HOUSEHOLD FOOD SECURITY AND NUTRITION STATUS OF UNDER FIVES IN KIENI WEST DIVISION, NYERI DISTRICT.

BY

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Household food security and

A Thesis Submitted in Partial Fulfillment for the Award of the Degree of Master of Science (Foods, Nutrition and Dietetics), School of Environmental Studies and Human Sciences, Kenyatta University.

APRIL 2006

DECLARATION

This thesis is my original work and has not been submitted for a degree in any other University or any other award.

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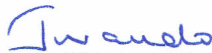

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DEDICATION

To my mum Teresa Mwema, grandma Magdalene, my sister Florence and my brothers Steve, James and Gabriel for their tender care.

ACKNOWLEDGEMENT

I would like to reiterate my appreciation and thanks to individuals and organizations who supported and provided input into this thesis. Thanks to Dr. Elizabeth Kuria and Prof Judith Waudo of Kenyatta University for their input and supervision of this thesis. I greatly acknowledge financial support from Katholischer Akademischer Auslander Dienst [KAAD-Germany] that enabled me to undertake this program.

I do wish to extend my sincere thanks to my mother Teresa, grandma Magdalene, my sister Florence and brothers Stephen, James and Gabriel for their care, love and affection. I feel indebted to my relatives and friends Francis, Charles, Eunice, Lydiah and Wambui for their encouragement and moral support they accorded me during the trying times of my studies.

I wish to acknowledge my research assistants Mary and Charles, the area assistant chiefs and elders for their commitment and generous support, and to the respondents who voluntarily participated and contributed considerably to the study.

Glory be to God.

ABSTRACT

Malnutrition has remained one of the major causes of high mortality rates among children under five years of age. Kieni West Division has continued to show pockets of malnutrition. The main objective of the study was to assess the household food security and nutritional status of under five children in Kieni West Division, Nyeri District so as to determine the risk of vulnerability of the households to food insecurity as well as malnutrition. A cross-sectional descriptive survey design was used. Random sampling methods were used to select the target group of 150 households. Household data were collected by use of interview schedules which were read out to the respondent directly and answers filled in by the interviewer also for the focus group discussions. Anthropometric parameters weight and height were collected using UNICEF's tools; electronic weighing scale, weighing pants, hanging scale and length/height boards. Nutrient adequacy was determined by use of 24hr recall. To determine the quantities calibrated jugs were used and respondents were asked to estimate the quantity of food the child had consumed the previous day. This data was compared with CTA-ECSA food composition tables and recommended daily allowance developed by WHO. Data collected were summarized and analysed by the use of Statistical Package for Social Sciences programme. Pearson and Spearman test at 0.05 significant level were used to establish the relationship. Anthropometric data were analysed using EPI-INFO 2000 computer package. The findings of the study showed that 24.0% of the preschool children were stunted, 12.0% were wasted and 24.7% were underweight. Incidences of illnesses were high with 60.7% of the children in the study being reported to have had been ill in the past two weeks prior to the study. The major constraint to food production was found to be erratic rains in the area while 72.7% of the respondents resulted to sale of labour as a coping strategy during times of food scarcity. At the time of the study, households were found to be in a state of food insecurity with 55% of the respondents reported not having any food in store. Maize formed the major component of the main meals. Meals were not widely diversified; vegetables, fruits and meat were rarely consumed. Some of the variables that were subjected to Spearmans Rho test and showed significant correlation included; household size was correlated with nutrition status (r=-0.158 p=0.027), land size and incomes obtained from farm produce (r=0.291 p=0.001), land size and sale of labour (r = -0.181 p = 0.026), household food security and nutritional status (r = -0.210 p = 0.010), stored food and household monthly income (r = -0.203 p = 0.016), breastfeeding duration and nutrition status (r = 0.271 p = 0.001). Variables that were subjected to Pearson Moment Correlation included; energy intake and underweight and wasting, (r= -0.366, p=0.000 and r–0.466, p=0.000 respectively), Vitamin A with under weight and wasting (r= 0.230 p= 0.005 and r=0.233 p= 0.004 respectively), Iron showed positive significant relationship with wasting (r=0.183 p= 0.025) and nutrition status with morbidity (r= -0.167 p= 0.041). The results of the study showed that the nutritional status of under-fives was poor and households were food insecure. The study recommends that since the main livelihood in the area is farming, there is need to diversify the sources of income, enhance the farming practices as well as need to promote growth and consumption of fruits and vegetables.

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List of abbreviations

CBS	Central Bureau of Statistics
FANTA	Food and Nutrition Assistance
FAO	Food Agricultural Organization
FSAU	Food Security Analysis Unit for Somalia
GOK	Government of Kenya
NCHS	National Center for Health Statistics
NCPD	National Council for Population and Development
RDA	Recommended Dietary Allowance
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children Education Fund
WHO	World Health Organization

CHAPTER ONE

1.0 Introduction

Food Agricultural Organization's latest estimates indicate that, in 1997-1999, there were 815 million undernourished people in the world of these 777 million in the developing countries, 27 million in transition countries and 11 million in the industrialized countries (Food Agricultural Organization (FAO), 2001). In Africa approximately 40% of the population lives in conditions of food insecurity, compared with 25% in South Asia and Latin America, and 16% in South and East Asia (World Bank, 1993a). Among developing regions, only Latin America and the Caribbean has been reducing the prevalence of hunger quickly since 1990 to reach the Millennium Goals of Development. In Sub-Saharan Africa, the prevalence of undernourishment has been decreasing very slowly although the speed of progress improved in the 1990s. Achieving the world food security goal of reducing the absolute number of hungry people from about 800 million to 400 million will prove more challenging, requiring much more rapid progress (FAO, 2005). One quarter of the Sub-Saharan African population is unable to secure adequate food all or part of the year to meet their nutritional requirements (Food and Nutritional Assistance (FANTA), 2001).

The broad objective of National Food Policy in Kenya is to ensure adequate supply of nutritional foods in all parts of the country at all times (Government of Kenya (GOK), 2002). However, recent experiences have shown that national food security does not necessarily lead to regional, household and individual food security (GOK, 2002). A decline in the production of maize is interpreted as sign of food insecurity in Kenya. In Nyeri District there has been experiences of notable deficit in production of the cereals mainly maize which is a major staple food in the district (GOK, 2002).

In Africa the level of stunting fell from 40 percent in 1980 to 35 percent in 2000 (World Health Organisation, 1999; FANTA, 2001). But despite these reductions in the prevalence, the number of stunted children in Africa increased from 35 million to 47 million during the same period. Within Africa the highest level of stunting is found in Eastern Africa, where 48 percent of children are currently affected (Onis, Frongillo and Blossner, 2000).

Nationally, children under five years of age with stunted growth increased from 33% in 1998 to 35% in 2000 (GOK, 2002). The number of underweight children rose from 22% to 23% during the same period. Estimates show that 23,000 children deaths in the year 2000 were associated with moderate to severe malnutrition (GOK, 2002). Mild and moderate forms of wasting and underweight are more widespread in rural Kenya. It is interesting to note that in all child nutrition surveys conducted since 1977, Central Province has consistently maintained better nutritional status of the children under five years of age (Central Bureau of Statistics (CBS), 1991). Although the level of nutrition seems high, the two divisions of Kieni East and West have continued to show low levels of nutrition (GOK, 1997).

In Kenya, almost 3.3 million citizens, includes 1.5 million school children, face a severe food shortage and need emergency aid. The food security crisis steering group warned that drought is expected to continue for the next year. President Kibaki declared the food shortage as a national disaster in June 2004 (Bosire, 2004).

Good nutrition improves resistance to infection, results to better physical and mental development and general social and economic productivity. Malnutrition causes stunting, underweight and mental retardation in children who are less than five years old. Children's nutritional status is an important indicator of the food security of the

most vulnerable members of a community. It is a sensitive indicator of changes in health status and food availability. It is a useful tool as an early warning of distress and ill health within the population and gives current status of the child in terms of immediate factors such as inadequate current food intake, child hood diseases and diarrhea, leading to wasting while the accumulated impact of chronic deprivation leads to stunting. Household food security is a determinant of the child's dietary intake, which is manifested at the nutritional status of an individual.

1.1 Problem Statement

Children under five tears of age have rapid growth development therefore they need adequate diet. Consequently, they are highly vulnerable to malnutrition if the diet is not adequate. They also experience frequent infections and illness that deplete their nutrient stores in the body and this further predisposes children to malnutrition.

Although Kieni West division is in Central Province it has continued to show pockets of malnutrition (GOK, 1997). According to the fifth nutritional survey, it was found that stunting levels in Central Province was 28%, which was below the national stunting levels, which was 33% (CBS, 1996). Although the level of nutrition status seems high, the two divisions of Kieni East and West have low levels of nutrition (GOK, 1997). The level of production has been declining and nutrition status of the under fives have not shown any improvement either. The need to find out factors affecting the household food security and nutritional status of the under fives in the division has become of great concern. This study seeks to assess the state of household food security and nutrition status of the under fives.

1.2 Purpose of the Study

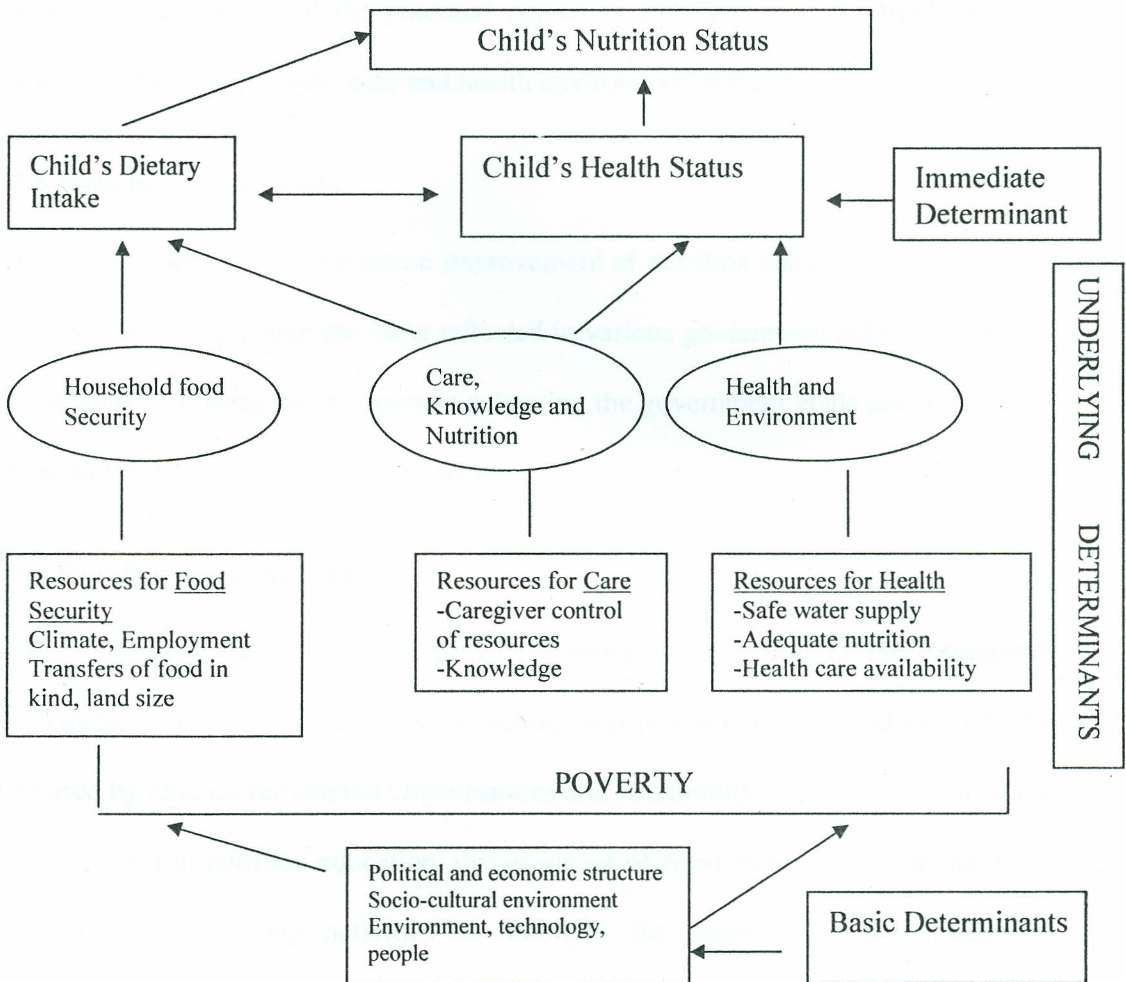
The purpose of the study was to assess the state of household food security and nutritional status of children in Kieni West Division, Nyeri District so as to determine the risk of vulnerability to food insecurity and malnutrition.

1.3 Objectives of the Study

The objectives of the study were to;

1. determine the nutritional status of the under fives in Kieni West division
2. asses the state of the household food security in Kieni West division
3. identify the coping strategies during episodes of food shortage in Kieni West division.
4. identify factors affecting food production and nutritional status in Kieni West division.
5. determine the relationship between selected socio-economic characteristics, household food security and nutrition status of the under fives.

1.4 Conceptual Framework



Source: Smith and Haddad, 2000.

Figure 1.1 Factors Affecting Food and Nutrition Security

The conceptual framework incorporates both biological and socio economic causes and encompasses causes at both micro and macro levels. It breaks the determinants of child malnutrition into three levels: immediate, underlying and basic determinants. The immediate determinants of child nutrition status manifest themselves at the level of individual human being. These factors themselves are interdependent. Immediate factors are influenced by the underlying determinants manifesting themselves at household level.

A key factor affecting all underlying determinants is poverty. The basic determinant affects the utilization of the potential resources and how they are translated into resources for food security, care and health environment services.

1.5 Rationale of the Study:

The government's commitment on improvement of nutrition status and ensuring food security of its population has been reflected in various government policy documents. This study will bring about inputs in achieving the government goals and at the same time to fill this research gap in the area.

1.6 Significance of the Study

The findings of the study will provide essential information to the community extension workers on those factors affecting crop production. The findings will also be used by Non Governmental Organisations and community-based organizations that are involved in nutrition education, disbursement of relief foods and those that focus on income generating activities to improve the incomes of the households consequently their nutrition status. Lastly, provide information about Kieni West division to those organizations that are interested on food security and nutrition status of under-fives in the area.

1.7 Operational Definitions of Terms

Dependent variables

Nutrition Status of the under fives: will be defined using the anthropometric indices; stunting, underweight and wasting.

Household food security: the availability of food in a household that is adequate at all times.

<u>Independent variables</u>

Education: the highest level of formal education one has obtained.

Land size under food crop: the amount of land one owns that was cultivated during the season prior to the study.

Occupation: where one spends most of their time in a day to earn their living.

Income: the amount of money one receives from their occupation or any other source.

Food availability: the presence of food in the household at the time of the study.

Morbidity: presence or absence of illness in the last two weeks prior to the study.

Access to safe water: the availability of treated surface water and untreated water such as piped water, roof catchment and protected springs and wells.

Access to health services: the availability of health care providers in relation to distance covered to these facilities

CHAPTER TWO

2.0 LITERATURE REVIEW

Literature is reviewed under the following topics; nutritional status, factors affecting nutritional status, household food security, factors affecting household food security and coping strategies in times of food shortage.

2.1 Nutritional Status

Nutrition improvement is becoming recognized as an important route to better health, and enhanced human capital. The interaction of malnutrition and infection are recognized as major public health issues (Tomkins and Watson, 1989). Causes of malnutrition can be analysed using the conceptual framework developed by Smith and Haddad (2000) (Figure 1.1). According to the framework child's dietary intake and child's health status are the immediate causes while household food security, care, maternal knowledge and nutrition, health and environment form the underlying determinants.

The nutritional status of the children is one of the most sensitive indicators of sudden changes in health status and food availability. Insufficient intake of calories is one of the primary causes of poor nutrition status and often, of premature death. However, it is also widely recognized that poor nutrition status (or under nutrition) can be caused by other factors including a diet that is insufficiently diverse or deficient in critical micro-nutrients and by poor health status - which renders the body unable to absorb or use calories and micronutrients (FAO, 2001). Measures of nutritional status are extremely powerful advocacy tools because they allow us describe the current nutritional status of the children and household food security situation. The nutritional status of the under five year old in Kenya has been varying from time to time (Table 2.1).

Table 2.1Trends of Under Nutrition Status in Kenya

Nutritional status of > 5yrs	Year: % of children who are malnourished		
	1998	2000	2003
Stunting	33.0	35.3	30.6
Wasting	6.1	6.0	4.8
Underweight	22.1	21.2	19.1

From the trends shown in table 2.1 it clearly indicates the changes in nutrition status, which depicts fluctuations (CBS and Ministry of Health (MOH), 2004). Household food security is one of the underlying determinants of children nutrition status as it influences child's dietary intake.

2.1.1 Measures of Nutrition Status

Anthropometric data is a good method of evaluating the nutrition status of young children (National Council for Population and Development (NCPD) and CBS, 1999). Anthropometric indices provide an approximate reflection of the nutrition status of a community. One of the most useful reference population, and the one used is United States National Centre for Health Statistics (NCHS) recommended by World Health Organization (WHO) (ACC/SCN, 2001). Three indices of physical growth that describe the nutrition status of children used are: Height - for – age (for stunting) which is a measure of linear growth which reflects chronic malnutrition, Weight - for – height (for wasting) which indicates short term food deprivation and Weight - for – age (for underweight) which is a consequence of inadequate diet and frequent infections (WHO, 2002).

2.2 Health, Water and Sanitation

A sound health care delivery system, good nutritional status, food security and the absence of epidemic diseases are the conditions that make people healthy (CBS, 2001). Adequate nutrition promotes the immune system and hence reduces the rate

and severity of infection. Malnutrition has a depressing effect on the immune system, which consequently increases vulnerability to infections and aggravates their incidence, severity and duration (Mahgoub, 1998). The interaction of infection and inadequate food consumption causing growth retardation in children leads to a vicious circle (malnutrition-infection complex). To break the circle it is necessary to improve environmental health conditions by addressing problems of contaminated water, sanitary disposal of human excreta and household wastes and poor food and personal hygiene (FAO, 1997).

Women in rural Africa and Asia still walk an average distance of 6 km to the nearest water source (FAO, 2001). Often, their only source of water is contaminated with germs - bacteria's parasites and viruses - that can cause diarrhoea. This undermines food security directly, by preventing the body from absorbing nutrients and indirectly by sapping people's ability to work and increasing time and money spent on health care other than provision of food (FAO, 2001). Access to health services is vital, especially in rural areas, where the prevention, timely treatment and proper management of infectious disease can make an important contribution towards improving nutrition status (FAO, 1997). The research assessed the availability of these services and their utilization in the area of study.

2.3 Maternal Knowledge, Care and Nutrition

Women who receive even a minimal basic education are generally more aware than those who are illiterate of the need to utilize available resources for the improvement of the health particularly the nutritional status of themselves and their families (United Nations Children Education Fund (UNICEF), 1997). Studies have found specific caring practices associated with better nutrition status in children. This is

mainly through protection of the child from pathogens, which depends on the caregiver's cleanliness and sanitation, use of health care services for routine checks and nursing care for the child during episodes of illness (Haggery and Shea, 1999; UNICEF, 1997; Murray, et al; 1997). Pelto and Allen (1991) found significant association between ratings of household's cleanliness over a number of home visits and child's nutrition status in rural Mexico.

The indirect effect is because increased education and literacy has a multiplying effect on development, and income, which in turn contributes to improved nutrition. The direct effects relate to the common observation that maternal education and literacy is associated with better utilization of household resources and improved nutrition of children. Additionally, agricultural advice given to women results in substantially higher crop yields (Technical Center for Agriculture (CTA), 2000).

While adequate incomes, greater food availability and expanded health services are necessary for adequate nutrition; they will not bring about improvements unless households are able to take advantage of them (FAO, 1997). A study done in Mumbuni, Machakos district in Kenya found that 67% of women made decision on use of food (Nzioki, 1993). The study identified the caregivers of the under fives, breastfeeding duration, mothers awareness of nutrition and feeding practices of the under fives.

2.4 Mother's Occupation and Income

A mother's workload influences her capacity to care for the family. The effect of women's income generating activities on the welfare of children has raised much concern since this may reduce time for childcare. The presence of working women

may well increase the food consumption of poorer households, even if the women have to travel away from the home to earn money (Campbell and Horton, 1991).

As the level of income of a family raises the amount and variety of the diet tends to improve. However, income cannot always remove barriers to access to food opportunities. The livelihoods of people living in Kieni West division being subsistence farming, the study sought to establish the sources of income in Kieni West Division.

2.5 Household Food Security

At the household level, food security has been defined as a state in which households have continuous access to food supplies, which can fully satisfy the nutrition and dietary needs of all its members at all times (FAO/WHO, 1992; Maxwell and Frankenrberger, 1992). Its essential elements are the availability of food and the ability to acquire it. Conversely, food insecurity is the lack of access to sufficient food and can either be chronic or transitory (FAO, 1997). When households are experiencing food shortages, they employ some strategies in order to have access to food.

2.6 Factors Affecting Household Food Security

2.6.1 Food Availability

Over the past decade, the incidence and intensity of hunger and malnutrition has increased significantly and food insecurity remains a national threat (FAO, 1996). At the household level, to nourish members adequately, there must be sufficient quantity and variety of good quality and safe food (Latham, 1997: World Bank, 1990; FAO, 1986). Adequate food security requires the availability of physical supplies of food as well as household access to such supplies either through production, purchase in the

market, commercial imports or food assistance (FANTA, 2001). The study investigated those factors that affected food availability in the area.

2.6.2 Food Accessibility

Food accessibility is ensured when households and all individuals within these households have adequate resources to obtain appropriate food for nutritious diet (SCN News, 2000). The ability of the farmers to produce food in adequate amounts depends to a large extent on their access to resources as well as knowledge to grow crops and raise animals (FAO, 1997).

Household access to food primarily depends on home production, household income and food prices. Increased food accessibility will not necessarily improve food utilization when other factors, such as health or social environment are not favourable (Hoddinott, 1999). The research study sought to identify the resources used by the subsistence farmers so as to have access to nutritionally adequate food.

2.6.3 Food Consumption Patterns

Socio-cultural beliefs and customs have a significant influence on family nutritional well being in terms of food choice and food sharing behaviour within the family (FAO, 1997). Intra-household food distribution is often related to hierarchical position, with the head of the family and the income-earning members of the household receiving priority in eating. In such families children may receive a smaller share of the food relative to their nutritional needs (FAO, 1997). Most rural people produce the food they consume while those in urban areas depend largely on their earned income to buy the food they need. Low food production in rural areas is responsible for the low food consumption. The research study established the food

consumption patterns in the area which could influence household food security and consequently the nutritional status of the under fives in Kieni West Division.

2.6.4 Land Size and Food Produced

In most areas, land holding and ownership has resulted in land fragmentation. Small-scale farmers cultivate maize and beans for home consumption, combined with some fruits and vegetables for local markets, and they sell their labour to the large estates. Because of small plot size, low yields and low wage rates for agricultural labour, farmers often do not produce or earn enough to meet minimum basic needs (FAO, 2001). They need to use fertilizers to increase productivity, but with low incomes, they can ill afford it (Donovas, 1996). In countries where land is not communally owned, the size of land owned by a family or household becomes an important asset. Land determines the amount of food that can be produced for that family in terms of crops or livestock at any given time (Kigutha, 1994). Land is a key factor in agricultural production. Normally, households with no access to adequate land are food insecure, consequently influences the nutritional status of the children within these households. Several studies have found that malnutrition is more prevalent in children of rural landless than in households with land (Kigutha, 1994).

2.6.5 Food Storage and Preservation

Households make choices on how much to store and how much to sell depending on the market price, their own consumption needs, storage facilities and their needs for immediate cash. In some developing countries an estimated 25 percent of all food produced is never consumed by humans, instead it is spoilt by insects, rats, and other pests (FAO, 1997). Adequate on-farm storage is therefore crucial, not only to enable storage of surplus food items, but primarily to provide farmers with a food supply

beyond the harvest period to ensure year round availability of food. The study sought to find out how surplus foods were stored to reduce the losses and consequently the effect on the food security, which is a prerequisite to good nutrition status.

2.6.6 Climate and Food Production

Temperature and rainfall highly affect crop production. Households in areas with unstable rainfall and high temperatures may have inadequate yield to last until the next harvest if resource base (land and capital) is not adequate or is poorly managed. The areas of low rainfall with least reliable distribution experience drought periods on regular basis (Longhurst, 1987). Research report from Kenya Agricultural Research Institute shows that frequent droughts and diminishing water resources due to destruction of vegetation in catchment areas is a major challenge to agricultural production (Kenya Agricultural Research Institute (KARI), 1995). A study done by Kamar (1992) shows that the productive capacity of dry lands is very closely related to soil moisture availability. This is because a water potential range exists between which plants can freely take up water, but, above and below which plants experience stress. Also a considerable portion of the limited rainfall in put in semi arid soils is lost as bare soil evaporation.

Currently, the country is experiencing food shortage in most parts. Insufficient rains could be blamed for the problem; however, some experts state that failure to diversify farming had led to the food scarcity (Bosire, 2004). Households in Kieni West division have their major livelihoods as agriculture and therefore, the study sought to find out if rainfall is a contributing factor to the continued decline in food production.

2.6.7 Employment away from Farm and Food Produced

The income earned through other employment contributes to improving the household's financial access to food. Through this, households with inadequate farm production may meet the food deficit from purchases. Regular source of income increases household purchasing power, as farmers may be able to purchase and use farm inputs and or hire labour. This way more land may be planted, weeded and harvested on time leading to higher farm production (UNICEF, 1992).

Given the constant threat of crop failure, farmers adapt by seeking income from other sources other than agriculture. Households living in marginal areas rely on illegal business like charcoal burning and beer brewing, which are detrimental to the environment and social welfare of the whole society (UNICEF, 1992). Non farm sources have been found to provide an average of 38% of total income in rural African households. In Kenya the share of non farm income represents 40% (Webb, 1994). These incomes are meagre and may not be channelled directly to accessing food and when made available to the household, they cannot meet adequate nutrition for the individuals or, to purchase farm inputs to increase production (Mbithi, 1981).

2.7 Coping Strategies.

All households are not equally vulnerable to a decline in their entitlement to food and the rich seldom starve. Even amongst a group of households with the same basic means of livelihoods, there may be tremendous differences between the options open to and the strategies chosen by each household. Poor households have amazing resilience and an impressive ability to cope with short-term crises and survive on low incomes and what appear to be relatively low availability of food (Latham, 1997). Whenever households are unable to produce enough food to sustain their survival, they develop ways and

means of acquiring the extra food needed. One way is to rely on food aid, food gifts, reduce the frequency of daily meals or develop other means of food acquisition such as food gathering, or sale of household assets and livestock and sale of labour to earn money to buy food; these are indicators of food insecure households (Campbell, 1990).

People adopt a range of strategies to cope with reduced access to food. In latter stages, coping mechanisms become exhausted so that the priorities of the individuals and community shift towards survival (Young and Jaspars, 1995). As a result of recurrent drought 'food insecurity shock absorbers' are exhausted. Therefore, reoccurrence of drought or famine would have more intense effects on household food security and consequently on nutrition status. The study sought to identify the coping mechanisms employed by the households in times of food shortages.

In chapter 3, the study methodology describes how the literature reviewed was related to area of the study.

CHAPTER THREE

3.0 METHODOLOGY

Information on household food security and nutritional status of the children under fives of age was obtained using both qualitative and quantitative research methodologies. Following is the presentation on research design, study area, target population, sample size and sampling procedures, data collection procedures, data collection instruments and data analysis.

3.1 Research Design

A cross sectional descriptive survey was used for the study. This allowed the researcher to collect data within a short period of time to determine the current status of that population with respect to one or more variables of the study (Krueger, 1988). This research design allowed collection of the data in its natural setting.

3.2 Study Area

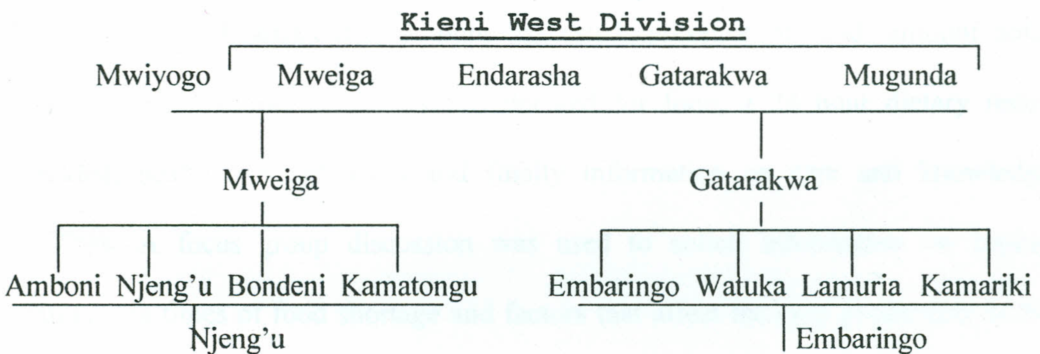
Kieni West is one of the Divisions in Nyeri District, Central Province. The division borders Aberdare Ranges to the West, Laikipia District to the North, Kieni East division to the East and municipality division to South. The division is the largest of the seven divisions of Nyeri District it covers an area of 626km^2. Kieni West Division experiences unreliable rainfall, which is generally below 800 mm p.a. in most areas (GOK, 1997). According to the census report of 1999, the division had a population of 68,461 people (CBS, 2001). Aggregated data for children under five years of age in Nyeri District is 67,785 (CBS, 2002). Segregated data for Kieni West Division is not available.

3.3 Target Population

The target population consisted of 3,357 households in Kieni West division with children under five years of age.

3.4 Sample Size and Sampling Procedure.

Kieni West division was randomly selected out of the two Kieni divisions as one of the areas that have continued to show pockets of malnutrition in the district. The division has five locations. Two locations were randomly selected (Mweiga and Gatarakwa). From each, a sub location was randomly selected (Njeng'u and Embaringo).



The total number of households in Njeng'u are 678 and Embaringo has 816 (CBS, 2001).

Ten percent of the total households constituted the sample, this formula is considered to give an appropriate study sample in descriptive survey that is a representative of the total population. The total sample obtained from Njeng'u and Embaringo, was 68 and 82 households respectively giving a sample size of 150 households. To get the respondents in each sub-location, the direction to be taken was defined by tossing a pen and where the tip faced, the first household was taken and every 10th household was used for the study.

To get the 10th household, the total number of households per sub location was divided by the expected number of household;

Njeng'u = 678/68 = 9.97 $\approx 10^{th}$

Embaringo = 816/82 = 9.95 $\approx 10^{th}$

Criteria for inclusion of the household was those with children under five years of age.

3.5 Data Collection Instruments

Anthropometric tools; Salter scale, bathroom scale, weighing pants, and length board were used to collect data on nutrition indices weight and height. Interview schedule was used to solicit demographic and food security information. These included: age, sex, family size, land size, income, occupation, and education level, type of house, duration the food stocks last, amount harvested, presence of food, amount sold, incomes obtained from crop, money allocated for food, a 24 hour dietary recall checklist, health and sanitation and finally information on care and knowledge practices. A focus group discussion was used to solicit information on coping strategies in times of food shortage and factors that affect the crop production in the division. Secondary data from the health facilities was obtained on common illnesses, immunization rates and cases of malnutrition reported.

3.6 Data Collection Procedures

A research permit was obtained from the Ministry of Education, Science and Technology to carry out the research. Prior to data collection, the local provincial administrators that is, the Chiefs and Assistant Chiefs were visited and informed about the study. The purpose of these visits was to sensitize them on the nature and purpose of the study.

3.6.1 Interview schedule

The interview schedule was explained to the respondents and consent was sought before the interview was conducted. In cases where the mother did not live with the child, the main childcare giver was interviewed. The researcher explained to the respondent the importance of the study and informed the respondent of the confidentiality of the information given.

3.6.2 Anthropometric Measurements.

Age was given by the mother and verified using growth monitoring clinic card or birth certificate.

Weight: This was taken using a 100kg calibrated Salter scale with 0.1kg intervals or an electronic bathroom scale calibrated up to 120kg at the interval of 0.1kg. Children below 2 years or those who could not stand with stability were weighed using the Salter scale. The scale was hanged from a strong place, set at zero with pants suspended from the scale for accuracy. The child was undressed; put on the weighing pants with straps in front of the child, gently hanged on the scale to hang freely on the scale. The reading was taken when the pointer stopped wobbling and the measurements were taken to the nearest 0.1kg. The readings were taken twice and the average recorded. Children who were over two years and could stand, a bathroom scale was used. It was placed on a flat surface; the child was lightly dressed and stood on the scale. When the pointer became stable, the weight was taken to the nearest 0.1kg. the reading was taken twice and the average recorded.

Height/ Length: This was taken using a length/height board. Children below 2 years their length was taken because they could not stand up rigidly. The child was let lie on board with back head, shoulders, buttocks and heels of feet touching the board. The child's head leaned on the fixed head board. The feet were flexed at lower end and the

foot piece slid to obtain contact to the heels. The reading was taken to the nearest 0.1cm. This procedure was repeated and a second reading was taken after which the average was calculated and recorded.

Children above 2 years stood bear feet together on the flat surface of the stadiometer. With back head, buttocks and shoulder back and heels touching the upright of the scale, the head of the child was comfortably held upright and headpiece was lowered to make contact of the head gently crushing the hair. The reading was taken to the nearest 0.1cm, the procedure was repeated and a second reading was taken. The average was calculated and recorded. The weighing scales and length/height boards were obtained from Wendiga Dispensary and they conformed to UNICEF standards.

3.6.3 Dietary Assessment

From the 24hour recall, dietary adequacy was determined by asking the respondents to give/mention the foods that were given to the child over the last 24hours prior to the study. Mothers were asked to show the utensils used to serve the child and estimated the quantities the child consumed at any particular serving. The quantities consumed were estimated using calibrated jugs.

3.6.4 Focus Group Discussions

The requirement of a focus group discussion (FGD) is 6-12 people (Krueger, 1988). Four FGD were conducted guided by the interviewer and each comprised of 8 people both men and women. The people who were included in the focus group discussion were some of those who had been interviewed as well as those who had not been interviewed and they had lived in the locality for a period of not less than twenty years. This duration was considered because it allowed those people who had a long experience in the study area. The focus group discussions sought to solicit

information on coping strategies, factors that affected crop production, trends in crop production, and sources of income, crops grown and the common illnesses the children suffered in these areas.

3.7 Pre-testing of the Research Instruments

The pre-testing was carried out in Labura sub location Kieni West division prior to the main study. These respondents were randomly selected. Weaknesses detected in the instruments during pre-testing were restated or discarded in order to enhance the reliability, validity and clarity of the research instruments.

3.8 Data Analysis

Data obtained from the household interview schedule were entered and analysed using the statistical package for social science (SPSS). Descriptive statistics such as means, percentages, frequencies and standard deviation were computed. To determine the nature and extent of relationships between the variables, Pearson product moment correlation was used for access to land, nutrition status, nutrient adequacy, morbidity, and food availability. Spearman test was used to analyse categorical data which included household size, land size, care practices, income and meal patterns,

Qualitative data (data obtained on coping strategies and factors affecting crop production), were organized, coded, categorized and generated into themes. Anthropometric data were analysed using the Nutrition Package Epi info 2000. The indicators used were Weight, height and age. To determine the nutritional status of children under five years of age weight for age, weight for height and height for age were computed. Z-scores were used to define the nutrition status with those below – 2SD in all the categories considered as malnourished. The nutritive value of all the ingredients used in preparation of the different dishes and for all the foods that were

consumed by the index child was determined using appropriate food composition tables mainly those developed by CTA-ECSA for use in East, Central and Southern African countries (West, *et al*., 1987). The nutrients of interest were energy, protein, iron and vitamin A that the child had consumed.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

The findings of the study are presented under the following topics; demographic and socio-economic characteristics, household food security, coping strategies, factors affecting food crop production, children nutritional status, and relationships between nutritional status, household food security and socio-economic characteristics.

4.1 Demographic Characteristics

Demographic characteristics give a general description of the population studied. The characteristics of respondents discussed are; gender, marital status, age, household size and number of children below five years. This is shown in Table 4.1

Table 4.1: Demographic Characteristics

Variable	N	%
Gender		
Female	129	86.0
Male	21	14.0
Marital status		
Married	121	80.7
Never married	21	14.0
Separated / divorced	5	3.3
Windowed	3	2.0
Age in years		
19-25	62	41.3
26-30	41	27.3
31-35	22	14.7
36-40	12	8.0
41-45	7	4.7
46-50	1	0.7
Above 51	5	3.3
Number of children under fives		
1	107	71.3
2	40	26.7
3 or more	3	2.0

These findings show that women were the majority, 86.0% with 14.0% men. This concurs with other research findings that women are mostly involved in agricultural production at the farm level (Latham, 1997). According to FAO (1997) women produce more than half of the food that is grown especially in the developing

countries. From the study women were engaged on on-farm employment and therefore they spent considerable time in agricultural production. Small-scale farmers usually receive low incomes which cannot be adequately used to purchase farm in puts to increase their production as well as adopt new farming technologies that reduce labour.

A majority of the women 80.7% were married. From the study marital status of the respondents did not show significant relationship with the nutritional status of children under fives neither on household food security. Studies have found that households headed by women are more likely to be more food insecure as well as have children who are malnourished than male-headed household. The type of household head influences household food security in that the burden of feeding the family is entirely on one person and the access to productive resources is limited to the female-headed households (FAO, 2002; Kennedy and Haddad, 1991).

The respondent's ages ranged from 19 years to 56 years. Majority of the women 41.3% were aged between 19-25 with only 4.0% above 46 years. This early age influenced the number of children under five years of which majority 71.3% of the households had only one child below the age of 5 years. Those who were above 46 years of age were found to be the caretakers of the under fives since the mother's to these children were working outside the home. Young adults are likely not to have accumulated assets and therefore, have limited access to resources this is because their incomes are limited. This greatly influences their access and use of available resources to improve their household food security and in turn their nutritional status as well as that of their children.

Studies have shown that women do spend significant years either pregnant or lactating or doing both at the same time. In Sub-Saharan Africa, the average woman bears her first child at age 19 years and her last child when she is 35 or 39 years (UNICEF, 1997). Frequent child bearing allow women little time to regain lost or absent nutrient stores and heightens reproductive risk. This threatens the health and nutritional status of the mother and the fetus.

4.1.2 Household Size

The respondents were asked to state the number of people that were living in the household and shared food from a common pot and the results are presented in Table4.2

Table 4.2 Household Size

Household size	N	%
2	2	1.3
3	37	24.7
4	43	28.7
5	21	14.0
6	19	12.7
7	23	15.3
8	5	3.3
Total	150	100.0
Mean household size 4.5		

From the Table 4.2 it shows that household size ranged between 2 and 8 with an average of 4.5 children. The mean size of Kenyan household is 4.4 persons (CBS and MOH, 2004). Household size determines the intra household food distribution in terms of quality and quantity. The larger the household the greater the quantities of food required which affects the dietary intake of the individuals. There was a negative relationship when the household size was correlated with stunting (r=-0.158 p=0.027). As the size of a household increased it was more likely to get a stunted child.

4.2 Socio-economic Characteristics

Socio-economic characteristics of a community determines the accessibility and level of utilization of available resources to ensure household food security and better nutritional status of the individuals. The socio-economic characteristics of the respondents discussed in this study are education levels, occupation, total monthly incomes, and sources of incomes, land ownership, livestock ownership and sources of water. Table 4.3 shows the level of education of the mothers, their occupation and their spouse's occupation.

Table 4.3 Level of Education and Occupation

Variable	N	%
Education level		
No formal education	4	2.7
Primary level	116	77.3
Secondary level	28	18.7
Tertiary college	2	1.3
Occupation of the women		
Farmer	121	80.7
Causal labourer	19	12.7
Business	6	4.0
Civil servant	2	1.3
Private sector	1	0.7
Housewife	1	0.7
Occupation of the spouse		
Farmer	67	44.7
Casual labourer	21	14.0
Civil servant	15	10.0
Private sector	15	10.0
Business	3	2.0
*	29*	19.3*

Note: * the spouses were either deceased or the women were not married or were separated/divorced.

The education levels attained were primary, secondary and tertiary level (77.3%, 18.7% and 1.3%) respectively. Those who had no formal education were 2.7%. From the study education level of the caregivers did not show significant relationship with nutritional status of children under five years of age. Maternal literacy and schooling

has been associated with an efficient management of limited household resources, greater utilization of health care facilities, better health care practices, lower fertility and more child caring behaviour (Gillespie, Mason and Martorell, 1991).

Majority of the women 80.7% were farmers as compared to 44.7% of the men. Women play a critical role as food producers and as income earners for their families. Casual labourers were found where there were coffee plantations. Private companies such as Sasini and Mweiga estates owned these plantations. On the contrary, local farmers either did not grow the coffee or where present was neglected.

The multiple roles of women in households as mothers, home managers, producers and community organizers, set two of their primary resources, namely income and time in conflict (ACC/SCN, 1990). Studies have shown that the capacity of a mother to care adequately for her children will depend to some extent on how she allocates her time between productive (income-earning) and reproductive (domestic work) as well as on her access to health services, water and fuel supplies, and markets for food (Gillespie, Mason and Martorell, 1991).

4.2.1 Income

This information was obtained from the respondents by asking them to state and or estimate the amount of money they earned on monthly basis and its source. Results are shown on Table 4.4.

Table 4.4: Incomes Earned and Sources

Variable	N	%
Amount in Ksh		
Up to 2000	79	52.7
2001-4000	50	33.3
4001-6000	16	10.7
6001-8000	-	-
8001-10,000	-	-
Over 10,001	5	3.3
Total	**150**	**100**
Sources of incomes		
Sale of farm produce	84	56.0
Sale of labour	50	33.3
Salaries from husband	8	5.3
Salaries from the wife	6	4.0
Parental support	2	1.3
Total	**150**	**100.0**

Table 4.4 show that majority 52.7% of the households earned below ksh 2000 monthly. Those who received over Kshs.10, 000 were only 3.3%. Those who received incomes between Kshs. 2001 – 6,000 were mostly those that worked as casual labourers and they stated that this income was unreliable.

Regular source of income increases household's purchasing power (UNICEF, 1992). Given the constant threat of crop failure, farmers adapt by seeking income from other sources than agriculture. The incomes received though considered regular, the respondents added that they were not consistent (they fluctuated from time to time). Von Braun *et al.*, (1992) mentions that smallholders with little income diversification and limited access to improved technology, such as improved seeds, fertilizers, irrigation and pest control are at risk of food insecurity. There was a significant relationship when land size and incomes obtained from sale of farm produce were correlated (r=0.291 p=0.001), as the land size increased incomes obtained were likely to increase. Consequently, as the land size decreased, there was an increase in sale of labour (r=-0.181 p=0.026). This phenomenon is likely to affect household food

security in that little labour was likely to be available at the household farm as well as incomes obtained were likely to be little.

Since people in Kieni West division depend on agriculture for their livelihoods, it is likely that they sold most of their produce leaving little or none for household consumption. The source, form and timing of payment are important factors; in-kind income, for example is more likely to be under female control than cash payment (Gillespie, Mason and Martorell, 1991).

4.2.2 Land and Livestock Ownership

The respondents were asked to state whether they owned land which they cultivated and by which means they owned this land is shown in Table 4.5

Table 4.5 Land and Livestock Ownership

Means of ownership	N	%
Inheritance	103	68.7
Hiring	24	16.0
Bought	7	4.7
Given a portion by the parents	10	6.6
Parents farm	3	2.0
No land	3	2.0
Total	**150**	**100.0**
Livestock ownership*		
Chicken	111	74.0
Cows	97	64.7
Sheep	86	57.3
Goat	67	46.7
Donkey	17	11.3
Rabbits	13	8.7
Bees (Hives)	7	4.7
No livestock kept	27	18.0

* Multiple responses were allowed

A vast majority 68.7%, of the respondents owned land through inheritance while 2.0% had no land (Table 4.5). It was noted that the households reported not to own

land they had access to formal employment and hence supplemented their source of food from the incomes obtained from employment. The nutritional status of their children under five years of age compared well with those from households that had access to land. Land is a key factor in agricultural production. Normally, households with no access to adequate land are food insecure and consequently influence the nutritional status of the children within these households (Donovas, 1996). The ability of a household to command adequate food resources through self-production or market transactions is primarily dependent upon assets and or income.

The kind of livestock that were reported were cows, goats, sheep, donkey, poultry, rabbits, and bees (Table 4.5). Studies have shown that families sell their livestock to buy food (FAO, 1997; Campbell, 1990) hence livestock are food insecurity absorbers. Since Kieni experiences episodes of food shortage, families could have resulted to rearing animals as buffers during the times of shortage.

4.2.3 Source of Water

Respondents were asked to state where they mainly obtained their water for domestic use. The results are shown in Table 4.6

Table 4.6 Major Sources of Water and Water Treatment

Source of water	N	%
Harvested rain water	6	4.0
Piped water at household	8	5.3
Piped – public tap	24	16.0
River/dam/well	112	74.7
Total	**150**	**100.0**
Water treatment		
Boiled or added chlorine	77	51.4
No treatment to the water	73	48.6

Table 4.6 showed that a majority of the households 74.7% fetched water from river/dam/well. River/dam/well water is likely to be contaminated and harmful for human consumption if it is not treated. These results conquer with other studies that have shown that women in rural Africa and Asia still walk to the nearest water source (FAO, 2001). Often these sources of water are contaminated. The time consumed in walking could be translated to childcare, food preparation and food production.

To obtain information on whether water was treated, the respondents were asked to state how they treated their water. About 51.4% of the respondents either boiled or added chlorine (treated) to their drinking water while 48.6% did not treat their water. The results partly explains why probably the frequent illnesses experienced were not water related. The results of study concur with the recent data in the Nyeri District development plan (GOK, 2002) that water supply is inadequate in the district especially in the semi-arid areas. The results of this study confirm the report in the development plan, as a majority of the households did not have piped water. (Kieni West division is in the ASAL areas). Investment in water supply have tended to favour the better off areas of the district. Thus, although most of the district has been supplied with piped water, Kieni Divisions are underserved by water projects.

4.3 Household Food Security

Food security is a broad and complex concept, which is determined by interaction of a range of factors. The indicators looked into are land size under food crop, crops grown, food utilization, income allocation, means of food procurement, presence of stored food, diet diversity, consumption frequency, and decision-making on use and purchase of food items.

4.3.1 Land Size-under Food Crop

The total land size under food crop was determined by asking the respondents the proportion of their land cultivated under food crops in the previous season prior to the study and the results are presented in Table 4.7

Table 4. 7: Land Size under Food Crop and the Crops Grown

Land size	N	%
Less than one acre	82	61.3
One to two acres	38	25.3
Two to five acres	15	10.0
More than five acres	2	1.3
No land	3	2.0
Crops grown*		
Maize	140	93.4
Potatoes	122	81.3
Beans	121	80.0
Vegetables and fruits	61	40.6
Bananas	20	13.3
Sweet potatoes	13	8.7
Wheat	31	20.7
Pyrethrum	27	18.1
Coffee	7	4.1

* Multiple responses allowed

From Table 4.7 a majority, 61.3%, of the respondents had less than an acre under food crop. Only 1.3% had more than five acres under food crop and 2.0% had no land for crop production. The results were not different from other studies as indicated that because of small plot size, low yields and very low wage rates for agricultural labour, farmers do not produce or earn enough to meet minimum basic needs (FAO, 2001).

Crop diversity will almost guarantee a varied diet and ultimately improved nutrition status. People's eating patterns are highly governed by the types of foods that are available. Crops that were grown in the areas of study were maize, beans, potatoes, peas, bananas, sweet potatoes and vegetables (cabbage, kales, onions and carrots). Maize, beans and potatoes were the major crops grown. All households at any

particular season planted maize, beans or potatoes. Where there was a stream or piped water households grew vegetables. A small number of respondents grew bananas and sweet potatoes.

Other crops that were grown in the areas of study were wheat, pyrethrum and coffee. Where the households had coffee plants they were not cared for. The farmers had neglected the plants as they complained the prices were too low and it took too long for them to be paid. This case was similar to those areas where pyrethrum was grown. It was also neglected as farmers said they had sold hundreds of kilos which had not been paid and therefore there was no need to spend their labour in it and it was better they concentrate on other crops. Those farmers who grew wheat were ready to increase their production if only there could be credit facilities to enable them obtain seeds and chemicals. They reiterated it would be appropriate if there would be a body to buy their produce since they felt exploited by the buyers who used weighing balances that had been tampered with. Studies have shown that cash crops are more remunerative than food crops and may be nutritionally beneficial providing the income they produce can be and is used to support livelihoods (Gillespie, Mason and Martorell, 1991). Maxwell and Fernado (1988) found evidence linking increased cash cropping to an improved command over food.

The limitations in the variety of crops grown reflected monotony in the diets, which were also limited in quality. This is in agreement with a study by Kigutha (1994), which found that household were more likely to consume what they produced.

4.3.2 Crops Utilization

The respondents were asked to state how they utilized their crops after harvesting and whether the reserves at the households were adequate; the results are presented in Table 4.8

Table 4. 8 Crops Utilization

Crop utilization		Maize	Potatoes	Beans	Peas	Wheat
Harvested	Yes %	79.3	82.0	72.3	22.7	12.7
	No %	20.7	18.0	27.7	77.3	87.3
Sold	Yes %	24.7	31.3	14.0	22.0	10.7
	No %	75.3	69.7	86.0	78.0	89.3
Adequacy of the amount left for household use	Yes%	43.3	40.0	28.0	0.7	10.7
	No %	56.7	60.0	72.0	99.3	89.3

From Table 4.8, the results show that few households had food for use as compared to the number of households that had harvested. For all the food types, higher percentages of the households stated that the food they harvested were inadequate. From the findings the households were at risk of food insecurity since the food present was considered little to take them to the harvest season, which was predicted to start two months from the time the data were collected.

4.3.3 Priority on Income Allocation

The information was solicited by asking the respondents to rate their priorities on expenditures. This is shown in the Figure 4.2

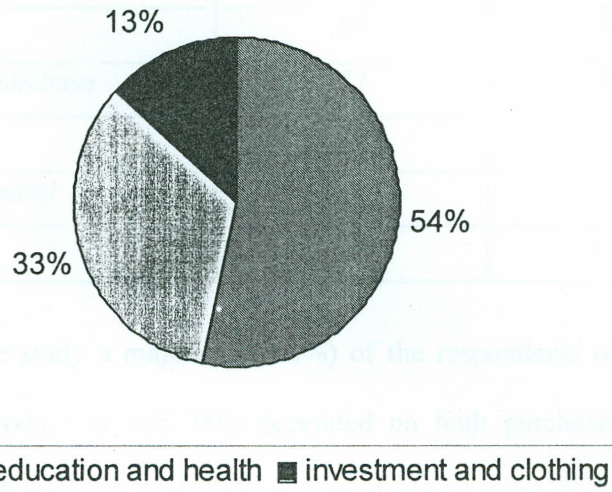


Figure 4.1 Priority on Income Allocation

From the findings of the study 54% of the respondents allocated their incomes on food as the first priority, education and health (33%) was the second while investment and clothing (13%) was the last. Though most of the respondents indicated that they obtained their food through home production (Table 4.8), they were indicated to have spent some higher portions of their incomes on purchase of maize. Other food items included vegetables, salt, both maize and wheat flours, cooking oils and rice. High expenditure on food is an indicator of household food insecurity (FANTA, 2001).

4.3.4 Source of Food for Household Consumption

The means by which the households procured their food was obtained by asking the respondents their major source of food. The results are shown in Table 4.9

Table 4. 9: Source of Food

Source of food	**Frequency**	**Percentage**
Home production	65	43.3
Home production and purchase	57	38.0
Purchase	26	17.3
Home production and barter	2	1.3
Total	**150**	**100.0**

From the results of the study a majority (43.3%) of the respondents obtained their food through home production and 38% depended on both purchases and home production. '*Farm production was only adequate when the season was good but poor climatic conditions lead to decreased yields and at some point they purchased some of the food items especially maize'* respondents said. Most rural people produce the foods they consume. Low food production in rural areas is responsible for the low food consumption (FAO, 1997).

4.3.5 Food Availability

Food availability was determined by finding out whether the households had stored food at the time of the study. The results are shown in Figure 4.3

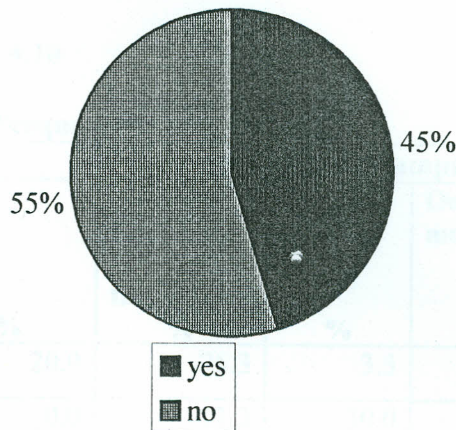


Figure 4.2: Presence of Stored Foods

As shown in the figure 4.2, majority of the respondents, 55% did not have any stored foods by the time of the study while 45% said they had some food in store. This was verified by asking the respondents to show the researcher the foods they had in store and/or in the house. Some of the respondents who did not have stored foods in their households, they harvested some of their crops (potatoes and maize) while not fully mature. Food availability is a factor of production capacity, amount of imports and amount that is normally used at a given period in time and of the availability of storage. (Food Security Analysis Unit for Somalia (FSAU), 2003). This increased their risk of being food insecure as this would reduce available amounts for storage as well as if there would be deterioration of the next season, there would be food shortage. From the results of the study as the incomes decreased it was likely that the household had no food in store (r=-0.203 p=0.016). There was also a positive significant relationship when one was asked to state whether they had some land for farming and presence of food at the household (r= 0.157 p= 0.050).

4.3.6. Food Frequency

A food frequency chart was used to obtain the frequencies of foods eaten. The results are shown in Table 4.10

Table 4. 10 Food Frequencies

Food item	Frequency of consumption				
	Daily %	Several times/week (2-6 times/wk) %	Once a week %	Once a month %	Never/after a long time %
Maize	20.0	75.3	3.3	1.3	0.0
Rice	0.0	13.3	30.0	40.0	16.7
Wheat	6.7	33.3	53.3	0.7	6.0
Potatoes	46.0	16.0	20.0	8.0	10.0
Other tubers	0.0	0.0	0.0	26.7	73.3
Pulses	0.7	18.7	32.0	9.3	39.3
Fruits	0.0	26.7	50.7	12.0	10.6
Vegetables	8.7	15.3	74.0	1.3	0.7
Meat/eggs	0.0	2.7	26.0	18.0	53.3
Milk	95.3	3.0	0.7	1.3	0.7

Other tubers; sweet potatoes, cassava, yams and arrowroots

The major cereal consumed was maize. Rice and wheat products were not consumed frequently. Where wheat was grown the respondents said that they could only afford wheat during harvesting period when wheat was in plenty but this diminished fast as wheat was sold to earn income for other uses. Potatoes were equally consumed frequently. In most meals potatoes were present. Other tubers such as sweet potatoes, yams, cassava and arrowroots were rarely or never consumed since they were not grown in these areas. They were said not to do well in the areas of study. Pulses were consumed especially beans, however, they were sparingly put in the food. It was stated that when pulses were harvested they were selling at a better price so they sold,

but they could not afford to purchase when they went out of stock since the prices were rated high. Fruits, meat and eggs were least consumed. These items were considered very expensive to afford.

Foods consumed by households are determined by the foods available, and what one can afford in addition to the likes and preferences. Hence food diversity in the diet is an important pointer to nutritional security (FSAU, 2003). The low consumption of fruits and vegetables and animal products contributed greatly to low levels of vitamin A consumption as well as iron. This was manifested in the high levels of morbidity especially the upper respiratory tract infection which is associated with lowered immune system of which vitamin A contributes greatly (WHO, 1999).

4.3.7 Meal Patterns

Food availability, stability and accessibility influence the frequency of consumption. The respondents were asked to state the number of times they had their meals during two weeks prior to the study. The results are shown on Table 4.11

Table 4.11 Meals Served per Day

Number of times meals are served per day	Frequency	Percent
Once	4	2.7
Twice	36	24.0
Thrice	108	72.0
More than three times a day	2	1.3
Total	**150**	**100.0**

The respondents had differences in frequencies in meals taken. Whereas 72.0% of the respondents had three meals per day, 24.0% had two meals in a day, 2.7% had one meal per day and 1.3% had more than three meals per day. The patterns extracted showed that the meal patterns were dictated by when the meals were taken (breakfast,

lunch and supper). It was found that snacks between the meals were not highly consumed. Reduced meals per day, is an indicator of food insecurity at household level (FAO, 1997). When the number of meals consumed per day were correlated with nutritional status, it was found that there was a negative significant relationship with stunting (r=-0.210 p=0.010). a reduction in number of meals taken per day led to an increased number of stunted children.

4.3.8 Decision Making on Use and Purchase of Foods

The decision on use of foods were made by husbands, wives or their parents (grandparents of the under fives). Figure 4.4.

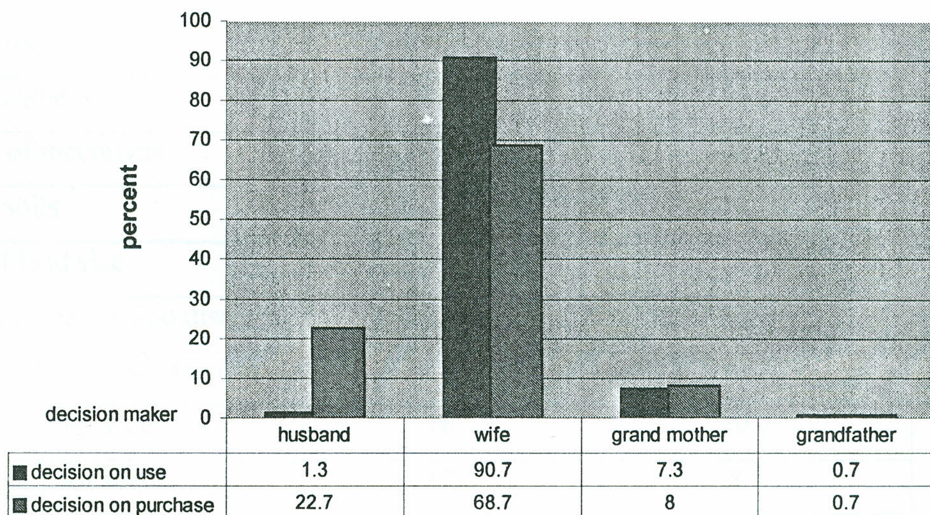


Figure 4.3 Decision Making on Use and Purchase of Food

From the findings of the study it was observed that women had an upper hand on decision-making on both use and purchase of foods (90.7%, 68.7%). This influenced what a household consumed. Although, other studies indicate that when women make food choices, they are likely to be beneficial to their own well-being and that of their children (Gittinger, 1990), other factors such as nutritional knowledge influence what

food items are purchased. From the study the food purchased were not diversified to supplement what was produced.

4.4 Factors Affecting Crop Production

The reasons given by the respondents why they had had continued low crop production were diverse. Since the major livelihood in Kieni West division is farming, decline in crop production poses a risk to household's food security. Table 4.12 shows the factors that were indicated by the households as well as from the focus group discussions.

Table 4. 12 Factors Affecting Crop Production

Factors	Frequency	Percentage
Unreliable rainfall	111	74.0
Lack of incentives	72	48.0
Poor soils	52	34.7
Small land size	48	32
Pest infestation and diseases	39	26.0
Destruction by wild animals	19	12.7
Poor selling prices	16	10.7
Lack or poor seeds	12	8.0
Other factors obtained through the focus group discussions		
Cutting down of trees Poor road infrastructure Poor farming practices Sale of labour		

The reasons that were outstanding for most respondents were unreliable rainfall, lack of incentives (to credit facilities, fertilizers, low or lack of returns from sale of other farm produce) and poor soils (74.0%, 52.0% and 34.7%) respectively. Others were

pest and crop diseases, destruction by wild animals, small land size, lack or poor seeds (this could have been attributed by the fact that farmers stored seeds for planting) and poor selling price of the surplus which led to lowered production. From the discussions other factors that were highlighted were cutting down of trees that had led to the low rainfall in the area, poor road infrastructure, poor farming methods and sale of labour. Sale of labour led to the community spending little time on their farms, hence decrease in crop production.

Factors affecting production influence food availability. The Kenyan economy is based on agriculture, which contributes 30% of the gross domestic product and provides livelihood to over 80% of the population living in rural areas. Adverse ecological and climatic conditions limit the available amount of good quality agricultural land. Only 7% of the land is of high quality, receives adequate and reliable rainfall and has good soils. About 11% is of medium quality while an additional 5% is arable but subject to periodic droughts and crop failures. Of the remaining land, a large part is only suitable for extensive livestock production (Ndiritu, 1994).

A study done in Africa found out that food production in many tropical African countries depends on rainfall, which is usually seasonally irregular and at times unpredictable (WHO/FAO, 1992). Seasonality in food production, therefore, implies fluctuations in food supply and food availability at certain periods of the year. This is especially true for those households with limited financial resources, and who mostly depend on the available land for their source of food.

Farmers are getting low prices for their farm produce. The main causes of the low prices are poor marketing arrangements and poor infrastructure. Inadequate access to

credit facilities at affordable rates has led to inadequate input application and low productivity. The results concur with national data that marketing of agricultural produce is one of the major development challenges the district faces (GOK, 2002).

4.5 Coping Mechanisms During Episodes of Food Shortage

Coping strategies in times of stress contribute to household food access. Table 4.16 shows the coping strategies the community turned to during times of food shortage. This information was obtained through the interview schedule and the focus group discussion.

Table 4.13: Coping Strategies

*Coping strategy	Frequency	Percentage
Sale of labour	109	72.7
Buying of food	94	62.7
Use of stored seeds	61	40.7
Food aid/relief	22	14.7
Parental support	17	11.3
Skipping meals	6	4.0
Cultivating along water ways	5	3.3
Additional coping strategies obtained through the focus group discussions		
Shift to other areas in search of food Sale of animals Charcoal burning Adultery		

*Multiple responses allowed

The major coping strategy during episodes of food shortage was sale of labour. This strategy was also blamed since these people would neglect their farms, hence affect their crop production. Other ways given were buying of food, use of stored seeds and food aid/ relief. For the food aid the respondents added that '*irio cia msaada ni nini*

kwauguo ni njega kuri andu aria aruaru na akuuru tondu matingihota guthii gwetha.' (relief food is beneficial to the sick and old who cannot go to search for food). Those who had waterways in their farms cultivated vegetables for sale hence could afford to buy other food items. Some households skipped meals so as to consume less as a result the food would last them longer till they could get more food. Such risk behaviour exposed the households to HIV/AIDS vulnerability which is also a cause of poor nutritional status.

Coping strategies change as stress continues. From the focus group discussion it was established that there was a change in coping strategies. It was revealed that charcoal burning was minimal since there had been deforestation and as well as bushy areas had been cleared. In the community it was also found that distress strategies were sought, where some people committed adultery. For men, it was said that they turned to adultery to get away from the responsibilities in their homes '*matigetio irio* (so that they are not asked for food), while for women it was because they would get some little money or food stuffs 'kamutu *kana gacukari'* (a packet of maize flour or sugar).

Poor households have amazing resilience and an impressive ability to cope and survive on low incomes and what appear to be relatively low availabilities of food. Whenever households are unable to produce enough food to sustain their survival, they develop ways and means of acquiring food (Campbell, 1990 & Latham, 1997).

4.6 Children Nutrition Status

Children nutritional status is a good indicator of the household and community food security situation. The study utilized a range of factors from the conceptual framework (Figure 1.1). Some of the variables that were examined were dietary intake, children health status, care practices, water and sanitation

The indicators that were used in this study to asses the nutrition status of the under fives were height for age (stunting), weight for height (wasting), and weight for age (underweight). There were 80 boys and 70 girls in the study sample.

Figure 4.5 shows nutrition status by age

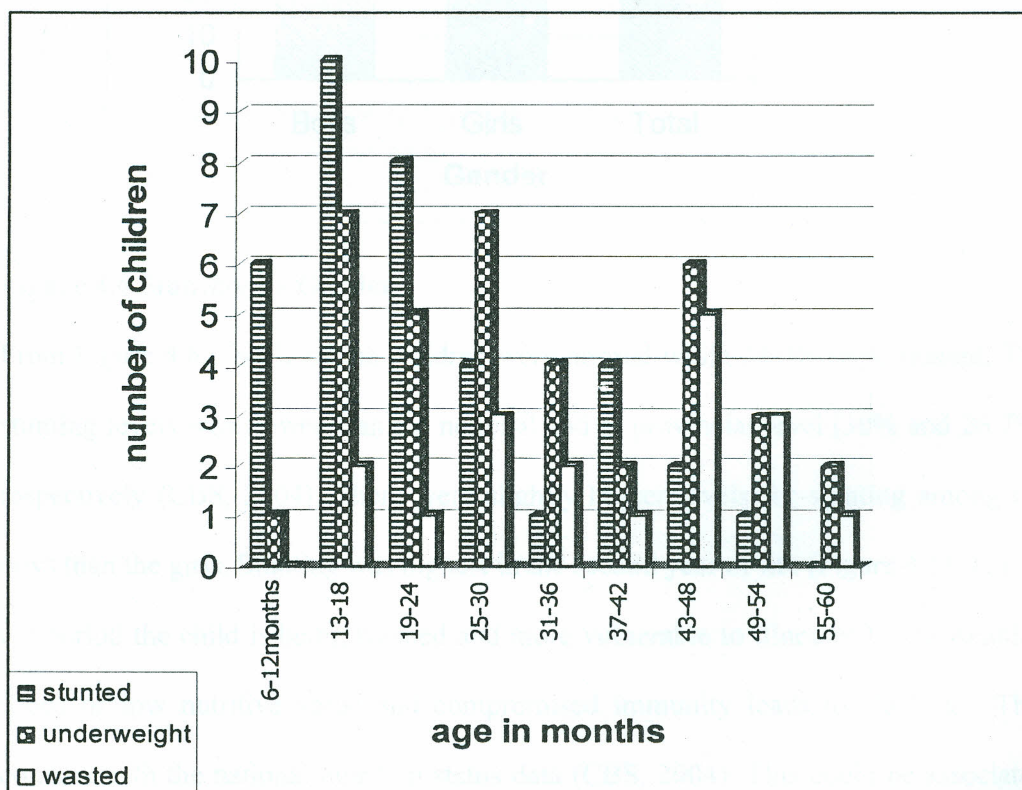


Figure 4.4 Nutrition Status by Age

Stunting

Height for age is the index that describes stunting. It is a measure of linear growth; it results to one being too short for their age. It reflects the cumulative effect of chronic malnutrition. Figure 4.6 shows stunting by gender.

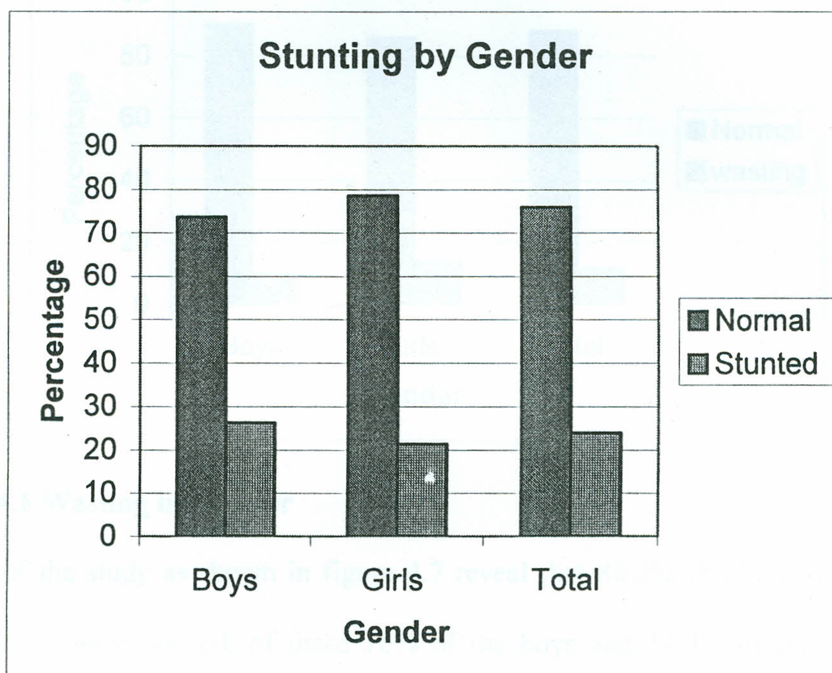


Figure 4.6 Stunting by Gender

From Figure 4.6, 76.0% of the children were normal while 24.0% were stunted. The stunting levels were lower than the national and at provincial level (30% and 26.7%) respectively (CBS, 2004). There were slightly higher levels for stunting among the boys than the girls. Stunting was highest in the second year of life (Figure 4.5). This is the period the child is being weaned and more vulnerable to illnesses hence weaning foods of low nutritive value and compromised immunity leads to stunting. This concurs with the national nutrition status data (CBS, 2004). This could be associated with the continued decline in food production in Kieni division (GOK, 2002), as well as a result of consumption of foods of low nutritive value.

Wasting

Weight for height is the index that describes wasting. This is when the child is too thin for his or her height. It indicates short-term deprivation of nutrients.

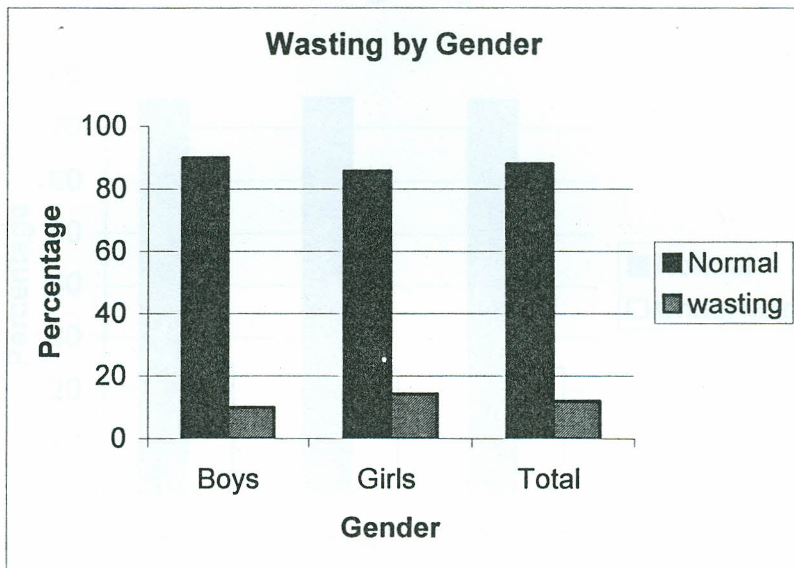


Figure 4.6 Wasting by Gender

Results of the study as shown in figure 4.7 reveal that 88.0% children were normal while 12.0% were wasted; of these 10% of the boys and 14.3% of the girls were wasted. Wasting levels were higher than the current reported 4.1% in central province (CBS, MOH and ORC Macro, 2004). Wasting was highest at age 43-48 months, (Figure 4.5). This is in contrast to other studies as they indicate high levels as occurring between ages 10-23 months (CBS, MOH and ORC Macro, 2004). This probably could have been as a result of the high rate of illness and may refusal of the child to eat during these times.

Underweight

This index does not differentiate between acute and chronic malnutrition. It is mainly a consequence of inadequate diet and frequent infection leading to deficiencies in

calories, proteins, vitamins and minerals (WHO, 2002). Figure 4.8 is a presentation of underweight by gender.

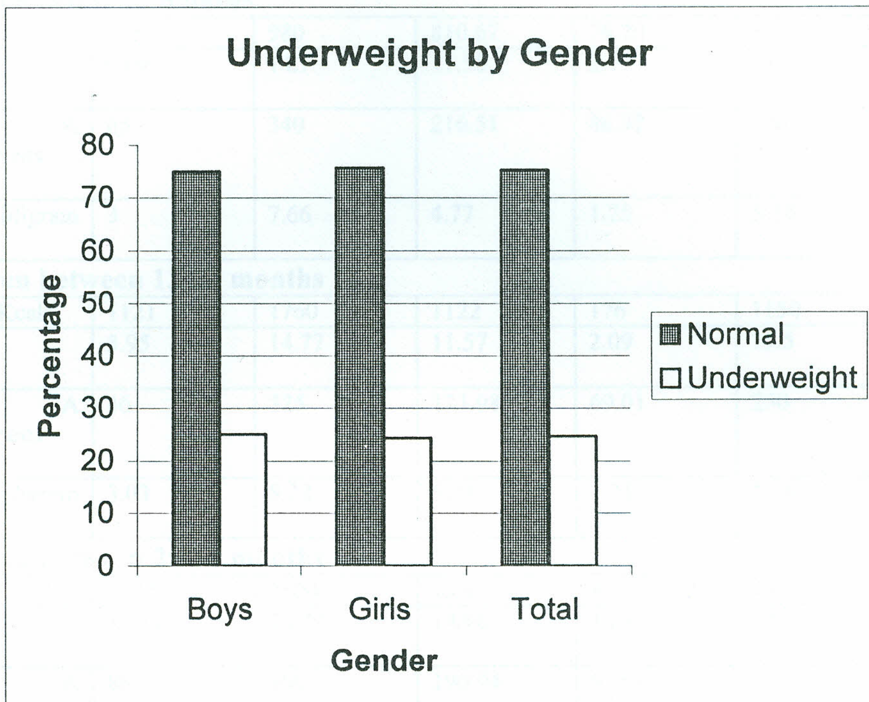


Figure 4.7 Underweight by Gender

According to Figure 4.6, 75.3% of the children were normal and 24.7% were underweight. There were more boys than girls who were underweight (20 and 17) respectively. Underweight was highest at the age of 13-18 and 25-30. From the nutrient composition analysis, children are reported to be receiving nutrients below the RDAs. This indicates consumption of inadequate diets.

4.6.2 Dietary Intake Using the 24 hr-recall

The food composition tables were also used to estimate the amount of protein, kilocalories, iron and vitamin A. The nutrients equivalents are shown in table 4.14

Table 4.14: Nutrients Equivalents

Nutrients	Minimum	Maximum	Average	Standard deviation	RDA
Children below 12 months					
Energy (Kcal)	668	980	810.67	76.20	820
Proteins (grams)	6.09	14.7	11.56	2.57	13.5
Vitamin A (micrograms µg)	65	340	216.51	86.92	300
Iron (milligram mg)	3	7.66	4.77	1.25	5-10
Children between 13-24 months					
Energy(Kcal)	1121	1760	1122	176	1150
Proteins (grams)	5.95	14.77	11.57	2.09	13.5
Vitamin A (micrograms µg)	46	325	173.98	69.01	250
Iron (milligram mg)	3.03	8.22	5.78	1.35	5-10
Children between 25-36 months					
Energy(Kcal)	1185	1500	1356	83.41	1350
Proteins (grams)	12.77	16.79	14.98	1.23	15.5
Vitamin A (micrograms µg)	86	300	190.94	61.90	250
Iron (milligram mg)	2.37	8.00	5.61	1.36	5-10
Children between 37-60 months					
Energy(Kcal)	768	1170	1541	156	1550
Proteins (grams)	14.36	19.03	16.90	0.98	17.5
Vitamin A (micrograms µg)	33	304	187.81	62.12	300
Iron (milligram mg)	3.33	12.04	5.76	1.53	5-10

When the nutrients consumed by the children below five years was calculated, compared to the recommended daily allowance by WHO, there was low consumption of vitamin A and proteins. Iron consumption for children above 12 months was adequate though low whereas energy consumption was also minimal.

Food availability, stability, accessibility and care practices influence the amount of food consumed, variety and/or diversity of the diets, frequency of consumption,

quality of food, and proportion of all essential nutrients in the diet. The results of the 24hr recall coincided with the results obtained from the food frequency (Table 4.14). The commonly consumed food were potatoes in large quantities, little amounts of beans, sparingly use of vegetables and little quantities of maize. These foods had very low content of Proteins, Vitamin A as well as Iron. The nutrient content of the meals consumed on average was below the RDAs. This pattern was influenced by food crops grown and also their cost when they had to be purchased.

The results of this study may suggest that the households were not food secure, as decreased nutritive values of food do not ensure a healthy life. Household food security does not only mean continuous supply, access and availability of food but it also entails foods of good nutrition quality value to ensure a healthy life (FANTA, 2001).

When energy intake was correlated with under weight and wasting, (r= -0.366, p=0.000 and –0.466, p=0.000 respectively) there was a negative significance. Decrease in energy intake led to decrease in SD scores which is an indicator of malnutrition status. Further correlation of Vitamin A with under weight and wasting (r= 0.230 p= 0.005 and r=0.233 p= 0.004 respectively), there was positive significant correlation. An increase in intake of vitamin A led to a reduction in underweight and wasting. Iron showed positive significant relationship with wasting (r=0.183 p= 0.025) similarly to Vitamin A, an increase in intake of iron led to an increase in SD which indicates an improvement of nutrition status. When nutrition status was correlated with morbidity, there was a negative significant relationship between stunting and presence or absence of illness (r= -0.167 p= 0.041).

4.6.3 Children Health Status

Nutritional status and diseases are closely linked. High disease incidences will compromise nutritional status. Practices that promote and maintain good health in the population are influenced by a number of factors. During ill health, these practices include seeking health services from qualified personnel, access to health services as well as control and treatment of communicable diseases. This data is shown in Table 4.15

Table 4. 15: Children Health Status

Immunization rate	**Frequency**	**Percentage**
Yes	148	98.7
No	2	1.3
Morbidity		
Common cold	72	48.0
Bronchial pneumonia	7	4.7
Malaria	6	4.0
Diarrheoa and vomiting	6	4.0
Not sick	59	39.3
Care given during illness		
Child taken to hospital	60	40.0
Nothing was given and child was not taken to hospital	42	28.0
Bought drugs over the counter	34	22.7
Herbal mixture (garlic and lemon) + salt and oil	14	9.3
Accessibility to health facility (distance in km)		
Up to I km	28	18.7
2 km	23	15.3
3km	41	27.3
4km	12	8.0
5km	24	16.0
Over 6 km	22	14.7

Information on immunization was obtained by asking the mother whether the child had been immunized according to their age. This was verified by cross-checking with the health/ growth monitoring card. The immunization coverage was high with 98.7% of the children fully immunized for their ages and only 1.3% who had not received

their measles dose. The high immunization coverage was greatly influenced by the high accessibility of the high facilities.

High coverage of immunizations against early childhood diseases is considered to be a safeguard to better nutrition and health (Viteri, 1987). This could have been attributed to the availability of the health facilities which most of the respondents had access to.

From the study results (Table 4.15), it's evident that the majority of the households had access to health facilities and more so they walked for short distances to seek treatment. Those who walked up to 4 kilometres were 69.3% this was higher than the national estimates that indicates 42% of the population walk up to 4 kilometres (GOK & UNICEF, 1988).

Access to health services is vital, especially in rural areas, where prevention, timely treatment and proper management can make an important contribution towards health morbidity rate. Access to, and utilization of primary health care has been found to buffer the child against growth deficits by decreasing the prevalence of disease through immunization and deworming (CBS, 2001).

The morbidity rate was high as shown in Table 4.15. From the findings of the study 48.0% of the children suffered from common cold, 4.7% bronchia pneumonia, 4.0% suffered from malaria, diarrhea and vomiting respectively. The interaction of infection and inadequate food consumption causes retarded growth in children leading to a vicious circle (malnutrition –infection complex). Low levels of consumption of Vitamin A which, helps in immune system exposes one to high rate of infections. Vitamin A deficiency has been associated with high rates of pneumonia infection

(West *et al.,* 1987). In addition respiratory infections have been reported to cause growth faltering (Rowland, Cole and Whitehead, 1977). From the findings of the study children consumed low levels of kilocalories, proteins, vitamin A and iron. This could have caused the high rate of illnesses.

Recognition of signs of illnesses and early care seeking behaviour among mothers of children under five years, prevents complications and death resulting from common childhood illnesses. The care given during the times of illness was indicated by the response one gave when they noticed that the child was unwell (Table 4.15). About 40% of the children were taken to hospital. Twenty eight percent of the respondents did not give the child anything neither did they take the child to hospital because they termed the illness as not serious. Those who prepared some mixture (garlic and lemon) added some salt and oil, then rubbed on the child believed that this would relief fever especially when the child was suspected to have pneumonia. The care of the sick reduces the severity and duration of current infection, prevents secondary infection and worsening of minor injuries.

4.6.4 Care Practices

The environment, tradition and practices within the household and the community influence nutritional status. Care practices vary with age and culture. The care practices that the study looked into were hygiene practices, breast-feeding duration, mode of feeding, intra household food distribution and responsiveness of the caregiver when the child had problems when feeding.

Table 4.16 Care Practices

Care practice	Child's age in months	Care giving person (N)		
		Self (Child)	Mother	Others
Hygiene Practices				
Toileting	6-12	0	25	2
	13-24	4	34	4
	25-36	16	17	1
	37-48	22	5	0
	49-60	17	3	0
Bathing	6-12	0	25	2
	13-24	0	40	2
	25-36	0	30	4
	37-48	0	24	2
	49-60	0	20	0
Feeding	6-12	0	25	2
	13-24	6	30	6
	25-36	21	10	3
	37-48	18	7	2
	49-60	20	0	0

Mode of Feeding

		Cup/bowl and spoon	Cup/bowl/spoon/bottle feeding	Bottle feeding
Age of the child in months	6-12	23	1	3
	13-24	42		
	25-36	34		
	37-48	27		
	49-60	20		
Total N= 150		146	1	3

Intra Household Food Distribution

Food distribution- first served.	N	Percent
Child(ren) below five years	97	64.7
Father	49	32.6
Grand parent	4	2.7
Mother	0	00
Total	150	100.0

Breast Feeding Duration

Age (up to) in months	N	Percentage
6	9	6.0
12	40	26.7
18	56	37.3
24	45	30.0
Total	150	100.0

Care Giver's Responsiveness when the Child Refused to Eat

Response	**N**	**Percentage**
Care giver encouraged the child to eat/sooth	85	56.7
Frequent feeding	42	28.0
Forces the child to eat	9	6.0
Increase breast feeding times	9	6.0
Stop at that	5	3.3
Total	150	100.0

Others: House helps and grandparents

Results show that mothers took the biggest responsibility in feeding, toileting and bathing their children. Studies have found specific caring practices associated with better nutritional status in children. This is mainly through protection of the child from pathogens, which depends on the caregivers' cleanliness and sanitation, use of health care services for routine checks and nursing care for the child during episodes of illness (UNICEF, 1997). Alternative caregivers in the study were grandparents and house helps. About 97.3% of the respondents used cup/ bowl and spoon to feed the children while only a small percentage 2.7% of the respondents who either used bottle-feeding or a bottle-feeding together with cup/bowl and a spoon. Utensils like cups, spoon and bowls if thoroughly cleaned are easy to keep clean as than the bottle.

Breastfeeding duration varied with only 6.0% of the children had been breast fed for less or up to six months. Majority, 37.3% had been breastfed for up to 18 months. The reason why most mothers were able to breastfeed their children for longer duration could have been explained by the fact that most of the mothers were working at home and hence spent more time with their children and also there was child spacing with an average of two children below five years. As the duration of breastfeeding was prolonged, stunting levels were likely to decrease (r=0.271 p=0.001).

From the results (Table 4.16) children were served before the other members of the family. Intra household food distribution ensures that nutrients needs of all household members are met, prioritizing the vulnerable members. The caregiver's response to the child when they refused is very important. From the results in Table 4.16, majority, 56.7% of the caregivers encouraged /soothed the children to eat.

4.6.5 Sanitation

From observation, in all the homes under study there was presence of a pit latrine. Household refuse was either burnt (papers, plastics) or thrown to the farms or fed to the animals. There was no presence of stagnant waters in the compounds. This was a good indicator of a healthy environment. Sanitation issues like disposal of human waste, disposal of garbage and cleanliness of the household environment affect health. Poor sanitation results in disease outbreaks and also interferes with food consumption and utilization. Low prevalence of diarrhea cases and malaria could be attributed to the positive health practices.

4.7 Relationship between Socio-economic Characteristics, Household Food Security and Nutrition Status of the Under fives.

The relationships were determined by use of Pearson Product Moment Correlation and Spearman Rho test at 0.05 significant level. Spearman Rho test was used to analyze those variables that were categorical in nature. These were household size and nutrition status, land size and incomes from farm produce and sale of labour and household food security and nutrition status. When household size was correlated with nutrition status, there was a significant negative correlation with stunting (r=0.158 p=0.027). An increase in household size was more likely to lead to an increase in number of children who were stunted. There was a positive and significant correlation when land size and incomes obtained from farm produce were correlated (r=0.291 p=0.0.001), as the land size increased there was an increase on incomes obtained from sale of farm produce. However, there was a negative correlation when land size was correlated with income from sale of labour (r=-0.181 p=0.026). Decrease in land size led to an increase in sale of labour. Decrease in incomes is more

likely to influence other foods purchased to supplement farm production while increase in sale of labour is likely to affect the time the mother spends with the baby. When the household food security and nutritional status were correlated there was a significant and a negative relationship between stunting and number of meals taken per day (r=-0.210 p=0.010). Presence of stored food in a household as an indicator of household food security when correlated with total income a household received per month, showed a negative significant relationship (r=-0.203 p=0.016). This shows that as the incomes decreased it was likely that the household had no food in store.

Some care practices were found to have had significant relationship with nutrition status of the under fives. When breast-feeding was correlated with nutrition status, there was a significant and a positive correlation with stunting (r=0.271 p=0.001). As the duration of breast-feeding was prolonged, stunting levels were likely to decrease hence an improved nutrition status.

Variables that were continuous and also dichotomous in nature were subjected to Pearson Moment Correlation. These were energy intake and wasting, vitamin A with underweight and wasting, Iron and wasting, nutrition status and morbidity and lasting, land width and presence of stored food at the household. When energy intake was correlated with underweight and wasting, (r=-0.366 p=0.000 and r=-0.466 p=0.000 respectively) there was a negative significance. Decrease in energy intake led to decrease in SD scores, which is an indicator of malnutrition status. Further correlation of vitamin A with underweight and wasting (r=0.230 p=0.005 and r=0.233 p=0.004 respectively), there was a positive significant correlation. An increase in intake of vitamin A led to a reduction in underweight and wasting. Vitamin A plays a major role in immune system hence reduces the duration and intensity of infection.

Iron showed positive significant relationship with wasting (r=0.183 p=0.025) similarly to vitamin A, an increase in iron intake led to an increase in SD which indicates an improved nutrition status. When nutrition status was correlated with morbidity, there was a negative significant relationship (r=-0.167 p=0.041). Children who were malnourished were likely to have had an infection. Malnutrition and illness are inter-linked.

Land as one of the indicators of household food security had a positive significant relationship with the presence of food at the household (r=0.157 p=0.05). Households with land for farming have an access to food, however, factors affecting crop production influences greatly land production.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Malnutrition has remained one of the major causes of morbidity and mortality among children below five years of age throughout the World. The state of food security in Kenya has been deteriorating over the past years. Kieni West Division has continued to show levels of malnutrition and food production has been declining. The general objective of the study was to assess the household food security and nutritional status of the under fives in Kieni West Division.

A cross sectional descriptive survey design was used in the collection of data. A sample of 150 households were obtained from two sub location that were randomly selected from Kieni West Division. Data was collected using an interview schedule, anthropometric tools and a focus group discussion. The data were analyzed using the SPSS computer package and Epi INFO 2000.

5.1 Major Findings of the Study

Household Food Security

At the time of data collection, it was found out that the households were at risk of food insecurity. Most of the households (55%) did not have any stored food at the time, at the same time, even those who had some food, they confessed they were harvesting their crops before they were ready (maize, peas, potatoes and beans). This led to reduced food stores; hence they would experience periods of lack before the next season. Poor season would aggravate the situation.

The major source of food was from farm production. Meals lacked diversity and the consumption of fruits, meat, eggs and diversified vegetables was very low. The meals consumed had low nutritive value as compared to the RDAs. The major source of

income was from sale of farm produce. This was said to be unstable due to seasonality changes. This also posed a risk on food availability since farm production was the major source food as well as income.

Factors Affecting Crop Production

The major constraints to food production were erratic rains. Other constraints were pests and diseases, lack of access to farm in puts (poor sales from farm produce due to poor infrastructure, lack of credit facilities, and lack of fertilizers).

Coping Strategies

The major coping strategy employed by the household was sale of labour. Other strategies were buying of foodstuffs since their main source of food was farm production, food relief, skipping of meals, shifting and sale of livestock. Over time due to continued food shortages, charcoal burning has ceased as the forests have been cleared.

Nutrition Status of Children

According to the results of the study, there were 24.0% stunted children; this was lower than the current national statistics, which shows that the stunting levels are 31%. Underweight was 24.7% and wasting 12.0%. Wasting was higher than the current national statistics 4.1%. Stunting and underweight were more prevalent among boys than among the girls. The level of stunting could have been high due to continued decline in food production and the high incidences of illnesses.

Relationships between Socio-economic Characteristics, Household Food Security and Nutrition Status of Under fives.

Increase in household size had a negative correlation with stunting (r=-0.158 p=0.027). From the study it was found that as the land size increased, the incomes obtained from sale of farm produce also increased (r=0.291 p=0.001) however, there was a negative relationship when land size was correlated with incomes obtained from sale of labour (r=-0.181 p=0.026). Land as one of the indicators of household food security had a positive significant relationship with the presence of food at the household (r=0.157 p=0.05). When household food security was correlated with nutrition status of the under fives there was a negative relationship (r=-0.210 p=0.010).

5.2 Conclusion

The major source of livelihoods in Kieni West Division was farming. Food produced from own farm was the major source of food and therefore seasonal variations determined their food availability. Crops grown were not largely diversified, the major staple food comprised maize, potatoes and beans hence the meals consumed. At the time of the study majority of the households were food insecure as they did not have stored food. Their food expenditures were higher, since most households prioritized their spending on food purchases.

Nutritional status of under fives in Kieni West Division is low. Consumption of inadequate nutrients and the high morbidity rates, were likely to predispose the young children high risks of malnutrition.

5.3 Recommendations

From the findings of the study women education need to be enhanced this would enable them gain knowledge on better utilization of available resources and more so be able to diversify their sources of income. This would be through conducting nutrition education and encouraging women to pursue secondary education.

Given that food security entails foods that are adequate in nutrient, there is need to promote cultivation of fruits and varieties of vegetables to enhance the accessibility as well as consumption. Other alternative sources of animal protein such as rearing of rabbits and chicken that are cheap, easily accessible and available should be encouraged. Alternative sources of incomes should be sought in order to enhance peoples incomes so as to reduce the over reliance on sale of farm produce. Government and non-governmental organizations should contribute considerably to creation of income generating activities.

There is need to improve the infrastructure. This area has poor means of transport (roads are impassable especially during rainy seasons which many at times corresponds with times of harvesting) this leads to poor sales of farm produce and wastes of surpluses especially for the perishable crops. Government and the donor community should improve water supply and accessibility to reduce time used on search for water. Credit facilities should be extended to farmers so as to enable them access farm in puts.

Agricultural extension officers should offer the farmers services on better farm management in order to conserve the little rains that the area receives so as to improve on production. There is need to encourage the farmers to grow drought resistant crops, better choices of hybrid seeds that can thrive in these areas and diversify their crops.

5.4 Suggestions for Further Research

The research findings indicate the need to carry out a study on farming methods and practices in Kieni West Division in order to identify more appropriate crops that can be grown in the area to mitigate the state of the household food insecurity. Findings of this study show that a gap exists on micro-nutrient adequacy among children under the age of five years, hence a need to carry out a research on micro nutrient deficiency. Similar studies should be done to include other age groups such as elderly, lactating and pregnant mothers.

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Appendix 1 Introduction letter

JOSEPHINE MUTHONI MWEMA
KENYATTA UNIVERSITY
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NAIROBI

2003

REF: RESPONDENTS CONSENT REQUEST

I am a postgraduate student from Kenyatta University undertaking research on household food security and nutrition status of under fives in Kieni West Division. I wish to request information from you on this subject. The results of this study will be of great benefit to you as a participant and the community at large as this information will be used by the organizations interested in food security and the well being of people in the division.

All the information given will be used for the purpose of the study only and will be treated confidentially. Your commitment and cooperation is highly appreciated.

Yours Sincerely

Josephine Muthoni Mwema.

APPENDIX 2: INTERVIEW SCHEDULE

(FOR THE HOUSEHOLD HEAD)

Code number

Instructions. The researcher / research assistant will guide the respondent through the questions. She / he will enter the code of the answer given in the brackets.

Section 1: Demographic information

1.Gender of head of the household [ ]
1. Male
2. Female

2. Age [ ] in years

3. What is your marital status? [ ]
1. Married
2. Never married
3. Separated
4. Windowed
5. Divorced

4. How many members are living in this household? [ ]
1. One
2. Two
3. Three
4. Four or more

5.(a) How many children are below 5 years of age? [ ]
1. One
2. Two
3. Three or more

Section 2: Socio economic characteristics

6. What is your highest level of education?[ ]
1. None
2. Primary education
3. Secondary education
4. College
5. University
6. Other (specify)

7[a]. Do you own land? [ ]
1. Yes
2. No

7 [b]. If yes, do you have an ownership title deed?
1. Yes
2. No

7 [c]. Means of land ownership
1. Inherited
2. Bought
3. Hire
4. Given a portion by the parents
5. Parents farm

8 a. Husband's occupation? [ ]
1. Farmer
2. Civil servant
3. Casual labourer
4. Business man/lady
5. Private sector
6. Other (specify)

8 b. Wife's occupation? [ ]
1. Farmer
2. Civil servant
3. Casual labourer
4. Business man/lady
5. Private sector

9. What are the main income generating activities in this household? (Record in the order of importance).

Source code	Activity	Very important 4	Important 3	Least Important 2	Not important 1
1	Sale of animals				
2	Sale of labor				
3	Salaries from husband				
4	Salaries from wife				
5	Sale of farm produce				
6	Given by the parents/siblings				

10. What is the total income received per month?

12 (a). Do you rear animals? (cows, goats, sheep, chicken, rabbits, ducks, bees)
1. Yes
2. No

12 (b) Tick the appropriate

Animal
1. Cow [ ]
2. Goats [ ]
3. Sheep [ ]
4. Chicken [ ]
5. Rabbits [ ]
6. Ducks [ ]
7. Bees [ ]
8. Other (s) specify

13 A]. Which is the main source of water in the household? [ ].

1. Piped-public tap
2. Piped water at household
3. Fetching from the well/ river/ dam
4. Rain water stored in reservoirs
5. Other (specify)________________________

13 B]. Do you treat this water to make it safe for drinking?
1. Yes
2. No

13 C. If yes how do you treat this water? [ ]
1. Boiling
2. Filtration
3. Chlorination
4. Others (specify)

Section 3 Household food security.

14.Which are the major staple foods grown in order of perceived importance?
[3] Very important
[2] Important
[1] Least important

Foods grown	Very Important [3]	Important [2]	Least important [1]
A			
B			
C			
D			
E			
F			

15.How much land was under food crop during the last season? ------acres

16.Please indicate the crops harvested, wasted, sold, and the price.

Crop	Amount harvested	Amount sold in	Price Ksh	Amount for household use	Adequate [1] Inadequate [2]

17. From the total income received by the household indicate in order of priority during the allocation of the incomes.

Allocation	**Order of priority 1-4**
Food	
Education and health	
Investment and clothing	
Others	

18. Which foods do you purchase frequently?
    1
    2
    3
    4
19. Do you have any stored food now?
    1. Yes
    2. No
20. For how long do you expect it to last?
    1. ---------months
    2. ---------days

20 b). How many meals were usually served in your household per day in the last two weeks?
1. Once in a day
2. Twice in a day
3. Thrice in a day
4. More than three times a day

21. Who makes decision on the use and purchase of food in this household?
1. Husband
2. Wife
3. Others (specify)---

22. What are the main problems that affect crop production in this household?
    1---
    2---
    3---

23. Which is the major source of food in this household? [ ]
1. Home production
2. Purchase
3. Food aid
4. Barter
5. Others [specify]

24. Do you store seeds for planting?
1. Yes
2. No

25. Do you use any preservatives for the stored harvest?
1. Yes
2. No

25 [b] If so please specify.
1. Chemicals bought from the agro vet
2. Ashes
3. Others (specify)______________________________

26. Do you use the stored seeds as food? [ ]
1. Yes
2. No

27. During the episodes of famine and food shortage, how do you provide food for the family?
1.
2.
3.

4.
5.
28 (a).Household food pattern using food frequency table

Food Frequency Table					
Food Item	Once a day 5	Several times a week 4	Once a week 3	Once or twice a month 2	Never/ after a long time 1
Ugali					
Rice					
Porridge					
Other cereals					
Potatoes					
Sweet potatoes					
Yams					
Other tubers specify					
Cabbages					
Carrots					
Pumpkins leaves					
Kales					
Otherveg.specify					
Beans(other pulses					
Meat					
Milk					
Eggs					
Fruits					
Githeri					

28 (b) What reason do you give for the food that never/ are taken after a long time?

1. To expensive to afford
2. Not readily available
3. Prohibited by the traditional beliefs/ religious beliefs
4. Other reasons (specify)

28 (c) Are there foods that restricted in the home?

1. Yes
2. No

28 (d) Which ones?
1.
2.
3.
28 (e) Which are/is the reason(s) given for the restricted foods?

____

____

______

29. Data on actual food intake for the child in the last 24 hours, that is from breakfast, lunch through supper.

24 hour recall				
Food item	Amount	Composition and amounts	Nutrient composition	Remarks

Section 4:Child nutrition status

30. Child gender[ ]
1. Male
2. Female

32.Age----------months

33. Anthropometric data

Measurement	Readings			Average
	1	2	3	
Height				
Weight				

Care practices

34 (a). Has the child received all the immunization?(According to the age)
1. Yes
2. No

34 (b)If no why?____

34 (c). Has the child been sick during the last two weeks?
1. Yes
2. No

35. What was the child suffering from?
1. Malaria
2. Diarrhoea
3. Common cold
4. Others (specify)

35 (b) What action was taken when the child fell sick?

____

36. Was the child taken to hospital?
1. Yes
2. No

37 (a). If no, why?
1. Too costly
2. Too far
3. No drugs

37 (c). How frequently do you deworm your child?

1. Never
2. Once every two months
3. Once every three months
4. Twice in an year
5. Once a year

38. How far is the nearest health clinic from your home?-------km

39. (a)Who feeds the child?________________

39.(b) Who assists the child while toileting?_________________

39 (c) Who bathes the child?_____________________________

39. (d) How do you maintain hygiene in the household?

40. What foods do you know that are important in helping one have a healthy body?
1. Carbohydrates____
2. Proteins____
3. Vitamins____

41 Which are the most frequent foods that you give to your child (children)?
____
_
1. Balanced
2. Not balanced

42. How long do you (intend to) breastfeed your child (children)?
1. Below 6 months
2. Up to 6 months
3. 18 months
4. 24 months

43. Why do you stop breastfeeding the child?
1. Has grown older
2. Too busy with other activities
3. The child can eat other foods to their satisfaction
4. The child refuses to breastfeed
5. Other (specify)

44. Which method of feeding the baby do you use?
1. Cup and spoon
2. Bottle feeding
3. Bowl and spoon
4. Cup, bowl and spoon
5. Bottle feeding and use of cup and spoon
6. Bottle feeding, cup, bowl and spoon
7. Others (specify)

45. Which are the reasons given for the choice of food prepared for the child?
1. ---
2. ---
3. ---

APPENDIX 3 FOCUS GROUP DISCUSSION;

1. What factors affect crop production in this area?

2. How does the community cope with food shortages?

3. What are the major sources of household income in this area?

4. What has been the trend of food availability in this area?

5. What are the major common illnesses experienced by the area residents?

6. How accessible are health facilities in the area?

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