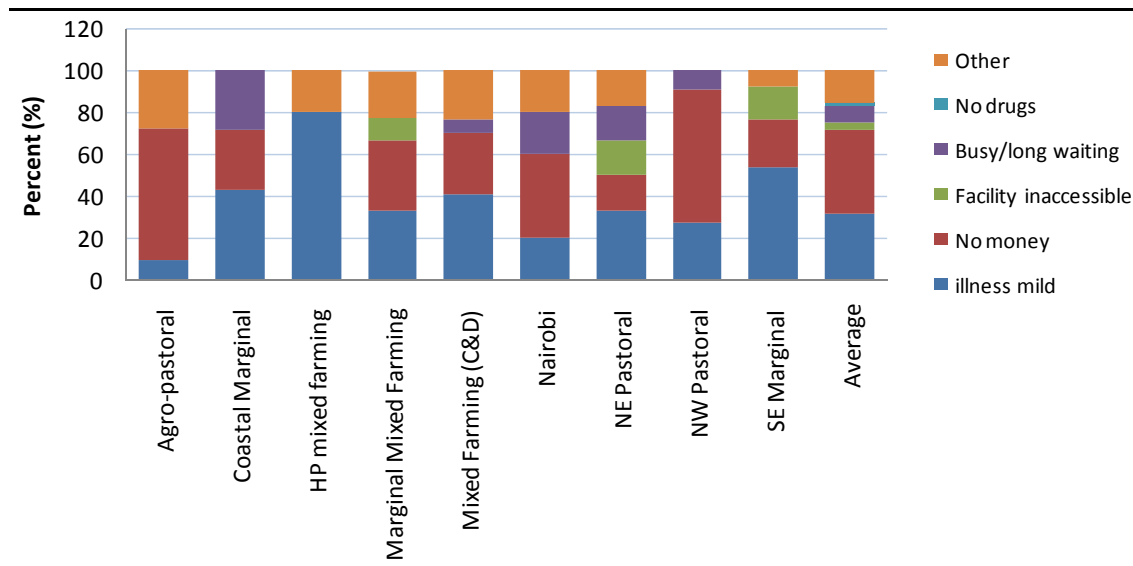
Consultations made for ill children

Consultations were made for 76.9 percent of the sick children from all the livelihood clusters. The highest consultation rates were made in High Potential (HP) Mixed Farming (87.8%) zone followed by Nairobi (83.8%) and NE Pastoral (82.5%). The lowest consultations (65.4%) were made in Mixed Farming (C&D) zone. Timely health seeking is important to prevent a sick child's condition from deteriorating and increasing the risk of mortality. Despite the fact that for the majority of the sick children, consultations were made, they were not made timely (within 24 hours of falling ill) for a majority of them. Timely health seeking was sought for only 46.2 percent of the children from all the livelihood clusters. The livelihood cluster which registered the highest proportion of children for whom timely health seeking was made was NW Pastoral (71.4%), followed by Marginal Mixed Farming at 58.7 percent and Agro-Pastoral at 51.6 percent. The rest of the livelihood clusters reported less than 50.0 percent with the lowest proportion of children for whom timely consultations were made in Coast Marginal at 15.2 percent.

Reasons for not making consultations for sick children

Reasons for not making consultations or seeking assistance for sick children varied from one livelihood cluster to another. The most commonly mentioned reason (40.0%) was lack of money to pay for health services (Figure 49). The highest proportion of respondents who reported a lack of money for healthcare were from NW Pastoral (63.6%) and a similar proportion from Agro-Pastoral zone. In the High Potential Mixed Farming zone, no respondent reported lack of money as a hindrance. Secondly, many respondents viewed the illness as mild and therefore did not seek assistance. The highest proportion of respondents (80.0%) who did not seek assistance for this reason were from the High Potential Mixed Farming followed by SE Marginal by 53.8 percent and the lowest proportion of respondents (20.0%) were from Nairobi (Figure 46).

Figure 44: Reasons for not seeking assistance for sick children



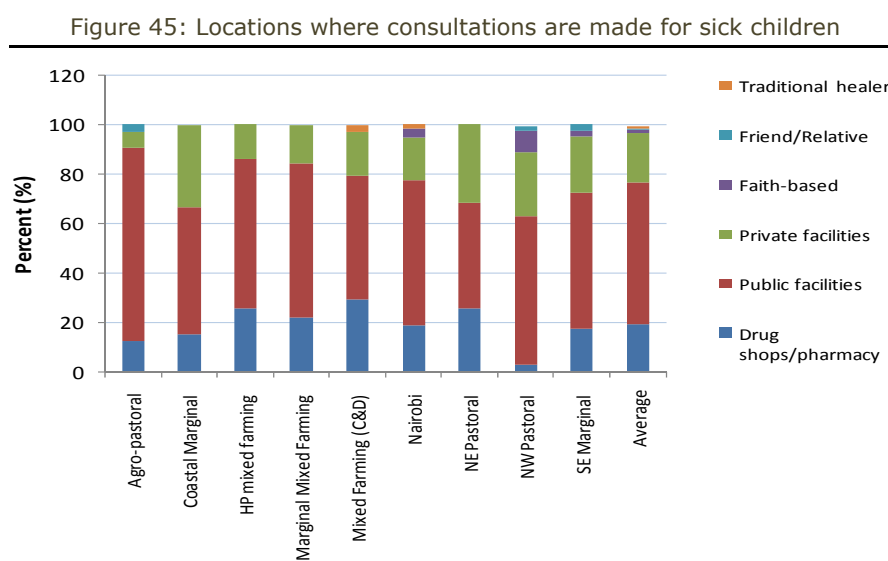
Another reason given for not seeking assistance was that the health facilities were inaccessible, reported by 16.7 percent in NE Pastoral zone, 15.7 percent from SE Marginal and 11.1 percent from Marginal Mixed Farming (Figure 46). Busy, overcrowded health facilities leading to long waiting times was a deterrent for 28.6 percent of respondents from Coastal Marginal zone, 20.0 percent from Nairobi and 16.7 percent from NE Pastoral. The lowest proportion was reported in Mixed Farming (C&D) whereas no

respondents from Agro-Pastoral, HP Mixed Farming, Marginal Mixed Farming and SE Marginal reported long waiting times as a reason for not seeking consultations for sick children.

On the whole, these findings concur with those from Focus Group Discussions (FGDs) with mothers of young children. Many factors were reported to influence health seeking behaviour during these discussions. The most important factor according to the majority of the participants was unaffordable, high healthcare costs. It was reported that health services were not free even in public health facilities as clients had to purchase the prescribed drugs. Distance to the health facilities was reported to be a major constraint in the utilization of health facilities as this implied transport costs. Overcrowding and long queues at the public health facilities were reported to limit their utilization. The low quality of services provided was another important challenge in the seeking of health services. Availability of qualified staff, lack of laboratory facilities and drugs, limited in-patient facilities were cited as major challenges. Other problems included poor service provision by uncaring staff.

Where consultations for sick children were made

Just over half of the mothers/caregivers (57.4%) of sick children from all livelihood clusters made consultations in public health facilities (either public clinics or government hospitals) as figure 47 shows. Analysis by livelihood cluster indicated that at least half (50.0%) of the consultations from each of the livelihood clusters were made at public health facilities (figure 50). The highest proportion of consultations (78.2%) made at public health facilities was in Agro-Pastoral livelihood cluster and the lowest (50.0%) in Mixed Farming (C&D) zone. The proportion of consultations made in public health facilities in Nairobi (58.6%) was lower than expected given that probably it has more such facilities than the other livelihood clusters. These findings were corroborated by those from the FGDs in which the participants reported that most of the consultations facilities for sick children were made at government and public health facilities.



A worrying finding was the relatively high proportion of respondents who sought assistance for their sick children from pharmacies, shops or kiosks. This is dangerous behaviour because it implies respondents self-prescribe drugs or consult unqualified persons for assistance without professional diagnosis. About one-fifth (19.0%) of respondents from all livelihood clusters sought assistance from drug 'shops' or pharmacies. Disaggregated by livelihood cluster, over 10% of the consultations from each of the livelihood clusters were made at the shops with the exception of NW Pastoral which reported only 2.9 percent of such consultations. The zone that reported the highest proportion of consultations was Mixed Farming (C & D) at 29.4 percent followed by NE Pastoral at 25.7 percent.

COVERAGE OF HEALTH SERVICES

Health service coverage is an indication of service quality and utilization. This survey focused on the health service coverage for children under five years of age as per the WHO recommended protocol for developing countries. Immunization, vitamin A supplementation and de-worming coverage are basic health services and a reflection of how the population access them. The coverage rates were based on documented evidence (child health cards) and on maternal or caregivers' reported information. The WHO cut-off-point is 80% as the acceptable level of coverage for immunization, vitamin A supplementation and de-worming.

Immunization Coverage for children 0-59 months old

The ultimate goal of immunization programs is to reduce the incidence of vaccine-preventable diseases in children and is achieved through full immunization coverage against five diseases (poliomyelitis, diphtheria, pertussis, tetanus, and measles) by the end of the first year of life. Immunization coverage was calculated based on cases recorded on child health card and those based on maternal/caregiver reports. There is a likelihood, therefore of recall bias influencing the findings. For all the antigens, about one-third of the cases reported immunized were based on recall.

The immunization coverage for all the antigens was high and above the 80 percent WHO cut-off-point. These findings are in agreement with those of KDHS 2008-09. For BCG, the overall coverage for all livelihood clusters was 98.2 percent, higher than the national urban rate at 96.2 percent (KDHS, 2008-09) (Table 34). Analysis by livelihood cluster showed the highest rate of BCG immunization in Nairobi and High Potential (HP) Mixed Farming livelihood clusters at 99.8 percent and the lowest rate in Mixed Farming (C&D) at 96.6 percent. The overall coverage rate for OPV1 (96.4%) was slightly lower than the national urban coverage rate at 97.1 percent. The highest coverage rate for OPV1 (98.0%) was observed in SE Marginal and the lowest in NE Pastoral zone (92.2%). As in the case of OPV1, the overall coverage for OPV2 (93.6%) was slightly lower than the national urban rate (95.6%). Disaggregated by livelihood cluster, SE Marginal zone had the highest coverage (96.2%) and NE Pastoral zone the lowest at 87.9 percent. By contrast, the overall coverage rate for OPV3 (90.5%) was slightly higher than the national urban rate at 88.5 percent (KDHS 2008-09). The highest coverage was reported in Nairobi (93.1%) and the lowest (83.6%), in NE Pastoral.

The immunization coverage rate for measles was calculated for children below nine months old as the vaccine is supposed to be administered at the age of nine months. The overall coverage (91.1%) was higher than the national urban rate of 88.5 percent (KDHS 2008-09). SE Marginal zone reported the highest coverage (94.6%) and NE Pastoral zone the lowest at 85.3 percent. The overall percentage of children 12-23 months old fully immunized (those who had received vaccination for all the antigens) was 93.6 percent compared to the national rate of 77.0 percent (KDHS 2008-09). It should be noted that the national rate was not disaggregated by urban and rural status and is therefore expected to be lower because of poor accessibility to health facilities in rural areas. The highest coverage rate for fully immunized children was in Nairobi (99.0%) and the lowest in NE Pastoral zone (82.3%) (Table 35).

Table 35: Immunization coverage

Livelihood zone	BCG	OPV/1 DPT1	OPV/2 DPT2	OPV 3/ DPT3	Measles	Fully Immunized (children 12-23 months old)**
Agro-Pastoral	99.3	97.7	94.1	91.7	93.4	97.0
Coast Marginal	97.5	97.2	95.2	91.8	93.3	93.2
Mixed Farming	98.8	97.1	94.1	91.1	93.3	92.8
Marginal Mixed Farming	97.8	94.5	92.3	89.5	86.6	91.0
Mixed Farming (Cereal & Dairy)	96.6	96.9	95.7	92.0	93.8	97.1
Nairobi	99.8	97.3	94.9	93.1	93.1	99.0
NE Pastoral	96.7	92.2	87.9	83.6	85.3	82.3
NW Pastoral	98.6	97.8	93.3	89.6	87.5	94.4
SE Marginal	99.1	98.0	96.2	92.9	94.6	94.7
OVERALL	98.2	96.4	93.6	90.5	91.1	93.6
National Urban*	96.2%	97.2	95.6	88.5	90.4	

***KDHS 2008-09; ** children who received vaccinations for all the antigens**

The overall picture was that immunization coverage for all the antigens was above the WHO-cut-off points (80%) and compares well with national urban rates. NE Pastoral livelihood cluster registered the lowest coverage rates.

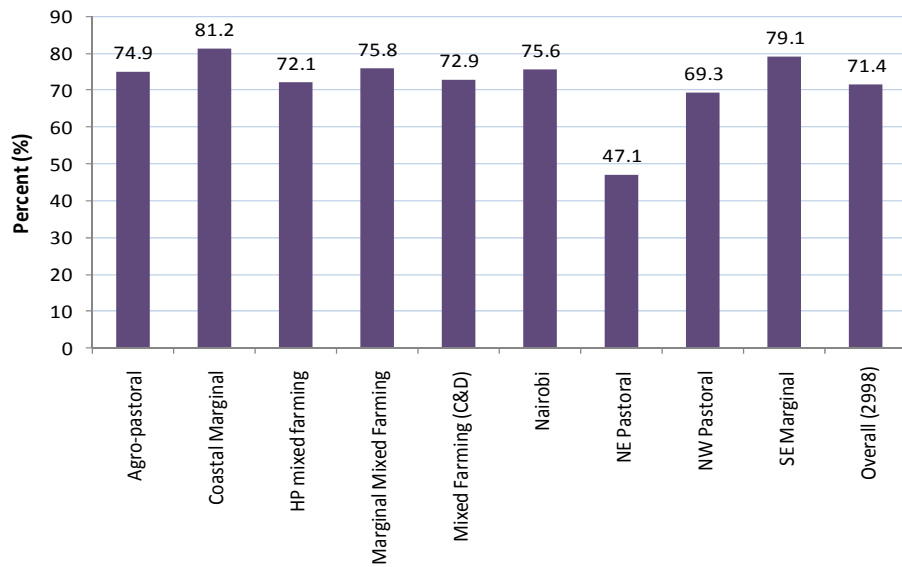
Vitamin A supplementation coverage for children 6-59 months old

Globally, it is estimated that 140–250 million children under five years of age are affected by vitamin A deficiency (VAD). In Kenya, the prevalence of sub-clinical VAD pre-school children is 84% (FAO, 2005). Children with VAD suffer a dramatically increased risk of death, blindness and illness, especially from measles and diarrhoea. Vitamin A is essential for the functioning of the immune system and the healthy growth and development of children. Part of the global strategy to eliminate VAD and its consequences is to ensure that young children living in areas where vitamin A intake is inadequate receive routine vitamin A supplementation together with breastfeeding, dietary improvement and food supplements.

Provision of vitamin A supplements every four-six months is a cheap, quick, and effective way to improve vitamin A status and save children's lives (www.who.int/vaccines/en/vitamina.shtml, 2010 & Rotondi and Khobzi, 2009). WHO stipulates that children below five years of age living in areas where the vitamin A intake is inadequate should receive the vitamin A supplement every 6 months. Kenya has adopted this policy and aims to provide supplementation once every 6 months for children 6-59 months old. According to this; children 6-11 months of age should receive the supplement once and those 12-59 months, twice in a period of 12 months. 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 during national days, which are meant to improve coverage especially in areas where there is limited accessibility to health facilities.

The overall vitamin A supplementation coverage rate (for children 6-59 months old in the last 6 months) from all the livelihood zones was 71.4%, more than double the national urban rate of 34.8% (KDHS 2008-09). Despite this, the overall coverage rate was lower than the WHO recommended acceptable rate of 80.0%. Analysis by livelihood clusters indicated that the WHO target was met only in Coastal Marginal zone (81.2%). All the other livelihood clusters reported coverage rates between 69.3% - 79.1%, with the exception of NE Pastoral zone, which reported a low coverage of 47.1% (Figure 48).

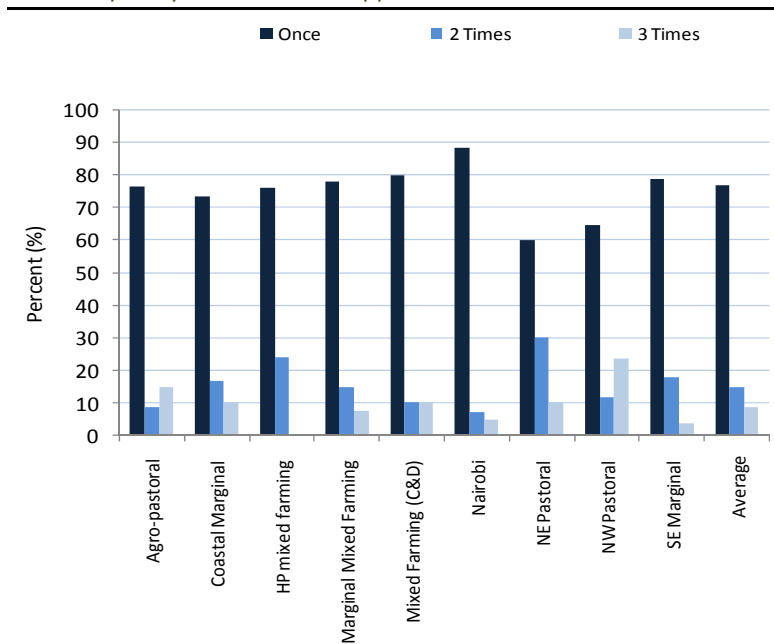
Figure 46: Vitamin A supplementation coverage for children 6-59 months old



Vitamin A supplementation coverage for children 6-11 months old

The frequency of vitamin A supplementation in the last 12 months was established for children 6-59 months old. The findings are disaggregated by age categories; 6-11 months old who should have received the supplement once and 12-59 months old who should have received it twice in the last 12 months, which is in accordance with the WHO guidelines that a child 6-59 months old should receive the supplement every six months. The majority (76.8%) of children 6-11 months old from all the livelihood zones had received vitamin A supplementation once in accordance with the WHO guidelines (Figure 49). Disaggregated by livelihood zone, only two livelihood zones attained the WHO 80% acceptable level; Mixed Farming C & D (80.0%) and Nairobi (88.4%). The rest did not meet the target with NE Pastoral recording the lowest percentage of children at 60.0 percent. Some children received supplementation twice or three times because of the integration of vitamin A supplementation with immunization during national days.

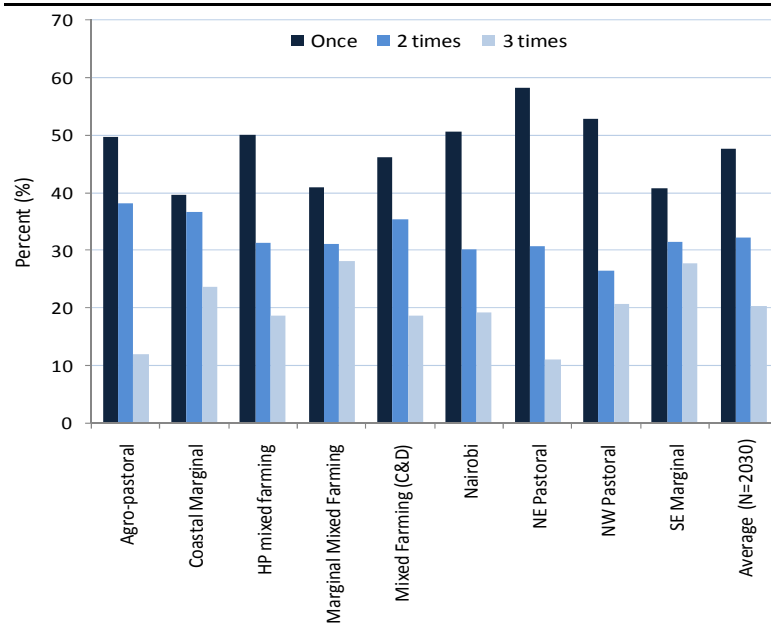
Figure 47: Frequency of vitamin A supplementation for children 6-11 months old



Vitamin A supplementation Coverage for children 12-59 months old

For children 12-59 months old, the overall picture was that 47.6 percent of the children had received the supplementation once whereas only 32.2 percent had received the supplementation twice. The livelihood cluster with the highest coverage for those who received vitamin A supplementation twice was Agro Pastoral at 38.2 percent and the lowest was NW Pastoral at 26.5 percent (Figure 50).

Figure 48: Frequency of vitamin A supplementation for 12-59 month olds

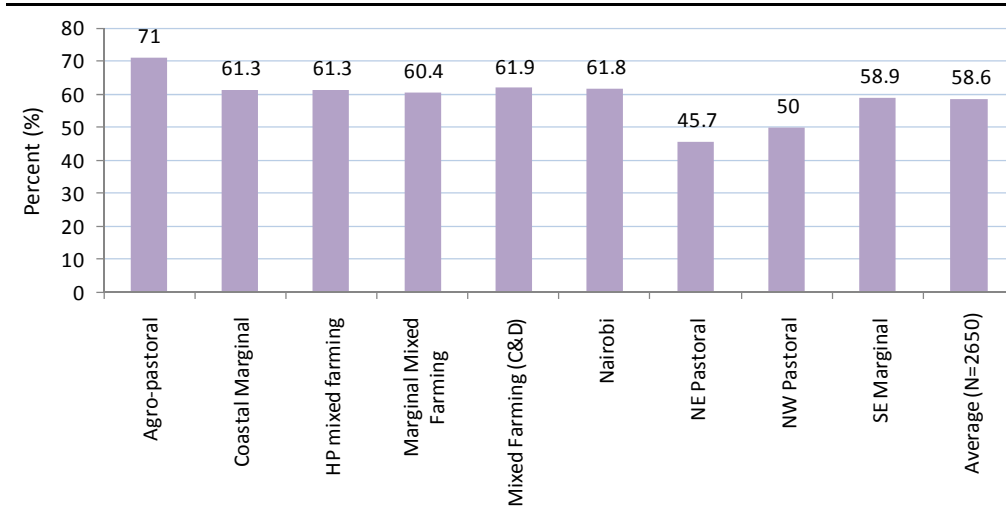


While the coverage rate of vitamin A supplementation is relatively high, the frequency of supplementation is inadequate. The majority of the children 12-59 months old had received the supplement only once and not the expected two times in the 12 month-period preceding the survey. It appears that the majority of those who receive the supplement are the younger children (those 6-11 months old), probably because this age of children visit the maternal and child health clinics (MCH) for immunization and then after that there is less contact with the health providers. Nonetheless, it would be expected that most of the children 12-59 months old should have received vitamin A supplementation more than once in the last 12 months because of the mass supplementation given to children during the national campaign days. Of concern is the large proportion of children for whom vitamin A supplementation was based on maternal and caregivers’ recall and not on documentation.

De-worming of children 12-59 months old

Certain types of intestinal parasites can cause anaemia. Periodic de-worming for organisms like helminthes and schistosomiasis (bilharzia) can improve children’s micronutrient and nutritional status. WHO recommends that children in developing countries exposed to poor sanitation and poor availability of clean safe water be de-wormed once, every six months. The de-worming coverage rates in all livelihood clusters were lower than the WHO cut-off-point of 80 percent. Overall, the coverage rate was 58.6 percent with the highest rate reported in Agro-Pastoral zone at 71.0 percent and the lowest rate in NE Pastoral at 45.7 percent (Figure 51).

Figure 49: De-worming coverage for 12-59 months olds



The coverage rates in this survey are higher than the national urban rate at 43.7 percent, an indication that the coverage of de-worming is an area needing attention in the provision of health services to children under-five years of age.

INFANT AND YOUNG CHILD FEEDING PRACTICES

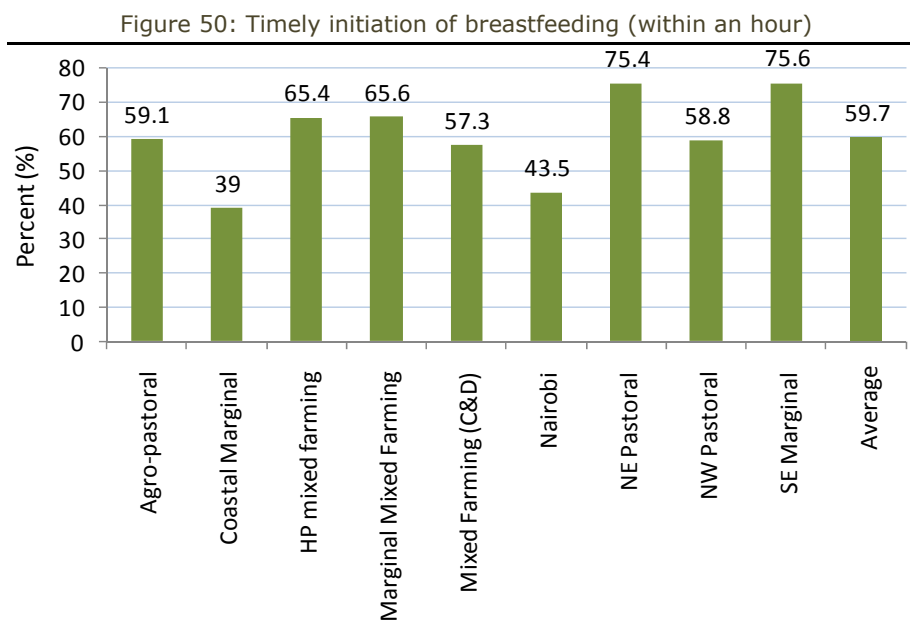
Appropriate infant and young child feeding practices play a major role in the healthy growth and development of children. The impact of under-nutrition during the “window of opportunity” from minus nine to 24 months (i.e. from pregnancy to two years old) has irreversible long term effects on cognitive and physical development. Studies have consistently shown the role breast milk plays in protecting infants from diarrhoea and respiratory infections, the two leading causes of infant death. Children not breastfed have a six-fold greater risk of dying from infectious diseases in the first two months of life than breastfed children. Breastfeeding has been ranked first in child mortality reduction, with the potential to prevent an estimated 13 percent of deaths of all children under five years of age (Jones et. al., 2003). Complementary feeding practices have also been associated with child’s growth (Ouédraogo et. al., 2008). Interventions focusing on the “window of opportunity” are among 13 high impact interventions in reducing death and disease and avoiding irreversible harm among children (Horton et. al., 2009). Breastfeeding and complementary feeding are among these interventions.

Information on infant and young child feeding (IYFC) practices was obtained based on the previous day recall period because it has been widely used and found appropriate in surveys of dietary intake when the objective is to describe infant feeding practices. Previous day recall will cause the proportion of exclusive breastfeeding in infants to be overestimated, as some infants who are given liquids irregularly may not have received them the day before the survey (Ochola et. al., 2008; Engebresen et. al, 2007; Bland, Rollins & Coutsoydis, 2002). The indicators used for infant feeding practices in this survey are based on WHO guidelines (WHO, 2007). The indicators are based on children 0-23 months old. The period provides an insight into required interventions after birth because from 24 months of age, the damage caused by poor and inappropriate feeding practices are essentially irreversible. The sample size of children for the analyses of IYCF practices was small and, therefore, the findings should be interpreted cautiously. Nonetheless, the findings give an indication of the practices among the urban poor.

Breastfeeding practices

Initiation to breastfeeding

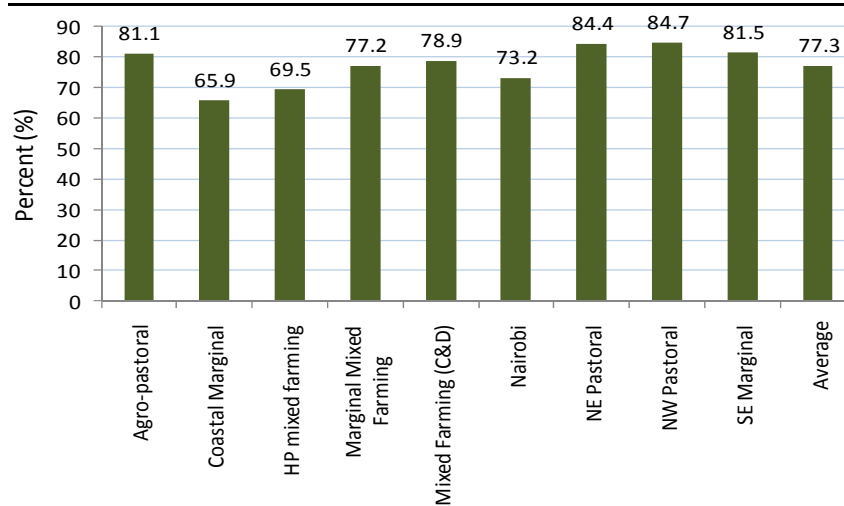
The coverage rate of children who had ever breastfed was universal (97.8%) in all livelihood cluster livelihood cluster zones. The main reason given for the children not breastfed was the mothers' perception that they had no milk. Timely initiation of breastfeeding is important to establish proper breastfeeding and bonding between the baby and the mother. Overall, 59.7 percent of the infants were put to the breast within an hour of birth across the clusters. NE Pastoral and SE Marginal reported the highest at 75.4 and 75.6 percent respectively (Figure 52). Two livelihood clusters; High Potential Mixed Farming and Marginal Mixed Farming reported 65.4 and 65.6 percent of the children having been timely initiated to breastfeeding. Three livelihood clusters; Agro-Pastoral, Mixed farming (C&D) and NW Pastoral compared closely to the national rate of 58 percent (KDHS 2008-09). The lowest percentage of children being timely initiated into breastfeeding was reported in Nairobi (43.5%) and Coastal Marginal (39%) livelihood clusters.



Giving of colostrum

Colostrum is the first milk produced and is highly nutritious and important as the milk contains antibodies which act as the first immunization for the baby. The children who received colostrum were 77.3 percent across all the livelihood clusters. Agro-Pastoral (81.1%), NE Pastoral (84.4%), NW Pastoral (84.7%) and SE marginal (81.5%) reported the highest percentage of infants receiving colostrum. Coastal Marginal and High Potential mixed farming reported the lowest percentage of 65.9 and 69.5 percent respectively (Figure 53).

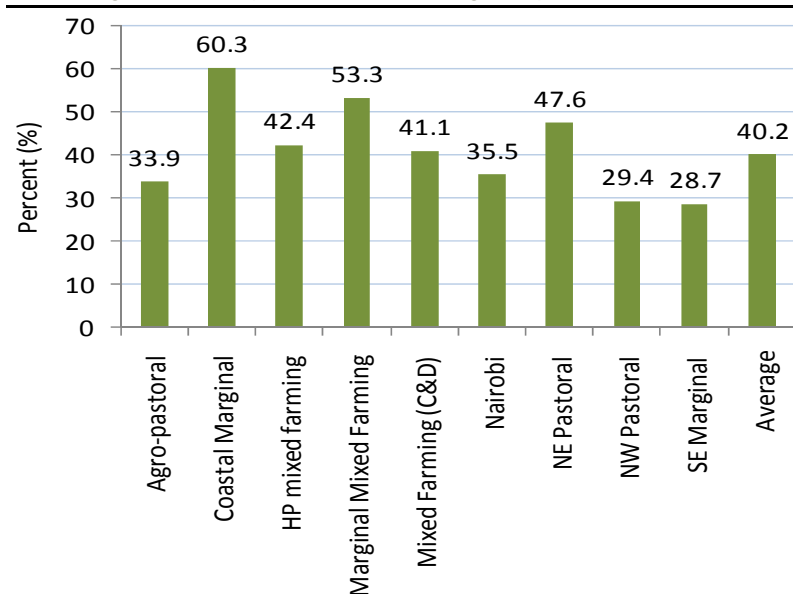
Figure 51: Proportion that gives the baby colostrum



Pre-lacteal feeding

Pre-lacteal feeds are given to the baby before breastfeeding is initiated. Overall, 40.2 percent of children were given pre-lacteals across the livelihood clusters and compares with the national rate of 42 percent (KDHS 2008-09). As figure 54 shows, the best performing livelihood clusters in terms of pre-lacteal feeding was SE Marginal (28.7%) and NW Pastoral (29.4%). The worst performing livelihood clusters were Coastal marginal (60.3%) and Marginal Mixed Farming (53.3%).

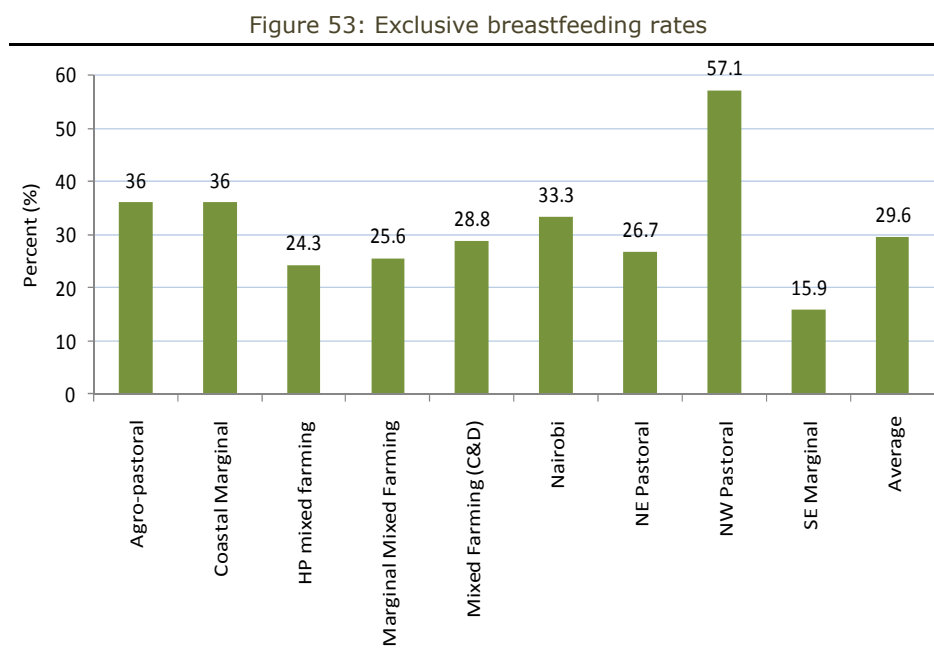
Figure 52: Proportion of children given pre lacteal feeds



Exclusive breastfeeding rates

WHO recommends exclusive breastfeeding for six months. The exclusive breastfeeding indicator is the proportion of infants 0-5 months of age who are fed exclusively breastmilk based on 24-hour recall. The rate for all the livelihood clusters was 29.6 percent, slightly lower than the national rate (both urban and rural) at 32.0 percent (KDHS 2008-09). The lower rate in this survey may be partly explained by the fact the mean duration of exclusive breastfeeding in rural Kenya is higher (1.0 months) compared to 0.6 months in the urban (KDHS 2008-09).

North West Pastoral livelihood cluster reported an exceptionally high rate (57.1%) of exclusive breastfeeding compared to the other livelihood clusters. Both Agro-Pastoral and Coastal Marginal livelihood clusters reported exclusive breastfeeding rates of 36.0 percent and Nairobi 33.3 percent. Exclusive breastfeeding for the rest of the livelihood clusters were between 28.2 to 24.3 percent with the exception of SE Marginal which recorded a low rate of 15.9 percent (Figure 55).

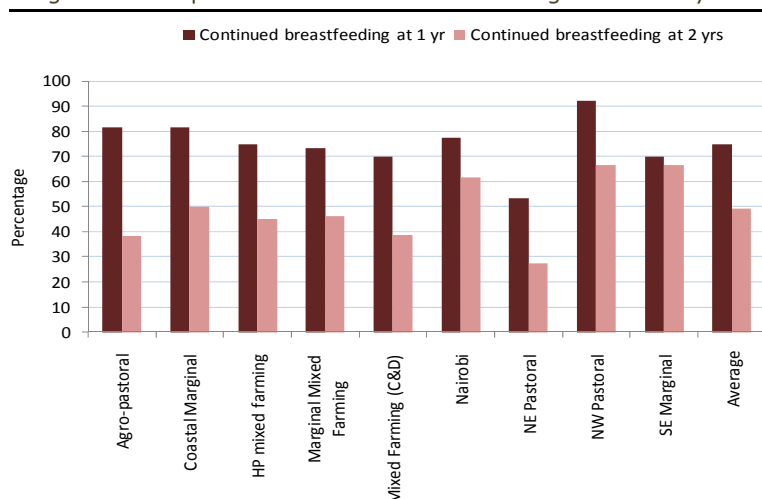


Continued breastfeeding at one year and two years

The indicator, 'Continued breastfeeding at 1 year' is calculated as the proportion of children aged 12-15 months who are breastfed based on 24-hour recall. The indicator, 'Continued breastfeeding at 2 years' is calculated as the proportion of children 20-23 months who are breastfed based on 24-hour recall (Figure 56).

- **At one year**, 74.8 percent of the children from all the livelihood clusters were still breastfeeding. This implies that about 25% of the children had stopped breastfeeding before the WHO recommended age of two years and were thus denied the benefits of breastfeeding. The highest rate of breastfeeding at one year was in NW Pastoral zone (92.3 percent), followed by Agro-Pastoral and Coast Marginal at 81.8 percent each. The rest of the livelihood clusters reported rates ranging from 77.3 to 70.0 percent with the exception of NE Pastoral with a rate of 53.3 percent (figure 59).
- **At two years** of age, about half (49.3%) of the children from all the livelihood clusters were still breastfeeding. The livelihood cluster that reported the highest proportion of children still breastfeeding was NW at 66.7 percent, followed by Nairobi at 61.5 percent and Coastal Marginal at 50.0 percent. The lowest rate was observed in NE Pastoral at 27.3 percent (figure 59). Again, the findings imply that breastfeeding was stopped prematurely for most of the children. The national urban median duration of breastfeeding is 19.3 months (KDHS 2008-09). The low proportion of children being breastfed at two years may be explained by the fact that many mothers were away from home in search of income to meet the economic needs of their families.

Figure 54: Proportion of children breastfeeding at 1 and 2 years



Complementary feeding practices

Complementary feeding should be introduced at 6 months and breastfeeding continued for two years or longer. The **time of introduction of complementary feeding** is calculated based on the number of infants 6-8.9 months of age who received solid, semi-solid or soft foods the day preceding the interview (as the numerator) and all infants of the same age as the denominator (WHO, 2007). It is important that complementary feeding be introduced at six months because breast milk alone is not sufficient to provide all the required nutrients for the child's optimal growth and development from this age onwards. The findings indicated that for the majority (87.3%) of the infants, complementary foods had been introduced at the right age (6 months). For about one-tenth (12.7%) of the infants, introduction of complementary foods had been delayed. The High Potential (HP) Marginal Mixed Farming zone had the highest proportion of children (95.0%) to whom complementary feeding had been appropriately introduced, followed by Nairobi (94.1%), Marginal Mixed Farming (93.7%) and SE Marginal (90.5%). With the exception of NE Pastoral zone which reported an introduction rate of 50.0 percent, the rest of the livelihood clusters reported rates exceeding 71.4 percent (table 36).

Table 36: Introduction of solid, semi-solid or soft foods and meal frequency

Livelihood zone	Timely introduction of complementary foods (%)	Minimum meal frequency (breastfed children 6-8 months old) ≥ 2 meals per day (%)	Minimum meal frequency (breastfed children 9-23 months old) ≥ 3 meals per day (%)
Agro-Pastoral	90.0	75.0	61.8
Coast Marginal	77.5	88.9	86.7
Mixed Farming HP	95.0	76.5	67.3
Marginal Mixed Farming	93.7	78.6	66.1
Mixed Farming (Cereal & Dairy)	70.6	92.9	64.6
Nairobi	94.1	92.3	67.1
NE Pastoral	50.0	92.9	62.5
NW Pastoral	71.4	80.0	53.3
SE Marginal	90.5	84.2	69.4
OVERALL	87.3	84.0	66.8

Minimum Meal Frequency

Children 6-23 months of age should be fed more frequently than adults because they need a relatively higher proportion of nutrients for their body size. They have small stomachs which cannot accommodate all the food required to provide these nutrients in a few meals. The indicators for the minimum frequency of feeding complementary foods are based on whether the child is being breastfed or not. For breastfed children 6-8.9 months of age, the minimum meal frequency for complementary feeding per day should be greater or equal to two while that for children 9-23.9 months is greater or equal to three (WHO 2007).

Overall, 84.0 percent of breastfed infants 6-8.9 months old were fed complementary foods two times as per the WHO recommendations. The NE Pastoral and Mixed Farming (C&D) zone recorded the highest proportion of infants 6-8.9 months old fed at least twice per day whereas Agro-Pastoral reported the lowest proportion of children (75.0%) who received food at the recommended frequency. The proportion of children 9-23 months old who received the recommended at least three meals per day from all the livelihood clusters was 66.8 percent signifying that about one-third of the children may not have received sufficient amounts of nutrients for adequate growth and development. Analysis by livelihood cluster showed that 86.7 percent of children in Coastal Marginal zone received food at the recommended frequency with the rest of the livelihood clusters reporting rates ranging from 69.4 to 61.8 percent. The only exception was NW Pastoral with a rate of 53.3 percent.

Minimum dietary diversity of complementary foods

The dietary diversity indicator is based on the premise that the more diverse the diet, the more likely it is to provide adequate levels of a range of nutrients. Higher scores indicate a more adequate range of food groups in the diet. Minimum dietary diversity is considered to be the consumption of at least four out of seven food groups (WHO, 2007). The food groups are summed, with each of the groups scored "1" if the child had the food group the day before and "0" if not. The results in a diversity score range from zero to seven for each child. Higher scores correspond to a more adequate range of foods groups in the diet. The food groups are as follows: grains, roots and tubers; legumes and nuts; dairy products (milk, yoghurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin A-rich fruits and vegetables and other fruits and vegetables. The cut-off of at least 4 of the 7 food groups was selected because it is associated with better quality diets for both breastfed and non-breastfed children (Working Group on IYCF, 2007). Consumption of foods from at least 4 food groups on the previous day would mean that in most populations the child had a high likelihood of consuming at least one animal-source food and at least one fruit or vegetable that day, in addition to a staple food (grain, root or tuber). The mean dietary diversity score is calculated for children 6-23.9 months of age (Table 37).

Table 37: Minimum dietary diversity

Livelihood zone	Minimum Dietary Diversity (Children 6-23 months old who ate foods from ≥4 out of 7 food groups) %
Agro-Pastoral	45.7
Coast Marginal	26.5
Mixed Farming HP	53.1
Marginal Mixed Farming	43.8
Mixed Farming (Cereal & Dairy)	39.0
Nairobi	42.7
NE Pastoral	28.8
NW Pastoral	23.5
SE Marginal	49.5
OVERALL	40.6

The majority of the children 6-23 months old did not receive a diet with the minimum dietary diversity required to provide the necessary variety of nutrients for adequate growth and development. Only two-fifths (40.6%) of the children 6-23 months old from all the livelihood clusters achieved the minimum dietary diversity. The livelihood cluster with the highest proportion of children that received the minimum dietary diversity were the HP Mixed Farming cluster (53.1%) and SE Marginal cluster (49.5%) and the lowest proportion of children was reported in NW Pastoral (23.5%) livelihood cluster. The low dietary diversity of the complementary diet may be due to low or inappropriate knowledge on IYCF practices and also to other factors such as food insecurity and cultural practices.

Hand Washing: Times when hand washing is done

Improved hygiene practices including hand washing is one of the high-impact, evidence-based, cost-effective, direct interventions to prevent and treat undernutrition (The Lancet, 2008). The majority, 89.3

percent of the respondents washed their hands before eating and 83.7 percent reported washing their hands after defaecating from all the livelihood zones. It was only in Coastal Marginal and SE Marginal that less than 80.0 percent of the respondents reported washing their hands after defaecating. Below two-thirds (58.9%) of the respondents from all the livelihood zones washed their hands before preparing food whereas only 35.1 percent of respondents washed their hands after handling a child's stool. The relatively low proportion of respondents who wash their hands before preparing food and after handling a child's stool is of concern. Of equal concern is the low level of respondents (17.2% from all the livelihood zones) who reported washing their hands before feeding a child (Table 38).

Table 38: Hand washing occasions

Livelihoods	Times at which hands are usually washed							
	Before preparing	Before eating	After defaecating	After handling child's stool	Before breast-feeding	Before feeding Child	After handling animals	Others
Agro-Pastoral	%	%	%	%	%	%	%	%
Agro-Pastoral	41.9	87.2	88.5	37.0	15.8	17.8	4.1	14.4
Coast Marginal	51.7	92.8	74.8	11.3	6.0	11.3	3.3	13.2
Mixed Farming HP	59.4	84.6	81.6	27.0	15.5	15.5	6.3	6.9
Marginal Mixed Farming	47.2	86.7	80.6	23.9	12.2	12.8	1.7	10.6
Mixed Farming (Cereal & Dairy)	59.6	88.5	90.4	35.3	17.9	16.0	3.2	9.6
Nairobi	64.7	19.4	95.8	47.4	23.3	20.0	0.9	2.8
NE Pastoral	58.0	86.4	80.9	45.7	27.2	21.6	11.1	13.0
NW Pastoral	69.7	92.3	83.2	47.1	18.7	20.6	2.6	9.7
SE Marginal	60.8	90.3	74.4	39.2	19.3	18.2	4.0	6.8
OVERALL	58.9	89.3	83.7	35.1	17.6	17.2	4.0	9.3

Washing of hands with soap

Hand washing with soap is important because the soap contains chemicals that kill germs. Hand washing with soap was most common after defaecating reported by 71.5 percent of the respondents from all livelihood zones. This was followed by washing of hands with soap before eating (57.6%) and before preparing food (42.3%). Of concern, was the low percentage of respondents who washed their hands with soap after handling a child's stool (29.6%) and before feeding a child (11.6%) therefore exposing the children to the risk of contracting diseases. The overall picture is that the practice of hand washing with soap needs to improve.

RECENT TRENDS

Availability and Utilization of Child Day Care Centres

Information on informal child day care centres was collected through focus group discussions (FGDs) with mothers of children 0-59 months old. Day care centres are a new concept in Kenya's high-density urban settlements. Six out of the nine livelihood clusters reported having day care centres. The livelihood clusters that did not have day care centres were Mixed Farming (C&D), NW Pastoral and NE Pastoral. In the latter two livelihood clusters, it was reported that children were taken care of by extended family members and thus there was no need for child care centres. Nonetheless, even in those livelihood clusters where the centres existed, only a tiny minority (2.0%) of the children attended the centres.

Most of the centres were started without government authorization. The few who got authorization did so mainly from District Education Officers, some from the Ministry of Gender and Social services and one reported obtaining permission from the local chief. The number and quality of staff providing services in these centres varied; some centres had staff with certificate-level training in Early Childhood Education, some were community health care workers (CHWs) while some used persons with a Kenyan Certificate of Secondary Education. The majority of the service providers did not have childcare qualifications. Parental choice of day centres depended on: the quality of care provided, affordability, security, cleanliness, staff experience, accessibility and the services provided.

Day care centres were perceived as providing an essential service to the community by freeing mothers to go to work and in providing employment. It was reported that the centres provided child care at a cheaper rate than would be incurred if the mothers employed nannies. The centres provided a learning and socialization environment for the children. Main activities included routine child care (changing nappies and clothes), playing and learning. Food was not provided by the majority of the centres.

The negative aspects of the day care centres as perceived by the respondents were many. Some of the centres were reported to be crowded, putting the children at a high risk of cross-infections. Many centres lacked appropriate child care practices, for example, children were left for long periods of time in wet napkins/diapers. It was reported that in some centres, children received physical punishment and that some of the staff were unfriendly. Facilities such as sleeping places were reported to be inadequate whereas some centres lacked a water supply.

Despite the negative aspects of the day care centres, the majority of the participants indicated that they should continue to exist so mothers would be free to participate in income generating activities. The participants reported that the centres should be improved by ensuring availability of enough playgrounds. In addition, the centres should provide staff with adequate and relevant training as well ensuring that children have adequate sleeping facilities. It was also recommended that the centres should improve on cleanliness and that high standards of hygiene should be maintained.

Street Foods

It was reported during the FGDs that street foods are commonly purchased by the residents in the informal settlements. The main reasons why people bought ready-to-eat street food were cited as affordability and convenience. Some respondents mentioned that street foods provided ready snacks for children. It was also mentioned that the food could be purchased on credit. It was more difficult to borrow all the items needed to prepare a meal from different sellers than getting credit from one vendor.

The majority of the respondents felt that street food provided a necessary service. Apart from providing a readily available source of food, street food provided a source of income to the vendors. Nonetheless, most felt that the hygiene standards practiced by the vendors was poor, putting the consumer at risk of infection. In order to improve the provision of this service, it was recommended that the vendors should be licensed by the City Council; the vendors should be regularly inspected by the Department of Public Health; hygiene standards should be maintained; the food should be served in premises and not in the open; food should be cooked properly; food handlers should undergo medical tests and be declared fit to handle food; sanitation should be improved and water availability assured.

FACTORS ASSOCIATED WITH THE NUTRITIONAL STATUS OF CHILDREN

The section examines factors associated with malnutrition among the urban households. Because of the cross-sectional nature of the survey, it is not possible to establish the direction of the association (e.g. illness causes malnutrition or malnutrition causes illness). Known causal factors are explored here, including demographic and socio-economic characteristics of the households; Food Consumption Scores [FCS], Wealth Index, Coping Strategies Index [CSI], and food aid; household assets, water sources, household availability of toilet facilities, child feeding practices and personal hygiene practices. Non-parametric statistics, Odds Ratio (OR) and chi-square tests were conducted to determine relationships between categorical variables in bivariate analysis. The results are presented below:

- **Child morbidity** was significantly associated with the nutritional status of the child. As is expected, sick children who were ill were 2.1 times more likely to be wasted (OR=2.1; p=0.005). There was no significant association between illness and stunting and underweight.

- Children from households with **no toilet/latrine** were two times more likely to be underweight (OR=2.0; p=0.006) than those from households with toilets. Improper disposal of faeces is associated with poor nutritional status of children because of the increased risk of infection.
- Ownership of specific **assets** was associated with malnutrition indicators:
 - Children from households without **cell phones** were 1.8 times more likely to be severely stunted compared to those from households with cell phones (OR=1.8; p=0.028). In addition, children from households without cell phones were 3.1 times more likely to be underweight than those from households with cell phones (OR=3.1; p=0.006).
 - Children from households without **televisions** had a 2.2 times greater likelihood of being severely stunted compared to those from households with televisions sets.
 - Radio ownership was significantly associated with being wasted and underweight. Children from households with no radios had 1.8 times greater likelihood of being wasted and 1.5 times of being underweight (OR=1.8; p=0.031 and OR=1.5; p=0.040) respectively.

These findings imply an association between socio-economic status of the household and the nutritional status of children. Households with higher socio-economic status are probably better placed to access food of better quality and also access better quality health services for their children. The association between wealth and nutritional status was investigated by chi-square test. The only association observed was between wealth status of the household and underweight and none with wasting and stunting. Children from lower wealth quintiles were more likely to be underweight signifying the impact of socio-economic status on the nutritional status of children.

The KU-CFSVA failed to find a significant association between nutritional status and gender of the household head, size of the household, hand washing practices, water sources, access to food aid, CSI and FCS (Table 39).

Table 39: Factors associated with nutritional status of children in bivariate analysis

	Nutritional Status		
	Wasting (Weight-for-length/height) OR (p value)	Stunted (Height-for-age) OR (p value)	Underweight (Weight-for-age) OR (p value)
Female vs. male headed households	NS	NS	NS
Household size (≤5 vs. >5)	NS	NS	NS
Child Morbidity	2.1 (0.005)	NS	NS
Availability of toilet at household	NS	NS	2.0 (0.006)
Hand washing practices:			
After visiting toilet	NS	NS	NS
Before preparing food	NS	NS	NS
Water Source	NS	NS	NS
Food Aid	NS	NS	NS
Coping Strategies Index (CSI)	NS	NS	NS
Food Consumption Scores (FCS)	NS	NS	NS
Ownership of Assets			
Cell phones	NS	1.8 (0.028)	3.1 (0.006)
Television	NS	2.2 (0.014)	NS
Radio	1.8 (0.031)	NS	1.5 (0.040)
<i>OR=Odds Ratio; NS: No statistically significant association</i>			
	Underweight (Weight-for-age)		

Wealth quintile	Yes % (n)	No % (n)	
Poorest	35.7% (55)	21.4% (219)	
Poor	18.8% (29)	20.8% (213)	
Medium	34.0% (31)	22.4% (229)	
Wealthy	28.4% (23)	19.0% (194)	
Wealthiest	24.1% (16)	16.4% (168)	

CONCLUSION AND RECOMMENDATIONS

Food insecurity and malnutrition prevail in all the low-income, high-density urban areas included in the present study, highlighting the urgent need for a specific **food security and nutrition management strategy for poor urban areas**. Following are the conclusions and proposed recommendations:

CONCLUSIONS

Livelihood Strategies and vulnerabilities

- A total of ten **livelihood profiles** were established based on the relative contribution of various activities to a household's livelihood. The largest groups include:
 - Poor casual wage labourers (25%)
 - Small businessmen / artisans (17%)
 - Private salaried (12%)
 - Non poor casual wage labourers (10%)
 - Public salaried (10%)
 - Petty traders/street vendors (10%)
- The highest proportions of households with a poor or borderline FCS were found among the Poor casual wage labourers and the Dependents (beggars, borrowers, remittances receiver). Poor casual wage labourers were most frequently found in Nairobi, Agro-Pastoral, Mixed farming and NW Pastoral livelihood clusters. Dependents were most frequent in NE Pastoral.
- A **Wealth index** based on asset ownership and housing construction materials was used to assess household wealth. The highest proportion of poor households was found among the Dependents (42%) and the Poor casual labourers (30%). In those two groups, over 50 percent belong to the two poorest wealth quintiles. Across livelihood clusters, the highest proportions of households in the poorest quintile were found in the NW (58%) and NE Pastoral livelihood clusters (38%).
- The **crowding index** averaged 3.2 and was highest among households in the NE and NW Pastoral livelihood zones. The crowding index was negatively associated with wealth and food consumption.
- Household **expenditures** averaged a total of 16,000 KSH per month, with 48 percent of expenditures allocated to food. In absolute values, expenditures were lowest in the NW Pastoral zone and highest in the NE Pastoral zone. Both zones, however, had the highest proportion of expenditures devoted to food purchases (respectively 62% and 65%).
- The **Food Consumption Score (FCS)** was used as a proxy measure of food insecurity. In total, four percent of all households in high-density urban areas reported a poor food consumption

score and nine percent reported a borderline FCS. The proportion of households with a poor or borderline FCS was highest in the NW Pastoral zone, followed by Nairobi and the Coastal Marginal livelihood zones which had high proportion in the borderline FCS category.

- The **presence of illness** (morbidity) was reported for 20 percent of the population over a two-week period prior to the survey. At the bivariate level, presence of illness was negatively associated with wealth and food consumption.
- The use of **coping mechanisms** during the one month period prior to the survey was most frequent in the NW Pastoral zone. A high Coping Strategy Index (CSI) was negatively associated with food consumption.

Education

- **School enrolment** was high on average, with 95 percent of children aged between 5 and 18 enrolled in school. The proportion of children not attending school was highest in the NE Pastoral livelihood cluster. Attendance was lowest among the poorest households.

Urban Agriculture

- **Crop Production.** About one-fifth of households engaged in **agricultural production** (21%), while 16 percent owned some **livestock**. Crop production was least frequent in NE and NW Pastoral zones, as well as Nairobi. Engaging in crop production was positively associated with food consumption.
- **Livestock Production.** Poultry and cattle were the main types of livestock kept across the livelihood clusters, which implies that they were the species of choice for urban households. The highest livestock numbers (in TLU) was recorded in NE and NW Pastoral zones, where large stocks are predominant.
- The main livestock products were: milk, in the Mixed Farming and SE Marginal cluster; and eggs, in Agro Pastoral cluster. Despite low production, livestock products contribute to household food consumption, to some extent. The main constraints to livestock production included parasites and diseases, poor availability of feeds and insecurity or theft.

Water and sanitation

- Improved water sources (taps and boreholes) were accessible to majority of urban households across livelihood clusters, with the exception of NW and NE Pastoral livelihood clusters. The main factors that restrict access to water include long waiting time at water points and the relative high cost of water.
- The treatment of drinking water was poor and nearly half of the interviewed households indicated that they did not treat or boil water before consumption.
- Though the majority of households had access to toilet facilities, the number of such facilities vis-à-vis the population is significantly disproportionate. In NE and NW Pastoral zones, however, a significant number of households do not have access to toilets. As a result, the risks of water-borne disease outbreaks are high, particularly during the rainy season.
- The practice of hand washing, especially with soap, before preparing food or feeding a child and after handling a child's stool was poor.

Markets and Trade

- The key drivers of urban food insecurity in regard to markets are the high variability of commodity supply to remote markets, the frequent inability of traders to cope with increased demand and the high variability in prices.
- The most traded food commodities in urban areas are maize meal, milk, sugar, wheat flour, pasta, rice and bread. These commodities are usually sourced locally across the livelihood clusters except in NW and NE Pastoral zones where most commodities are sourced outside local areas.
- Food commodity availability in the markets is positively correlated to production seasons. While commodity sales usually peak in April, August and December across the livelihood clusters, traders in NE and NW Pastoral zones reported inadequate supplies in January, March and August.
- The study showed that food commodity prices vary greatly between livelihood zones, likely due to supply and demand dynamics. Food prices tended to be higher in Nairobi, Marginal Mixed Farming, NE and NW Pastoral livelihood clusters.
- Over the last two years, the demand for food commodities has either remained the same or declined across all livelihood zones. Only half of interviewed traders indicated that they would be able to service a 50 percent increase in demand for food commodities. The main constraints to servicing increased demand included lack of capital, competitors or taxes, low profits, lack of credit, lack of supply, insecurity and lack of transport.

Health and nutrition

- The rate of **acute malnutrition** was within the WHO acceptable rate (<5%) in all livelihood clusters with the exception of the NW Pastoral livelihood cluster. By contrast, **stunting rates** were above the WHO acceptable level (<20%) with the exception of NE Pastoral livelihood cluster. The high stunting rates may be indicative of the impact of chronic food insecurity and/or repeated infections.
- The prevalence of **child morbidity** was high. Though consultations were appropriately made in public health facilities for most of the children, they were not timely. An area of concern was the relatively high proportion of mothers/caregivers who sought assistance from drug shops/kiosks self-prescribing drugs for their children without professional assistance. About one-fifth of respondents did not seek assistance for sick children because they viewed the illness as mild and therefore not requiring attention. This may have contributed to the lengthy periods of illness. The utilization of health services was constrained mainly by high costs and lack of access.
- **Immunization coverage** was above the WHO recommended acceptable rate of 80 percent for all antigens in all livelihood clusters, though lowest in NE Pastoral. **Vitamin A supplementation** was below the WHO cut-off-point of 80 percent in most livelihood clusters. The frequency of supplementation was adequate with the majority of the children 6-11 months old having received the supplement once as per the WHO guidelines. **De-worming rates** were low with no livelihood cluster meeting the acceptable level of 80 percent.
- Infant and young child **feeding practices** were inappropriate for the majority of children. Many children stopped breastfeeding before the WHO recommended two years. Exclusive breastfeeding rates were low. Despite the timely introduction of complementary feeding for the majority of children, the frequency of feeding, particularly for children 9-23 months of age was lower than recommended for many children. The same was observed for minimum **dietary diversity**, with less than half of the children of 6-23 months of age having received the minimum dietary diversity recommended.
- As was expected, children's morbidity, availability of toilets and socio-economic status of the households were associated with the **nutritional status of the children**. Socio-economic status of households, particularly in urban areas, is more likely to influence the nutritional status of children because the households' main source of food is through purchase compared to rural areas where foods are also sourced through own production.

- Informal **child day care centres** are a new concept in high-density urban areas in response to the need for working mothers to find affordable childcare. Although few children are currently attending the centres, the numbers are likely to increase in future. Hygiene standards and the provision of more sleeping and playing facilities need to be improved.
- **Street foods** are fast becoming a common item in the dietary intake of households in urban informal settlements. The foods are readily available and relatively cheaper and therefore convenient for many people who have limited income and time to prepare their own meals. The major concern was the poor hygienic conditions under which these foods are prepared and stored.
- At the bivariate level, nutrition indicators were associated with child morbidity, sanitation, ownership of specific assets and wealth.

RECOMMENDATIONS

Urban Agriculture

- Undertake a specific and comprehensive survey to evaluate the contribution of urban agriculture to food security in the high population density informal settlements. The study should identify the key food security indicators that should be monitored for urban agriculture.
- The agriculture and livestock sector working group of the KFSSG should effectively participate in the formulation of urban and peri-urban policy on agriculture.

Markets and trade

- Carry out a comprehensive market study for urban high-density areas in order to better understand how the market structure, conduct and performance influences food insecurity in those areas.
- Establish a system for regular food commodity price monitoring (maize meal, milk, sugar, wheat flour, pasta, rice and bread) in high-density urban markets and carry out periodic monitoring of supply and demand indicators.
- Formulate specific interventions to address constraints that prevent traders from meeting effective demand and develop mechanisms for improving supply to remote urban markets.

Health and Nutrition

- Improve coverage of vitamin A supplementation and de-worming. In addition, documentation of actions taken on child health cards should be improved. All vaccinations, vitamin A supplementation and de-worming given during campaigns should be documented. Lost cards should be replaced as soon as possible;
- Strategies to reduce morbidity prevalence among children should be put into place and/or up-scaled. These include provision of long-treated insecticide bed-nets to children under-five years of age and pregnant mothers for malaria prevention and sensitization on the home management of diseases especially of diarrhoeal disease and fever.
- The ongoing sensitization and education of community members should be scaled-up on the following aspects:
 - Health seeking behaviour of parents for their sick children: Health education messages should re-emphasize the importance of seeking medical attention for sick children and for doing so in a timely manner. In addition, the dangers of self-prescription should be emphasized;
 - Exclusive breastfeeding for 6 months and continued breastfeeding for 2 years need to be re-emphasized in breastfeeding promotion messages. Complementary feeding practices in terms of timely introduction, dietary diversity and frequency of meal consumption need attention. Education sessions should include demonstrations on locally available food preparation for

children. Planning and demonstrations should be participatory and involve the community in order that it be sustainable;

- The health benefits of hand washing with/ without soap after visiting the latrine, before preparing food/ feeding children and after handling a child's faeces.
- A process should be initiated with the government to provide guidelines for informal child day care centres given that they are likely to increase in number. The centres should be required to get authority from a government body and there should be an efficient supervision system in place to monitor centre activities.
- It is recommended that the Government/ the Department of Public Health properly inspect street vendors and issue licenses.
- **Recommendations for monitoring indicators.** WFP should compile a health and nutrition information database in order to guide programme activities. The following indicators are suggested:
 - Growth monitoring promotion for children under-five years of age including weight-for-age, height-for-age and MUAC;
 - Child morbidity indicators: Diarrheal diseases, malaria, measles, parasitic infections, fever and acute respiratory infections.
 - Indicators of health service coverage; immunization coverage, vitamin A supplementation coverage; and de-worming coverage.
 - IYCF indicators; exclusive breastfeeding rates, continued duration of breastfeeding at 1 and 2 years, time of introduction of complementary feeding, frequency feeding and dietary diversity of complementary foods.
 - Maternal ante-natal and post-natal attendance; coverage of iron/folate supplementation for pregnant women; rate of health facility delivery; and rate of vitamin A supplementation for lactating women;
 - Family planning coverage; and
 - Household food dietary diversity and food consumption patterns from results of surveys conducted in the informal settlements.

ANNEX

MEASUREMENTS

The Food Consumption Score:

Food Consumption Scores (FCS) were computed to reflect the diversity and frequency (number of days per week) of the food items consumed by a household using a 7-day recall. A score of 0 to 7 for various food groups was obtained, and a weight factor assigned, reflecting the nutritional value of the food group. The summation of the weighted frequencies for a particular household gives the FCS. The food commodities used in the generation of the FCS are shown in the table 40.

Table 40: Food Groups and Weights

No:	Food Groups	Types	Weight
1	Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains	Main staples	2
2	Beans, Peas, groundnuts and cashew nuts	Pulses	2
3	Vegetables, leaves	Vegetables	1
4	Fruit	Fruits	1
5	Beef, goat, poultry, pork, eggs and fish	Meat and Flesh	4
6	Milk yogurt and other diary	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	spices, tea, coffee, salt, fish power, small Amounts of milk for tea.	Condiments	0

Source: WFP, 2008. Food Consumption Analysis

The FCS is a continuous variable that is difficult to interpret. Two thresholds are used to distinguish consumption level: a FCS of 28 and a FCS of 42. The thresholds define three groups: Poor consumption (FCS ≤ 21), Borderline Consumption (FCS >21 and ≤ 35), and Acceptable Consumption (FCS >35).

Food Expenditure Analysis

Food expenditure shares provide an important indicator of allocations across different food items. The shares are simply estimated as proportions of the total expenditure. This is analogous to the food poverty cut-off line. Household food expenditures are also convertible to calories using price per unit and calorie per unit conversion factors.

Food Gaps and Severity Estimation

The food consumption/access gaps give an indication of severity of food security. While the food *consumption gap* is estimated from the actual nutritional value estimated from the minimum nutritional requirement, the *access gap* is monetary and is determined from the minimum cost of food basket considering foods consumed away from home and not purchased (WFP, 2008). It is possible to draw an analogy with the Foster-Greer-Thorbecke (FGT) methods of poverty severity and derive important conclusions on food security. Food insecurity severity is computed as;

$$p(\alpha) = \frac{1}{n} \sum_{i=1}^n \left[\frac{(z - y_i)}{z} \right]^\alpha, I(y_i) < z$$

- α is a measure of 'food insecurity aversion'¹⁶
- z - is the food poverty line (can be monetary or calorific values)
- y_i is the household adult calorie intake or food expenditure.

Coping Strategy Index (CSI)

In the anticipation of food insecurity, households adopt strategic measures such as the consumption of less cheap and less preferred substitute foods especially under price increases, purchasing on credit or borrowing, rationing and reducing the number of people in the household for instance by sending children to neighbours. The CSI is a food security status indicator in a particular context computed from the frequency of use of this coping mechanism and the severity indicated by the coping strategies. A higher CSI is associated with a higher level of food insecurity (less food secure).

Nutritional Analysis

Measures of age, sex, weight in kilograms (to the nearest 100g), height in centimeters (to the nearest millimeter), presence or absence of oedema and the Mid Upper Arm Circumference (MUAC) were collected to assess the nutritional status of children aged 6 to 59 months. The levels of stunting, wasting, and underweight were computed using nutria-survey software and are expressed in standard deviation from the median of the 2006 WHO reference standards, with cut-offs set at -2 SD and -3 SD. The following WHO classification is used to determine severity at population level, table 41.

Table 41: WHO Classification of Severity of Malnutrition

Severity of Malnutrition	Prevalence of Wasting	Prevalence of Stunting
Acceptable	<5%	<20%
Poor	5-9%	20-29%
Serious	10-14%	30-39%
Critical	≥15%	≥ 40%

¹⁶ $\alpha = 0$ food insecurity headcount ratio, $\alpha = 1$ (food insecurity gap index) and $\alpha = 2$ (food insecurity severity index or squared food insecurity gap index).