IMPACT OF THE EARLY CHILDHOOD DEVELOPMENT PROGRAMME ON THE NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN IN KAITI AND KILUNGU DIVISIONS IN MAKUENI DISTRICT, KENYA

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN APPLIED HUMAN NUTRITION, IN THE DEPARTMENT OF FOOD TECHNOLOGY AND NUTRITION, FACULTY OF AGRICULTURE, UNIVERSITY OF NAIROBI, KENYA

AUGUST, 2007

DECLARATION

I Margaret Owendi Indimuli, hereby declare that this dissertation is my original

work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my parents the late Shadrack Indimuli Murundu and Sellah Olisa Indimuli whose love, patience, sincerity and determination continue to be the guiding principles in my life.

ACKNOWLEDGEMENTS

I wish to acknowledge most sincerely the Individuals and Institutions that contributed towards the successful completion of this work. I acknowledge with thanks my employer the Ministry of Education, Science and Technology, for providing me with the funds to undertake the study.

My sincere appreciation goes to my supervisors Dr. Abiud M. Omwega and Prof. S.K. Mbugua for providing academic advice and guidance throughout the span of this study. Special thanks to Jacinta, Grace, Eunice, Nzivo, District Education Office Makueni, (Kaiti and Kilungu divisions) who were of great assistance during the field work. Special thanks also go to my field assistants who worked tirelessly during data collection.

I also sincerely appreciate my colleagues and friends and all who though not mentioned, contributed to the completion of this dissertation. Finally, I owe gratitude to my parents, brothers and sisters for their patience, encouragement and care, without which I would not have been successful. I say thank you and God bless you all.

Above all, thanks to GOD almighty for Grace, Strength and Sustenance throughout the course of study.

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ABBREVIATIONS

ACC	Administrative Committee on Co-ordination
ANOVA	Analysis of Variance
ANP	Applied Nutrition Programme
ARTI	Acute Respiratory Tract Infections
CBS	Central Bureau of Statistics
CI	Confidence Interval
DICECE	District Centre for Early Childhood Education
ECD	Early Childhood Development
EFA	Education For All
FAO	Food and Agricultural Organisation
FGD	Focus Group Discussion
GOK	Government of Kenya
HAZ	Height For Age Z - score
HFA	Height For Age
HHLD	Household
ITN	Insecticide Treated Nets
KDHS	Kenya Demographic and Health Survey
KIE	Kenya Institute of Education
KSHS	Kenya Shillings
MOEST	Ministry of Education, Science & Technology
MCH	Maternal and Child Health
MICS	Micronutrient Indicator Cluster Survey
MOH	Ministry of Health
NACECE	National Centre for Early Childhood Education
NCHS	National Centre for Health Statistics
NGO	Non Governmental Organisation
ROK	Republic of Kenya
RTI	Respiratory Tract Infections
SCN	Standing Committee on Nutrition
SD	Standard Deviation
SES	Socio- Economic Status
SPSS	Statistical Package for Social Sciences
STH	Soil Transmitted Helminth
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A Deficiency
WAZ	Weight for Age Z - score
WFA	Weight For Age
WHZ	Weight for Height Z - score
WFH	Weight For Height
WFP	World Food Programme
WHO	World Health Organisation

OPERATIONAL DEFINITION OF TERMS

EARLY CHILDHOOD DEVELOPMENT (ECD): Early childhood (here defined as from birth to age eight) refers to a time of rapid development. It refers to a comprehensive approach to policies and programmes for children from birth to eight years of age, their parents and caregivers.

FOCUS GROUP DISCUSSION (FGD): A non-randomly selected group of people brought together to discuss and explore a limited number of defined topics.

HOUSEHOLD: Will refer to a group of people with or without a family relationship that live together under one roof, share food from a common pot.

INDEX CHILD: Refers to a child aged between 3-5 years belonging to the study household whose nutritional status will be assessed in this study.

PROFILES: Is a process for nutrition policy analysis and advocacy that is designed to demonstrate the contribution that improved nutrition can make to human and economic development.

SOCIO-ECONOMIC STATUS (SES): For the purpose of this study, SES will be limited to income levels earned from employment or other sources in the last month prior to the study period **(Appendix 6).**

STUNTING: This is defined as height for age (HFA) less than -2 Standard Deviation (SD) of the WHO references.

UNDERWEIGHT: This is weight for age (WFA) less than -2 Standard Deviation (SD) of the WHO references.

WASTING: This is defined as weight for height (WFH) less than -2 Standard Deviation (SD) of the WHO references.

ABSTRACT

A comparative cross sectional survey on the impact of the early childhood development programme on the nutritional status of pre-school children (36-59) months was carried out in Kaiti and Kilungu divisions in Makueni District Kenya during the months of August and September 2004. Households were drawn from two divisions, one participating in the early childhood development Health and Nutrition pilot and one not participating in the health and nutrition pilot.

The main objective of the study was to assess the impact of the ECD program on the nutritional status of pre-school children (36 – 59 months) in Kaiti and Kilungu divisions in Makueni district. Specific objectives were to assess the demographic and socio-economic characteristics of households whose children are either participating or not participating in the ECD health and nutrition programme; determine the morbidity pattern of the study children who either are participating or not participating in the ECD health and nutrition programme; evaluate the nature of ECD activities and level of participation by households whose children are either participating or not participating in the ECD health and nutrition programme; and compare the nutritional status of children 36-59 months who are either participating or not participating in the ECD health and nutrition programme in the two areas.

The principal tool of investigation was a structured questionnaire that was administered to mothers and other caregivers to the children. Methods used to

collect data were anthropometric measurements, focus group discussions and key informant interviews. The study district was purposively selected while the divisions, locations and sub-locations were randomly selected. All villages in each sub-location were sampled. Proportionate sampling was used to get the number of households to be sampled in each village with children aged 36-59 months based on the calculated sample size of 280 households. One half of the study households (140 households) were systematically selected from the study area. In households where there was more than one child aged 36-59 months, one child was randomly picked as the index child.

Data was collected with assistance of field assistants who were trained on sampling methodology, administration of the questionnaire, taking anthropometric measurements and conducting focus group discussions. The SPSS/PC+ computer package was used for data entry and analysis. Nutritional status indices weight-for-age, height-for-age and weight-for-height were computed using the EPI-Info programme.

The average household size was 4.5 and 4.9 persons in the project and non-project areas respectively. Nearly half of the respondents (49.2%) had primary education while 25.7% had no formal education. The average size of land owned was 2.0 acres and 1.75 acres in the project and non-project areas respectively. Casual labour was the most common source of income in the project area. Majority (80.5%) of households in the project area were in the low-income group compared to 19.5% in the non-project area. More than half (67.1%) of the

pre-school children in the project area were not enrolled in early childhood development centres.

Chronic malnutrition among the study children was higher than the provincial prevalence of 21% reported in the 2003 KDHS. The prevalence of malnutrition in the study area was 30.8% stunting, 17.1% underweight and 4.3% wasting. This however, was comparable to the national prevalences of 30.3% for stunting, 20% underweight and 6% wasting (KDHS, 2003), but an improvement when compared to the 35.1 % underweight and 22.4% wasting reported during the baseline studies carried out by the Ministry of Education in 1997. Prevalence of stunting however remained the same. The results of the study also established that there was no significant difference in the prevalence for malnutrition (stunting, wasting and underweight) between the two areas. However, the prevalence for stunting in the project area (35.7%) was much higher than in the non project area (25.7%), although the difference between the two figures was not statistically significant (p=0.069). The prevalence for underweight in the study area was 17.1%, with 0.7% of the children being severely underweight (weight for age of <-3SD). This prevalence was slightly lower than the national figure (20%) and that for Eastern province (21%), but was much higher than that observed during the early childhood development baseline (10%). Moderate and severe wasting in the project and non-project area was 6.4% and 2.1% respectively. The prevalence for moderate and severe wasting in the project area (6.4%) was similar to the national figure (6%), higher than the provincial figure (4.2%), but lower than the baseline figure for the district (10%).

A higher proportion of males were stunted in the project area (13.6%) compared to the non-project area (7.1%). The same applied for females with 11.4% of the project females being stunted compared to 8.6% in the non-project area. However, these differences were not statistically significant (p=0.172 and p=0.573 respectively). For children between the ages of three to four years, the stunting levels were lower in the project area (6.4%) compared to the non-project area (10%). For the age group 4-5 years the stunting levels were higher in the project area (18.6%) compared to the non-project area (5.6). Here, the difference was highly significant (p=0.010). Underweight levels on the other hand were higher in the age group 3-4 years in both the project area (13.6%) and non-project area (7.1%), compared to the age group 4-5 years with underweight prevalences of 5.7% and 6.4% for project and non-project areas respectively. These differences however were not statistically significant. More than half of the children in the project area (63.6%) and 34.3% in the non-project area were reported ill within 7 days preceding the survey. Symptoms of upper respiratory tract infections and skin disease were the most common in both study areas.

Finally, no significant difference was noted in the nutritional status of pre-school children in both areas contrary to what may have been expected. Therefore, the alternative hypothesis is rejected and the null hypothesis that "there was no difference in the nutritional status for the pre-school children in the two areas" accepted. Chronic malnutrition among children is still a problem as reflected by the high prevalence of stunting observed among the pre-school children. This

may have been aggravated by the withdrawal of the School Feeding Programme by the MOEST from the ECD centres.

The results of this study show that the study population exhibits a young age structure with a high dependency ratio and large household size. It is therefore concluded that the large household sizes have a negative implication on nutritional status of the study children and food security of the households and this is aggravated by the small land holdings. Thus, adequate food for the households cannot be produced.

The data also suggest that there was no significant difference in the morbidity patterns for project and non-project children as incidences of ARIs, malaria, skin diseases and diarrhoea that were most prevalent among the project and non-project children affected them in a similar way.

Participation by the community in ECD activities was minimal. This is reflected by the number of children who were not enrolled in ECD centres (67%) hence were not benefiting from ECD health and nutrition services such as deworming, Vitamin A supplementation, and growth monitoring.

It is therefore recommended that the pre-school education programme should involve the community more actively in ECD activities such as nutrition education programmes, growth monitoring, deworming, Vitamin A supplementation and create awareness on the importance of the ECD

programme to the community. More parents should be encouraged to enrol their children in the ECD centres so that they can benefit from the health and nutrition programme of ECD. It is also recommended that public health measures to control malaria, ARIs and diarrhoeal diseases such as hygiene, sanitation, prompt treatment and use of insecticide treated mosquito nets be encouraged as possible ways of contributing to reduction of malnutrition in the area.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Good nutrition and health are fundamental human rights. Nutrition is a cornerstone that affects and defines the health of all people. It paves the way for us to grow, develop work, resist infection and aspire to realisation of our fullest potential as individuals and societies. Conversely, malnutrition makes us all more vulnerable to disease and premature death (WHO, 2000b).

Malnutrition affects all age groups across the entire life span. Health implications range from intrauterine brain damage and growth failure through reduced physical and mental capacity in childhood to an increased risk of developing diet-related non-communicable diseases later in life. Up to 49 percent of the 10.7 million deaths among under five children each year in the developing world are associated with malnutrition. Currently, an estimated 182 million children under five years of age, representing 32.5 percent of all pre-school children in developing countries are malnourished when measured in terms of height for age (stunted). Stunting prevalence rates vary widely across nations. The highest rates can be found in south-central Asia and Eastern Africa, where about half of the children suffer from some degree of growth retardation (WHO, 2000a and WHO, 2000b).

The immediate causes for under five-year old child deaths are attributed to malnutrition and diseases. Malnutrition has been linked to food availability in terms of household food security and presence of diseases that influence food intake, absorption and utilisation of the food by the body (UNICEF, 1990 and 1998).

The nutritional situation in Kenya for children under five years shows that in the past decade, there has been minimal improvement; in fact there has been deterioration in most regions in the country. Estimates show that in the 1980s to early 1990s, the prevalence of chronic malnutrition appeared to be declining at a rate of 0.4-percentage point per year. However, this improvement was not maintained into the later 1990s. This scenario has been of great concern due to the fact that once children are malnourished at the age of two years; the impairment in cognitive development is irreversible. It is estimated that over 1.8 million children suffer from some retarded growth and 38% are malnourished (KDHS, 1998).

Information from various demographic and health surveys carried out in Kenya shows that Kenyan children grow normally up-to the age of six months (KDHS 1993, KDHS 1998 and KDHS 2003). Thereafter, stunting and underweight increases significantly peaking at two years as shown in figures 1.1, 1.2 and 1.3. This may imply that the increase in growth retardation results from repeated episodes of childhood illnesses accompanied by poor weaning practices. Age two

is very critical for children because the effects of malnutrition are most damaging during this period and the impact is irreversible (CBS, 2000). Several studies have shown that the effects of early childhood malnutrition persist into the school years and even adulthood, lowering productivity and quality of life.

Fig. 1.1 Nutritional Stunting By Age Categories (months)

	<6	6-11	12-23	24-35	36-47	48-59
1993	7.5	18.1	40.3	37.7	37.3	34.5
1998	7.1	17.5	41.8	37.8	35.6	38.0
2003	7.4	16.5	43.1	35.5	34.1	27.9

Y-axis: % Stunted (0, 10, 20, 30, 40, 50). X-axis: Age in months
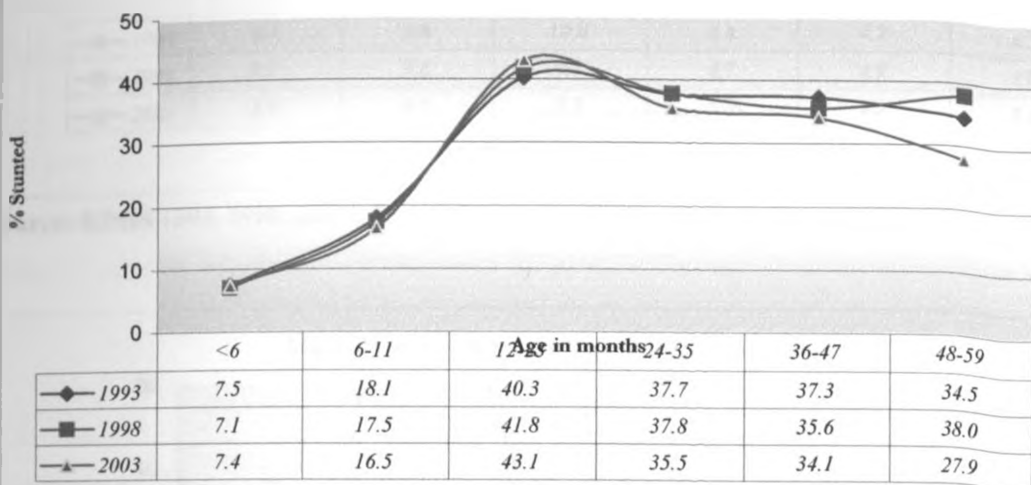
Source: KDHS 1993, 1998, and 2003

Fig. 1.2 Nutritional Wasting by Age Categories (months)

	<6	6-11	Age in months 12-23	24-35	36-47	48-59
1993	4.3	4.8	10.0	5.4	4.7	4.7
1998	5.2	7.8	9.1	4.7	4.9	4.0
2003	3.9	6.5	9.5	5.5	4.3	3.4
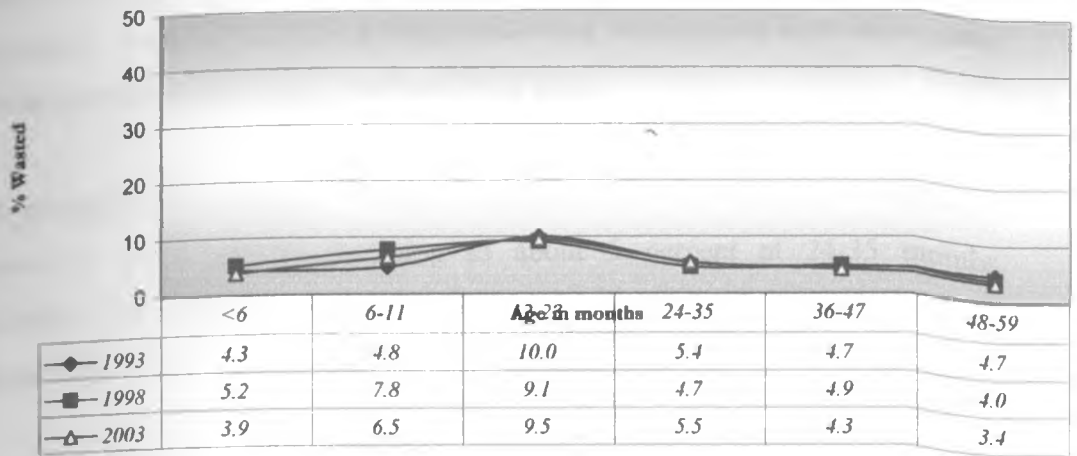
Source: KDHS 1993, 1998, and 2003

Fig.1.3 Underweight by Age Categories (months)

	<6	6-11	12-23	24-35	36-47	48-59
1993	3.5	16.1	31.6	26.2	22.0	20.4
1998	2.3	14.8	26.9	28.3	23.8	22.7
2003	2.4	17.2	26.8	25.3	20.8	17.8
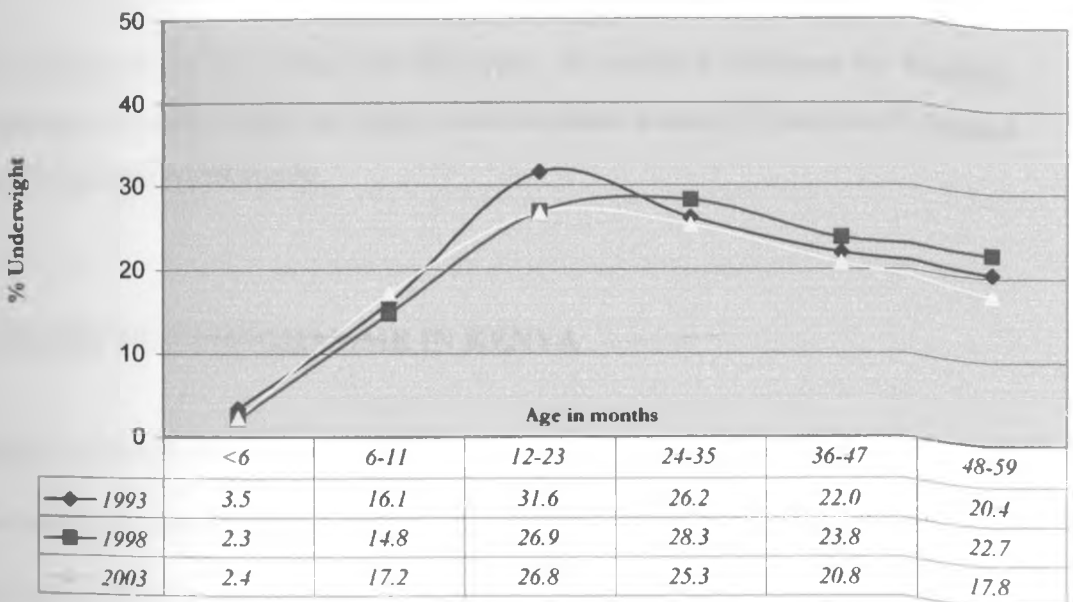
Source: KDHS 1993, 1998, and 2003

According to KDHS results, the age below 2 years is the most vulnerable period for children in Kenya. The proportion of children with stunted growth rises steadily between 6months and 12-23 months, peaking to 43 percent as shown in figure 1.1. This is followed with a decline after the age of two years. However,

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the stunting levels do not decline substantially after the peak, with the rates remaining at about 30 percent up to five years. The impact of stunting may be felt more in terms of cognitive development in the future as has been documented by various studies and models such as PROFILES.

The prevalence of nutritional wasting among children also increases to about 10 percent at 12-23 months declining to about 5 percent at 24-35 months. Thereafter, the proportion remains at about 4 percent through the age of 5 years (figure 1.2).

The proportion of underweight children follows the same pattern as the other two indices, reaching a peak of 31 percent at 12-23 months, then declining steadily after 24 months and remaining at about 20 percent through to 59 months (figure 1.3).

It is interesting to note that over the years, the national estimates for stunting, wasting and underweight for under-fives oscillate around 30 percent, 4 percent and 20 percent respectively.

1.1.1 THE ECD PROGRAMME IN KENYA

Early childhood development (ECD) has been perceived as the most critical moments for a child's socio-cultural preparation. What happens during the very earliest years of a child's life from birth to age five, influences how the child develops later on in life, yet this critical time is usually neglected in the policies, programmes and budgets of many countries. Choices made and actions taken on behalf of children during this critical period affect not only how a child develops but also how a country progresses (UNICEF, 2001).

In Kenya, this age group (0-5 years) comprises approximately 20 percent of the country's population (GOK, 2001). Kenya's vision is to eradicate absolute poverty and hopes to reduce the current rates by half by the year 2010. In addition, the country hopes to achieve Education For All in the same period (GOK, 1999). To achieve this goal requires a healthy and productive labour force, which in turn calls for children to be well nourished and well cared for. Sadly though, many of the children in Kenya could miss this opportunity because of poor nutritional status.

The ECD programme started in Kenya in the 1940s. The goal of the program is to improve the quality of life for children. The interventions focus on provision of health and nutrition services, increasing access to ECD services to more children, particularly those from disadvantaged households, and building capacities of families and teachers to provide quality services for the young children.

The ECD programme in Kenya is community based, and the Government being a major partner, makes significant contributions to the programme. In 1997, the Government carried out a Baseline Survey on ECD which looked at the following components: Teacher Education, Community Support Grants and Mobilisation, Health and Nutrition, and Transition from Pre-school to Primary School. The primary goal of the survey was to obtain information and

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consequently design strategies through which capacities of families and teachers to provide quality services for the young children would be enhanced (MOEST, 2000).

The Health and Nutrition Component of the survey was conducted on ECD centres and Households in 8 Districts namely: Kiambu, Thika, Isiolo, Mwingi, Makueni, Turkana, Samburu and Baringo. The goal of the health and nutrition component was to strengthen the community and institutional efforts in the provision of health and nutrition services, with emphasis on preventive and promotive interventions. Specifically, the project set out to improve community and institutional feeding practices through food production, storage, preservation, better utilisation and nutrient supplementation in order to reduce protein energy malnutrition (PEM) by 20 percent and micro nutrient deficiency by 50 percent. Services offered under the health and nutrition component included: growth monitoring, deworming, treatment of minor illnesses (at the local dispensary), Vitamin A supplementation, establishment of kitchen gardens and Nutrition education for the community.

1.2 STATEMENT OF THE PROBLEM

Kenya's vision is to eradicate poverty and achieve Education For All (EFA) by the year 2015. To achieve this goal requires a healthy and productive labour force. Sadly though, this vision may not be realised because may of the children under five years of age are malnourished. Various nutrition situation analyses in

the country show that stunting for children under five years of age has stagnated over the last twenty years despite numerous efforts and interventions by the Government and its partners (KDHS 1993, KDHS 1998 and KDHS 2003).

A Baseline study was carried out in 1997 by the Ministry of Education, Science and Technology (MOEST) to obtain information on the nutritional status of pre-school children in Kenya. Results from the study showed that 30.2 percent of the children surveyed were stunted, 35.1 percent underweight, while 22.4 percent were wasted. Stunting and underweight were most serious amongst children aged 3-4 years. In Makueni district, 25 percent of the children surveyed during baseline were stunted, 10 percent were underweight, while 10 percent were wasted. The third Household Welfare Monitoring Survey conducted in the same year by the Central Bureau of Statistics (CBS) showed that the level of stunting for children less than five years of age was 43.3 percent in Makueni, while the national average was 36.9 percent (GOK, 2000) compared with 35.3% stunted children (KDHS 1998). These levels of malnutrition are unacceptably high, underscoring the need to address the underlying contributing factors.

The effect of undernutrition on young children (ages 0-8) can be devastating. Whether or not children are well nourished during their first years of life has a profound effect on their health status. Longitudinal studies indicate that nutrition interventions aimed at pre-school children in the first few years of life lead to better life. The earlier the programmes are started the better the results tend to be.

The importance of early nutrition interventions and their relationship to cognitive ability is clear. Both nutrition and early stimulation programmes work better when children benefit from them simultaneously. ECD programmes can help prevent and address malnutrition by providing supplemental feeding and by educating parents about their children's nutritional needs (Martorell, 1996).

1.3 PURPOSE OF THE STUDY

This study sought to asses the impact of the ECD program on the health and nutritional status of pre-school children (36-59 months) in Kaiti division in Makueni district, with a view to providing information that will make the ECD program more effective.

1.4 JUSTIFICATION

Though substantial research and intervention has been done to establish the nutritional status of children of the rural communities in Kenya, very little information exists on the impact and effectiveness which health and nutrition interventions have on the nutritional status of the children.

The ECD programme has been in existence for over 40 years. In 1980, the responsibility of running ECD centres was given to the Ministry of Education, Science and Technology (MOEST) and since then, a lot of efforts and resources have been put into the program. Accordingly, its impact on nutritional status of the children needs to be assessed. Although enrolment in the ECD centres had

improved considerably over the years, with introduction of Free Primary Education, the enrolments have been on the decline. There are, however, data gaps regarding the health and nutrition status of pre-school children in the country. The information gathered from this study would therefore be useful to the MOEST and its partners for planning, implementing and improving on interventions for the existing and future ECD programmes.

1.5 OBJECTIVES OF THE STUDY

1.5.1 GENERAL OBJECTIVE

The broad objective of the study was to assess the impact of the ECD program on the nutritional status of pre-school children (36 – 59 months) in Kaiti and Kilungu divisions in Makueni District.

1.5.2 SPECIFIC OBJECTIVES

1. Assess the demographic and socio-economic characteristics of households whose children are either participating or not participating in the ECD health and nutrition programme

2. Determine the morbidity pattern of the study children who either are participating or not participating in the ECD health and nutrition programme

3.   Evaluate the nature of ECD activities and level of participation by households whose children are either participating or not participating in the ECD health and nutrition programme

4.   Compare the nutritional status of children 36-59 months who are either participating or not participating in the ECD health and nutrition programme

in the two areas.

1.6 EXPECTATIONS FROM THE STUDY

Results from the study will assist in decision making by the Government, researchers, policy makers, Non Governmental Organisations (NGOs), and agencies that have been implementing intervention programs in the district, and especially in improving the nature of ECD activities in the area in order to render them more effective and efficient area.

1.7 LIMITATIONS OF THE STUDY

1.7.1 Only children aged between 36-59 months and who had lived in Kaiti and Kilungu Divisions for more than six months prior to the research were included in the study.

1.7.2 Only households with children aged 36-59 months old were included in the study.

1.7.3 Anthropometric measurements for the children were limited to Weight and Height measurements.

1.8 HYPOTHESIS

This study tested the following hypotheses:

1. The nutritional status of pre-school children participating in the health and nutrition project is better than that of children not participating.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Good nutrition and health are fundamental human rights. Nutrition is a cornerstone that affects and defines the health of all people. It paves the way for us to grow, develop work, resist infection and aspire to realisation of our fullest potential as individuals and societies. Conversely, malnutrition makes us all more vulnerable to disease and premature death.

Evidence shows that malnutrition, even in its milder forms, can increase the likelihood of mortality from a number of different disease entities and may be associated with up to 56 percent of all childhood mortality (Pelletier et al. 1995). This makes malnutrition one of the most significant public health problems in developing countries. To have a sustained impact on childhood morbidity and mortality, all programs must include nutrition intervention components in order to reduce malnutrition.

Malnutrition continues to be a major public health problem and of considerable concern in the developing countries. It is a factor in about half (49%) of the deaths for children under five years of age (Sanghvi and Murray, 1997; BASICS UNICEF, 1999). Studies have also shown that the effects of early childhood malnutrition persist into the school years and even adulthood, lowering

productivity and quality of life (BASICS UNICEF, 1999). Malnutrition is economically costly particularly when it occurs among children because of the cumulative effects over a lifetime. Ross and Aguayo (1999) point out that poor nutritional status leads to child deaths, increased health costs to households and the Government, decreased mental capacity and lower future productivity. All these factors hinder economic growth resulting into poor households. In this regard, malnutrition reduction is an outcome for the true progress towards the Millennium Development Goals especially Goal 4: – Reduced child mortality and Goal 5: – Improved Maternal Health (Scrimshaw, 2004). All over the world, child malnutrition is linked to poverty, low levels of education, and poor access to health services. The poor nutritional status of infants and women has implications for overall development in terms of productivity losses throughout the lifecycle of both boys and girls.

2.1.1. NUTRITION AND EDUCATION

Good Nutrition is essential for good mental development and school performance in children. Good health and nutrition are not only essential inputs but also important outcomes of basic education of good quality. First, children must be healthy and well nourished in order to fully participate in education and gain its maximum benefits. Second, education of good quality can lead to better health and nutrition outcomes for children especially girls, because it improves the

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opportunities for gainful employment, and thus for the next generation of children as well.

The relationships between nutrition and education are numerous and complex. Several forms of malnutrition increase the risks and severity of illness for children, which in turn affect their mental development, physical development, social and emotional development and School attendance and performance

Micronutrient deficiencies have a profound impact on all sectors, but more so, the education sector. With a total goitre rate of 16 percent (GOK/UNICEF, 1995), it is estimated using Profiles[1] (define profiles) that if the trend is not reversed, more than 1.6 million children born in Kenya will have some form of intellectual disability because their mothers lack iodine. This will make it impossible for the country to derive the expected benefits from the investment being made in education.

Vitamin A on the other hand has an immense impact on the levels of child mortality and morbidity. In Kenya, vitamin A deficiency affects 41% of our children resulting in increased levels of illness and deaths (GOK/UNICEF, 1994a). Using profiles, it is estimated that over the next 11years, 165,000 child deaths will be attributed to Vitamin A deficiency. On the other hand, if Vitamin

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[1] Profiles estimates for Kenya based on computations from spread sheets by Ross, J. and Aguayo, V. (1999).

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A deficiencies were reduced by 50% over the next 11 years, then 130,000 deaths would be attributable to Vitamin A, thus saving about 35,000 child lives.

Iron deficiency anaemia affects millions of people. The health consequences are devastating and invisibly erode the development potential of individuals, societies and national economies. The benefits of controlling anaemia on the other hand are substantial. Timely treatment can restore personal health and raise national productivity levels by as much as 20%. If anaemia among children is not addressed in a timely manner, it will reduce the expected benefits of the investments in education and the contribution of children to the economy (WHO, 2000b).

Malnutrition is the underlying cause of half the deaths for children below 5 years of age; it weakens the immune system and makes illness worse yet, the sufferers are not aware of it. The nutrition of mothers and children is closely linked. Malnutrition often begins at conception and this may cause permanent damage to the unborn child. Even mild and moderate malnutrition have severe consequences. More than 80% of the deaths associated with childhood malnutrition involve mild or moderate malnutrition (WHO, 2000 b).

Deficiencies of specific micronutrients such as Vitamin A, Iron and Iodine are widespread and have significant health effects. These lead to children being malnourished hence enter school later, miss more days of school, have difficulty

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paying attention and concentrating, and drop out of school earlier (Nkinyangi and Van der Vynckt, 1995).

Several affordable and highly effective nutrition interventions are available to reduce malnutrition. Effective school health programs such as the ECD health and nutrition programme of the Ministry of Education, Science and Technology will contribute to the development of child friendly schools and thus to the promotion of EFA. Therefore, combining poverty alleviation and human development for purposes of economic growth could go a long way in improving the nutritional well-being of Kenyans in general and children in particular.

2.2 NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN

The nutritional situation in Kenya as measured by the growth deficit among young children has not shown improvement over the years. Estimates show that in the 1980s to the early 1990s, the prevalence of stunting appeared to be declining.

Fig. 2.1 National Trends in Nutritional Stunting: 1982-2003
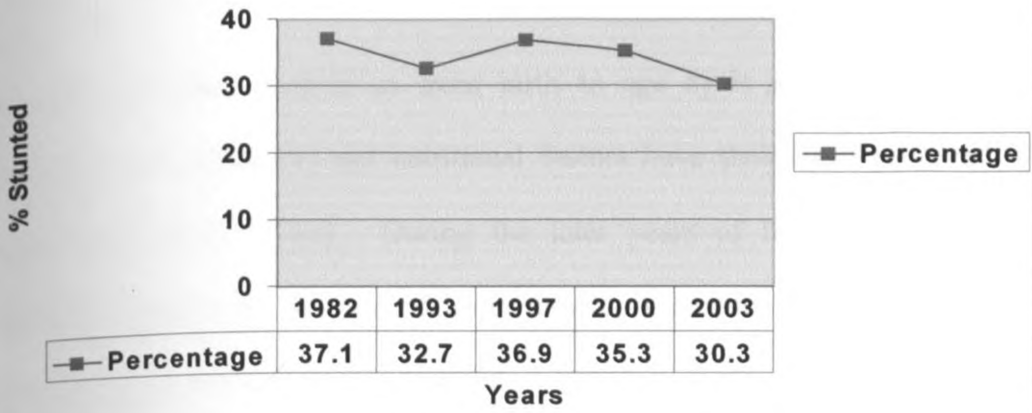
Years	1982	1993	1997	2000	2003
Percentage	37.1	32.7	36.9	35.3	30.3

(Chart: % Stunted vs. Years, with Percentage plotted)

However, this improvement was not maintained into the late 1990s and beyond. Current data indicate that prevalence of chronic malnutrition among children aged 0-5 is 35 percent, a level about 17 times higher than what is expected in a healthy, well-nourished population (Figure 2.1). At the current rate of stunting, it is estimated (using Kenya profiles) that over 1.8 million children will suffer from retarded growth in the next ten years.

Analyses of the regional data show that chronic malnutrition does not affect the Kenyan child uniformly. Geographical diversity exists in rates of malnutrition. When the data is desegregated to district level (rural), it shows wide disparities in the prevalence of malnutrition (GOK, 2000). Acute malnutrition is generally prevalent in the Arid and Semi Arid Lands (ASALS). This implies that further desegregation of data to sub-district level is necessary for district level planning. The data currently generated on nutrition in Kenya is for national level planning and as such, it influences methodologies used for collecting it.

2.3 NUTRITION IN EARLY CHILDHOOD DEVELOPMENT

Early childhood (here defined as from birth to age 8) is a time of rapid development when physical and nutritional factors have their most profound consequences (Bundy, 1996). During the later years of life, even where remediation is possible, the rate of improvement is reduced because of the relative slowing of subsequent development.

Many of the most prevalent infections and diseases like acute diarrhoea, malaria, and intestinal parasites tend to achieve their highest incidence during this phase and claim millions of young lives per year. The rise in prevalence of chronic malnutrition is therefore of great concern to a country since it plays a major role in child deaths. From the various surveys that have been carried out (KDHS, 2003; KDHS, 1993; KDHS, 1998), it is estimated that 38 percent of all child deaths in Kenya are due to malnutrition, making this the single greatest cause of child mortality. It should however be noted that 34 percent of these deaths are attributable to stunting.

Stunted physical growth and development have been traditionally viewed as the major consequences of ill – health in early childhood but there is now growing recognition that they are also consequences for mental and intellectual development (Bundy, 1996; Claeson, 1996 and Martorell, 1996). Although long – term consequences of events in early childhood for human capital and

productivity are difficult to assess directly, associations have been shown with proxy measures such as physical growth. Using profiles, it has been demonstrated that short stature, (a frequent outcome of many of the most prevalent infections and conditions of early childhood) is associated with late or non-enrolment in school, slow progression through the school, and great risk of dropping out (Ross and Aguayo, 1999). Stunting is also associated with reduced physiological capacity and work output and reduced physical growth and poor educational achievement.

Primary prevention and remediation in early childhood is needed to avoid these constraints on physical and intellectual development as well as their long – term consequences for human capital development. For many of the most prevalent conditions, cheap and simple interventions of proven effectiveness (such as immunisation treatment of diarrhoea, and parasitic infections) are already part of programmatic experience. Other interventions (such as the use of bed nets for controlling malaria) have been proven to be effective at the operations research level (Claeson, 1996 and WHO, 1995). A comprehensive ECD program however, extends beyond disease control. The rate of recovery from measles for example, is enhanced by Vitamin A supplementation. The promotion of early child development implies the need for the early delivery of a comprehensive package of interventions through a cost – effective and sustainable approach.

Longitudinal studies carried out indicate that nutrition interventions aimed at pre-school children in the first few years of life lead to measurable improvements in adolescence and adulthood. According to Martorell (1996), children who receive combined nutrition and stimulation programs perform better than those who do not. Therefore, ECD programs can help prevent and address malnutrition by providing supplementary feeding at ECD centres and by educating parents about their children's nutritional needs.

2.4 IMPORTANCE OF NUTRITION IN ECD

The mounting body of evidence that early intervention in childhood can result in substantial future gains, has prompted many nations to incorporate early interventions into their national and regional development agendas.

The reasons for investing in ECD programmes are numerous and interrelated. ECD project research has proven that children who participate in well conceived ECD programmes tend to be more successful later in school, more competent socially and emotionally, and show higher verbal and intellectual development in early childhood, than children who do not enrol in such ECD programs (Bundy, 1996; Claeson, 1996 and Martorell, 1996). Ensuring healthy child development therefore, is an investment in a country's future workforce and capacity to thrive economically and as a society.

Studies from diverse cultures show that girls who enrol in early childhood programmes are better prepared for school and frequently stay in school longer (Bundy, 1996; Claeson, 1996 and Martorell, 1996). Early childhood interventions also free older sisters from the task of tending pre-schoolers, so that they can return to school.

Early childhood interventions in health and nutrition programs increase children's chances of survival. With ever more mothers working and more households headed by women, safe childcare has become a necessity. Providing safe childcare allows women the chance to continue their education and learn new skills, thereby addressing the intersecting needs of women and children.

2.5 GAPS IN KNOWLEDGE

Currently, there is adequate information and data on the nutritional status of children under five years in Kenya. What is lacking is information on the impact and effectiveness that various nutritional programs have had on the nutritional status of children especially pre-school children (3-5 years).

Malnutrition rates for children below 5 years of age have not improved over the last two decades despite the many nutrition interventions that have been put in place by various players in this area. There is need to establish what the impact of these interventions have been and where improvements can be made or change approaches all together if necessary.

This study therefore seeks to address this gap with a view to recommending strategies that can be used to improve the efficiency and effectiveness of ECD health and nutrition programmes by sharing best practices and lessons learnt in ECD programme.

CHAPTER THREE

STUDY SETTING AND METHODOLOGY

This chapter describes the study setting, design, data collection instruments, procedures, data processing and research methodology.

3.1 STUDY SITE

The study was carried out in Okia and Kithembe locations of Kaiti and Kilungu divisions respectively in Makueni District.

3.2 STUDY AREA AND POPULATION

Makueni District was carved out of Machakos District in 1992 and is one of the thirteen Districts that form Eastern Province, and among the four that comprise the Ukambani region. The district borders Kajiado District to the west, Taita Taveta to the south, Kitui to the east and Machakos to the north (see Map 1 Appendix 9). Makueni has sixteen divisions namely Tulimani, Mbooni, Kisau, Kalawa, Kilome, Kilungu, Kaiti, Kasikeu, Mbitini, Wote, Matiliku, Kathonzweni, Nguu, Makindu, Kibwezi, and Mtito Andei (see Map 2 Appendix 10). This study was carried out in Kaiti and Kilungu divisions. These occupy an area of 418.1 Km^2 out of 7,965.8 Km^2 of the district. Mtito Andei, Makindu, Kibwezi and Kathonzweni are the largest divisions and are situated in the low

potential areas of the district. Tulimani, Mbooni, Kilungu and Mbitini divisions are the smallest in that order.

The district is prone to droughts and famines that occur periodically. This state of affairs has over the years continued to thwart development efforts in the district. The community consumes most of the income during famine, leaving very little savings that can be ploughed to investments. Lack of animal feeds and water causes loss of a large percentage of livestock yet livestock forms one of the major sources of income for the community.

3.3 PHYSIOGRAPHIC AND NATURAL CONDITIONS

The major land formations in Makueni district include the volcanic Chyulu hills, which lie along the Southwest border of the district in Kibwezi division. The Mbooni and Kilungu hills rise to a height of 1,900m above sea level. The land rises slightly below 600m above sea level in Tsavo at the southern end of the district. The southern part of the district is low lying grassland, which receives little rainfall but has an enormous potential for ranching. The northern part of the district is hilly with medium rainfall and has a potential for food crop production. This part of the district, mainly Kilungu and Mbooni divisions, has few natural and planted forests. These divisions are suitable for coffee, horticulture and dairy farming.

The district experiences two rainy seasons, namely: the long rains occurring in March/April while the short rains occur in November/December. The hilly parts of the district receive 800-1200mm of rainfall per year. The high temperatures experienced in the low-lying areas causes high evaporation. During the dry periods that are between May and October, the lower parts of the district experience severe heat.

The district has one major river the Athi River, which is perennial and is joined by tributaries such as Kambu, Kiboko and Mtito Andei, which drain, from various parts of the district. A few other perennial streams flow from the Mbooni and Kilungu hills but their flow becomes irregular as they move to the low-lying areas. These rivers have a potential for both large and small-scale irrigation.

3.4 POPULATION

According to the 1999 Population and Housing census, Makueni district registered a total population of 771,545 people, which is projected to be 887,488 people by the year 2004. The district population is generally youthful with those aged between fifteen years accounting for 47 percent of the total population. This age group together with those above 64 years constitute 51.8 percent of the total population bringing the dependency ratio to 100:109, which implies that for every 100 economically active people, there are 109 persons depending on them (ROK, 2002).

3.5 SOCIO ECONOMIC PROFILE

3.5.1 MAJOR ECONOMIC ACTIVITIES

The major economic activities in the district include small-scale farming in cash crops like coffee, cotton and horticulture, livestock keeping, trade and manufacturing and construction. Off farm activities include charcoal burning, woodwork, jua kali, tourist operations, and hawking,

Jua kali activities undertaken include motor vehicle and bicycle repairs, welding of steel doors and windows, repair of jembes, ploughs and pangas, making of metal jikos, sufurias (utensils), goldsmith works, shoe repairs and woodworks. Also open air market hawking is common. Other activities like sand harvesting, brick making, retail and wholesale business, hotel and restaurant, salon and carpentry are also undertaken.

3.5.2 AGRICULTURAL PRODUCTION

The major food crops in the district are maize, beans and pigeon peas, while the major cash crops are coffee and cotton. Maize and beans production is evenly distributed in the district mainly because it is the staple food for the local community.

3.5.3 LIVESTOCK PRODUCTION

Most farmers engage in livestock keeping of goats, cattle and poultry. The main livestock products are milk, meat, eggs, hides and skins, besides cow dung used for manure. Honey production is also a major activity in the district.

3.5.4 DISEASE INCIDENCE

The major diseases affecting the people in the district are malaria, respiratory diseases, skin diseases, diarrhoea and intestinal worms. Malaria has remained the major cause of morbidity in the district. Skin diseases and diarrhoea are caused by lack of safe and clean water for domestic use. Poor refuse disposal and unhygienic environments have contributed to the large number of malaria cases and intestinal worm infections. The top six diseases (not in any order) affecting pre-school children in the district are malaria, diarrhoea, respiratory tract infections, skin diseases, malnutrition and intestinal worms.

3.5.5 HEALTH AND NUTRITION SITUATION

There are 79 established health facilities in the district and 59 nursing homes. Malaria is a major killer of the district's under fives (GOK, 1994; GOK, 1997 and GOK, 2002). High poverty levels hinder the use of preventive measures such as use of mosquito nets to reduce the disease incidence. The infant mortality rate is 45 per 1000 live births (GOK, 2002). The average malnutrition level in the district is 30% but with a rising trend. This is even higher in low potential areas

of the district and is attributed to the recurrent food deficit, low income and low purchasing power for food.

3.6 STUDY DESIGN

This was a cross sectional descriptive and analytical survey. A total of 280 households with children aged 36-59 months were selected for the study.

3.7 SAMPLING

3.7.1 STUDY POPULATION

The study population was made up of children aged 36-59 months in Kaiti and Kilungu divisions, Makueni District.

3.7.2 SAMPLE SELECTION

3.7.2.1 SAMPLE SIZE DETERMINATION

The minimum sample size for the study was computed using the rate of malnutrition for children under five years in Makueni District. This was estimated at 21% underweight (KDHS, 2003). The formula by Fisher et al, (1991) used to test differences (d^1) between two sub samples regarding a proportion and an equal number of cases was used to calculate the sample size:

$$n^I = \frac{2Z^2 pq}{(d^I)^2}$$ where,

Z = standard normal deviation usually set at 1.96 which correspond to 95% confidence level

p = percentage of children below five years who are estimated to be malnourished in Makueni (21%)

q = 1-p denotes children not malnourished (79%)

d = acceptable range of error (degree of accuracy desired) set at 0.10 or 10% for this study

Hence $n^I = \frac{2(1.96)^2 (0.21)(0.79)}{(0.10)^2}$ =127 x 2 divisions = 254

Add 10% attrition (25) =279 rounded off to 280 households

This gave 140 subjects in the intervention group and another 140 in the control group, giving a total of 280 study subjects.

3.7.2.2 SAMPLING PROCEDURE

The sampling frame consisted of all households in Mukuyuni sub-location in Okia Location, Kaiti division and all households in Nduu sub-location, and Kithembe location of Kilungu division with children aged 36-59 months.

Makueni district was purposively selected because it was the only district among the eight pilot districts that has implemented the Health and Nutrition component of the ECD programme for over three years. Most of the other districts were

either preparing to implement or just started the program. The delay in implementation was due to delay in releasing of funds by the Government and World Bank. Makueni managed to carry out the activities in this component using borrowed funds and in collaboration with the Ministry of Health. The district raised funds to run the program through their own initiatives. Of the 16 divisions in Makueni, Kaiti and Kilungu were randomly selected. Out of the 16 divisions only two (Kilungu and Kilome) had not implemented the nutrition component. Kilungu was randomly selected as a control out of the two divisions that had not implemented the programme. Kilungu also borders Kaiti division and the two are likely to be similar in many aspects for comparison purposes.

The sample size was divided into two. Two locations Okia in Kaiti and Kithembe in Kilungu were randomly selected from 17 administrative locations in the study area to give each location a chance of being selected. One sub-location was then randomly selected from each of the two locations. All villages in each of the sub-locations were sampled. Mukuyuni had 4 villages and Nduu had 6 villages. Thereafter, proportionate sampling was used to get the number of households to be sampled in each village with children aged 36-59 months that made up the sample size. From the sampling frame, 140 households with children aged 36-59 months for each of the study area were systematically selected (See figure 3.1 below). The sampling interval for the two divisions was 8.9 (Kaiti) and 9.2 (Kilungu). Accordingly, every 9th household was selected in both divisions until the required sample size was obtained. A landmark such as a church, school,

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market or hospital aided the investigator and field assistants to follow a specific systematic direction.

A child aged 36-59 months was selected in each sampled household as the index child. In households where the mother/caregiver was not available to answer the questionnaire, a revisit was scheduled for a time when the mother/caregiver would be available to answer the questionnaire. This was to ensure that the systematic sampling of households was followed. However, where a child was identified, all siblings were included in the study group for demographic purposes, but only one child selected randomly in the family was identified as the index child to minimise bias. The sampling method described above resulted in 280 index children divided equally at 140 in Kaiti and Kilungu. The above sampling procedure is shown in Fig. 3.1.

Fig. 3.1 Schematic Presentation of the sampling procedure

	MAKUENI DISTRICT	STAGE 1 PURPOSIVE SAMPLING

KAITI DIVISION

KILUNGU DIVISION

STAGE 2 & 3 RANDOM SAMPLING

OKIA LOCATION 1300 HOUSEHOLDS

KITHEMBE LOCATION 1250 HOUSEHOLDS

STAGE 4 PROPORTIONATE SAMPLING

MUKUYUNI Sub- location 140 HHLDS

NDUU Sub-location 140 HHLDS

STAGE 5 SYSTEMATIC RANDOM SAMPLING

VILLAGES

VILLAGES

...tu	45
...kavi	32
...ele	43
...o	20

Kisyulya	22
Kivungi	34
Kyatuku	22
Thumbi	29
Nthunguni	16
Kaiya	17

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3.7.2.3 CRITERIA FOR INCLUSION

To be eligible, a household had to have a child aged 36-59 months and had to have lived in the study area for at least over six months prior to the study.

3.8 DATA COLLECTION PROCEDURE

3.8.1 PRE-PREPARATION

The investigator made a preliminary visit to the study area and familiarised herself with the general set up. During this time, relevant authorities were visited and informed of the intended research project. A research permit was also obtained.

3.8.2 RECRUITMENT AND TRAINING OF FIELD ASSISTANTS

Fourteen field assistants were recruited and trained for 3 days to assist with the data collection. Priority was given to those with a good education background and command of English, Kiswahili and the local language Kikamba. The purpose and general procedure of the survey and its expected duration was explained to the assistants. The training was centred on the sampling methodology, administration of the questionnaire, taking anthropometric measurements, making observations at household level and conducting Focus Group Discussions (FGD). Although the questionnaire was in English, at times it had to be administered in Kiswahili or the local language. Time was spent in

translating the questionnaire into Kiswahili and the local language and back into English to make sure the meaning of the questions was the same.

On sampling, the field assistants were briefed on how to identify all children aged 36-59 months from the eligible households, both from information given by mothers and from clinic cards where they were available.

Pertaining to the questionnaire, emphasis was laid on the necessity of:

a) Demonstrating courtesy when visiting households by introducing themselves and stating the purpose of visiting

b) Filling in the responses clearly and as per their order in the questionnaire

c) Avoiding leading questions

d) Calculating and entering the child's age in months correctly

e) Probing to get more information from the respondents

Training in anthropometric measurements involved demonstrating:

a) How to use the Length board and correct positioning of the child

b) How to weigh a child correctly, adjusting the scales to zero and the need to take two measurements

c) Correct entry of measurements

d) How to calibrate the weighing scales

3.3 PILOT STUDY (PRE-TEST)

Following the training, twenty-one households were randomly selected and visited to pre-test the tools of data collection. During the pilot study, the draft questionnaire was administered to 21 respondents in order to:

Pre-test clarity of the questions and comprehension by both the field assistants and the respondents

) Facilitate pre-coding of some questions

) Establish main crops grown in the study area

) Help in estimating the time that would be taken in administering a questionnaire in each household

The results of the pilot study were discussed with the supervisors and adjustments of the tools for the study were made.

3.9 DATA COLLECTION

3.9.1 RESEARCH INSTRUMENTS

The research instruments were divided into two those used to collect qualitative data and those used to collect quantitative data. For Qualitative data – FGD guides and Key Informant interview guides were used.

The following tools were used to collect quantitative data:

a) A structured questionnaire

b) Anthropometric measurements- the following equipment were used:

- A salter scale calibrated from 0-25 kg with 100g divisions

- A length board

- Plastic pants with harness for supporting a child when weighing

The following information was obtained using the different tools of data collection:

- Socio-demographic characteristics of the study population

- Household Socio-economic status

- Child health and nutritional information

- Parents participation in ECD activities

- Anthropometric measurements - height and weight

3.9.2 QUESTIONNAIRE ADMINISTRATION

Following the selection of the index child, the structured questionnaire was administered to 280 mothers/caregivers of pre-school children aged 36-59 months. The questionnaire was divided into five sections as follows:

a) Household composition. This section looked at general information about the household head and other members of the family such as age, sex, marital status, occupation and religion.

b) Household Socio-economic status which looked at land ownership and acreage, types of livestock kept and numbers, sources of income for the family, and daily household expenditure on food.

c) Child health and nutritional status. This part of the questionnaire was child based and had questions relating to the child's age, sex, enrolment in an ECD centre, Immunisation status, morbidity of one week period prior to the study, and use of mosquito net

d) Participation in ECD activities. This section looked at parents' participation in various ECD activities like growth monitoring, attending ECD seminars, establishment of Kitchen gardens, and action taken when a child is sick. Information was also sought on the mothers/caregivers knowledge of exclusive breastfeeding, frequency of breastfeeding and introduction of weaning foods.

e) Anthropometry. Measurements of weight and height of the index child were taken twice and an average calculated.

3.9.3 FGD GUIDES

FGD guides were developed and used to collect information from the community regarding the role of the ECD program in enhancing nutritional status of pre-school children (Appendix 2).

3.9.4 GUIDES FOR KEY INFORMANTS

Several in-depth Key Informant interviews were carried out to collect information from certain Key people in the community regarding the role of the ECD program in enhancing nutritional status of pre-school children. Those

interviewed included, the ECD District Program Officer (1), ECD divisional secretaries (2) and Ten ECD teachers with five from each division (Appendix 3). Also interviewed were clinical officers manning the divisional health centres.

3.9.5 PROCEDURE FOR TAKING ANTHROPOMETRIC MEASUREMENTS

Anthropometric measurements of weight and height were collected to allow for computation of the nutritional status indices namely weight-for-age, weight-for-height, and height-for-age. Age and sex of the child were also collected, as they are essential in the conversion of the measurements into nutritional indices. The procedures followed for taking anthropometric measurements are as recommended by the United Nations (1986). Age, which is necessary for computing weight-for-age and height-for-age, was given by the mother/caregiver and verified using growth-monitoring cards where they were available.

3.9.5.1 WEIGHT

Children aged between 36-59 months were weighed using a salter scale calibrated from 0-25 kg. They were dressed in inner clothes but had no shoes as recommended by the United Nations (1986). The children were weighed by being placed in a pair of plastic pants, which were then suspended by a hook on the weighing scale. The measurements were read and recorded twice to the nearest (0.1 Kg) to improve accuracy. In addition, the indicator needle of the

scale was returned to zero before every child was weighed and the readings taken from an upright position.

3.9.5.2 HEIGHT

Height for all the children was taken using a Length Board to the nearest 0.1-cm. The children were measured while standing without shoes on. The board was placed on a hard flat surface and against a wall or tree. Two readings were taken for each child as recommended by the United Nations (1986).

3.9.6 CONDUCTING A FOCUS GROUP DISCUSSION

Focus Group Discussions (FGD) were used to collect information from the community regarding the role of the ECD program in enhancing Nutritional status of pre-school children. Four focus group discussions (two in each division) were conducted on pre-school teachers who were also mothers/caregivers. The pre-school teachers were randomly selected from the pre-school teachers in the division and invited in advance, 2 days before the meeting to an identified, suitable and accessible venue for all. The pre-school teachers were not part of the mothers who were interviewed in the households (appendix 2). The meetings lasted between one and one and a half-hours and were conducted at a time convenient to all the mothers to allow maximum participation. The investigator

was the moderator with one field assistant as a recorder. The data collected was to verify and provide validity for the information collected through the questionnaire.

3.9.7 CONDUCTING KEY INFORMANT INTERVIEWS

Ten pre-school teachers from the two divisions were interviewed in-depth on the subject matter of ECD programme. These interviews provided individual variation and clarified information obtained from FGDs and other data collection methods. Also interviewed were two ECD secretaries co-ordinating ECD activities in the division and the clinical officers at the local health centres. The Key informants were selected on the basis of being officers currently implementing various aspects of the ECD program in the District/Division.

3.9.8 DATA QUALITY CONTROL

The investigator closely supervised the field assistants. This enabled the investigator to check on the accuracy of the anthropometric measurements To maintain high standards in data collection, the principal investigator ensured that every morning before the exercise began, objects of known weights were weighed to ascertain that the weighing scales gave consistent and accurate measurements. This was done to ensure instrumental errors due to faulty equipment did not arise. To avoid bias and errors in recording, scales were

adjusted before a weighing session for every child. Every effort was made to ensure that at the end of the day, the scales were properly stored.

Stadiometers were placed on a flat surface/ground and the headpiece moved smoothly up and down before any measurements were taken. To minimise intra-observer errors, readings were taken twice and an average taken. The margin of error allowed between each measurement was 0.1cm.

Field assistants were trained in taking of anthropometric measurements and emphasis laid on the correct methods to be used when taking measurements to enhance accuracy and validity of results.

To ensure standardisation of techniques in taking anthropometric measurements, tests consisting of repeating measurements twice on different respondents were done. The variation between repeated measures were calculated to assess accuracy. These tests provided a helpful measure in instilling the importance to the field assistants that high precision and accuracy were to be adhered to. This also helped reduce a wide variation in the intra observer measurements (WHO, 1983).

After being adequately trained in data collection techniques, the field assistants participated in piloting of the survey procedures. During the training period, the questions were discussed and an appropriate Kiswahili and local language

translation agreed upon. This was done until all the questions were translated uniformly by the assistants. Correct interpretation was obtained to ensure that each question was posed to all the respondents in the same way.

Verification of data on administered questionnaires was done to minimise error. Each recorded questionnaire was thoroughly reviewed at the end of each day by the researcher. Reviewing was done to ascertain that the questionnaire had been properly completed. Where the questionnaire was incomplete or data was found to be suspect the field assistant was sent back to the household to verify this or complete the questionnaire.

3.10 DATA PROCESSING

3.10.1 DATA ENTRY, CLEANING AND ANALYSIS

Information obtained from the completed questionnaires were checked, verified coded and entered into a computer. This information was entered into data entry sheets specially prepared to facilitate easy feeding of the information into the computer using SPSS program. The data on nutritional status, social and demographic characteristics was entered in SPSS using two different file names Data cleaning and analysis was done using EPI-INFO and SPSS. Frequencies were run for all the variables to check on the distribution of the data and to identify any incorrect entries. The frequencies for non-continuous data and the mean values for continuous data were obtained before carrying out statistical analysis.

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Anthropometry data was processed using the EPI-INFO program to obtain indices that were used as indicators of the nutritional status of the study children. The NCHS reference figures on nutritional indices were used to translate recorded age, weight and height (anthropometric measurements) of the study children into weight-for-age Z scores, weight-for-height Z scores, and height-for-age Z scores and the cut off point was -2 SD. Age was computed in months 36-47 and 48-59. The three files were then merged in SPSS.

3.10.2 DATA ANALYSIS PROCEDURES

Data analysis consisted of descriptive and analytical components with a variety of statistical tools to describe the study population with respect to nutritional status. Data was analysed using the statistical package for social sciences SPSS.

Information obtained from the FGDs and Key Informant interviews was recorded in field notebooks and was verified and transcribed and descriptive analysis done. Responses to the questions asked were synthesised and summed up. Constants that emerged from each question asked were identified and interpreted. Differences were also identified. Information from the Key Informant interviews was analysed and presented as percentages.

Descriptive statistics computed out of quantitative data included percentages, means, frequencies, and cross tabulations. These were presented as tables, charts, graphs, Bar graphs and Pie charts to describe the nutritional status of the

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population. The statistical analysis was done using the SPSS program where simple cross tabulations were used to identify relationships among variables. ...iation and significance tests were done using chi-square to determine the ...between maternal/caregiver, child characteristics and nutritional ... children. The dependent variables (nutritional status) as ...weight-for-height and height-for-age were determined for all the ...the study. The independent variables for maternal/caregiver factors ...age, occupation marital status and education level were related to child ...tritional status. Simple and multiple regression analysis were used to determine the strength of association between the independent and dependent variables.

The prevalence of malnutrition and the factors causing malnutrition were tested using the Pearson Product- Moment Correlation Coefficient, and T-Test was used to compare groups from different socio-economic strata in terms of income levels of the study population, which was categorised into 3 groups, low, middle and high. These were correlated to the nutritional status of the study children. Chi Square (X^2) was used to compare categorical variables so as to determine the relationships between the various risk factors and nutritional status.

3.11 PROBLEMS AND CONSTRAINTS ENCOUNTERED

Some of the problems that were encountered in the process of conducting this study were:

population. The statistical analysis was done using the SPSS program where simple cross tabulations were used to identify relationships among variables. Association and significance tests were done using chi-square to determine the association between maternal/caregiver, child characteristics and nutritional status of the study children. The dependent variables (nutritional status) as weight-for-age, weight-for-height and height-for-age were determined for all the children in the study. The independent variables for maternal/caregiver factors such as age, occupation marital status and education level were related to child nutritional status. Simple and multiple regression analysis were used to determine the strength of association between the independent and dependent variables.

The prevalence of malnutrition and the factors causing malnutrition were tested using the Pearson Product- Moment Correlation Coefficient, and T-Test was used to compare groups from different socio-economic strata in terms of income levels of the study population, which was categorised into 3 groups, low, middle and high. These were correlated to the nutritional status of the study children. Chi Square (X^2) was used to compare categorical variables so as to determine the relationships between the various risk factors and nutritional status.

3.11 PROBLEMS AND CONSTRAINTS ENCOUNTERED

Some of the problems that were encountered in the process of conducting this study were:

a) The study period August to September 2004 coincided with a time when the Arid and Semi Arid areas of the country were experiencing severe drought and National disaster was declared

b) There was suspicion among some respondents hence some field assistants were not well received in some homes. But after more explanations were made the parents were convinced and the interviews went on. This made it difficult to interview the number of households allocated per day hence more time was needed to complete the exercise

c) Some respondents were not very comfortable being asked about their occupation activities and sources of income.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

The results of the study are divided into qualitative (descriptive) and quantitative groups. The descriptive results are presented in tables and graphs and give information on characteristics of the study population and individual survey respondents such as age, sex, marital status, education level, household size and religion. The results also include child nutritional status, Socio economic status of the households and participation in ECD activities. The other set of data is on the association of the above variables with the nutritional status of the index children

4.2   QUANTITATIVE DATA

4.2.1 CHARACTERISTICS OF THE STUDY POPULATION

4.2.1.1 POPULATION SIZE AND STRUCTURE

The size and structure of the study population is shown in Figure 4.1 and Table 4.1. The study covered a total of 1320 respondents from 280 households of which 611(46.3%) were males and 709 (53.7%) were females. Out of the total 1320 persons 635 (48.1%) were in the project area. The average household size ranged from 3-7 persons in both areas. The average household size in the project area was 4.5 persons (SD 1.159 and variance 1.344) and in the non-project area 4.9 persons (SD 1.097 and variance 1.204). The T-test for equality of means was

done and showed that the difference between the two means (when p=0.01) was statistically significant (t= 2.647, p=0.009). The data indicated a dependency ratio of 1:1.15 in the project area and 1:1.28 in the non-project area. The under five year old children constituted 31.5% of the population while those aged 3-5 were 22.4%. More than half of the population in the project (51%) and non-project area (55.3%) was less than 15 years of age. In the reproductive age (15-64), the proportion was higher (46.6%) in the project area than in the non-project area (43.8%), but not significantly different. The mean age of mothers/caregivers (who were also the respondents) was 31 ± 1.0 years (project area) and 32 ± 1.0 years (non-project area) with a SD of 8.95 and 8.1 respectively. The T-test for equality of means showed that the difference observed between the two means (when p=0.05) was not statistically significant (t= 0.990, p=0.323).

Figure 4.1: Population distribution by age and sex in the project and non project area

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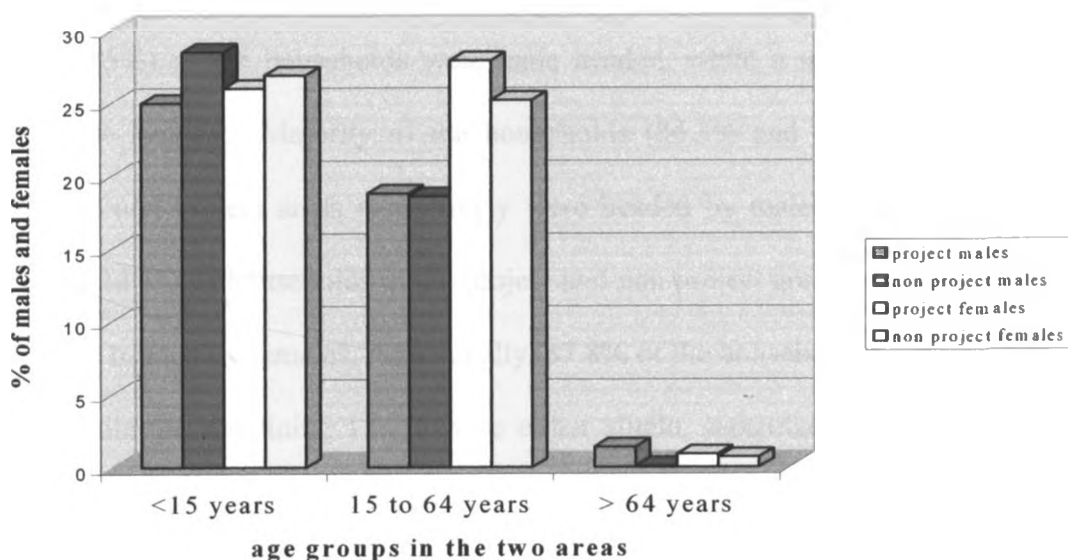
Table 4.1 Distribution of households by selected Socio-demographic and economic characteristics in the project and non-project areas.

Characteristics	Project area N=140	Non project area N=140	P value	Statistical Test
Population size and structure				
Household size (average)	4.5	4.9	0.009**	T
Mean mother's /caregiver's age	31 (8.9)	32 (8.1)	0.323*	T
Population	**N=635**	**N=685**		
<15 years	51%	55.3%	0.1172	Chi square
15-64 years	46.6%	43.8%	0.3038	Chi square
> 64 years	2.4%	0.9%	0.0310	
Marital status of Respondents	**N=140**	**N=140**		
Married	117 (41.8)	119 (42.5)	0.743	Chi square
Separated/divorced/single/ Widow	23 (8.2)	21 (7.5)	0.668	Chi square
Classification of family income	**N=635**	**N=685**		
Low income	33 (23.6)	8 (5.7)	0.000	Chi square
Middle income	95 (67.8)	120 (85.7)	0.000	Chi square
High income	12 (8.6)	12 (8.6)	0.975	Chi square

[a] =Chi square   () in parenthesis are percentages
[aa] = T - test
** P is significant at the 0.01 level (2 tailed)
* P is significant at the 0.05 level (2 tailed)

4.2.1.2 RELIGION, MARITAL STATUS AND HOUSEHOLD HEADSHIP

Majority (85%) of the households were male headed, while a minority (15%) were female headed. Majority of the households (84.3% and 85.7%) in the project and non project areas respectively were headed by males compared to 15.7% and 14.3% of households in the project and non project areas respectively which were headed by females. Additionally, 87.8% of the household heads were married while the remaining 12.2% were either single, separated or widowed. The religion of the household heads was mainly Christian (99.8%). Only one household head (0.2%) reported being a Muslim.

4.2.1.3 EDUCATION LEVEL

With reference to education of the population in the study households, 49.2% of the respondents had primary level, 11% secondary level, 3.9% had college level, 10.2% pre-school level, while 25.7% had no formal education.

4.2.1.4 OCCUPATION

The population included people engaged in different professions. The category with the highest number of respondents was students with 31.4%, formal employment 7.3%, casual workers (temporary employment) 8.8%, while 8.6% owned businesses (e.g., running kiosks, shops, sale of foodstuffs, carpentry, Taxi e.t.c.). Farmers constituted 4.5%, housewives 13.3%, while 24% of the people were not working. It was pointed out in chapter three that majority of people in this district were smallholder farmers and are also engaged in small businesses.

4.3 HOUSEHOLD SOCIO-ECONOMIC STATUS

The Socio-economic status of a household influences how decisions concerning production and distribution of goods and services within the household are made. The well being of each family member is enhanced by an increase in the household's ability to produce or purchase its material resources (food and non-food). Distribution within the household matters a lot. Children especially need a large resource outlay if they are to start their life on a strong physical and

psychological foundation. The survey collected information on the assets owned by households i.e. agricultural and livestock production, income and the amount of money spent on food.

4.3.1 LAND SIZE

Sizes of land owned by the households varied across the two divisions surveyed. The mean land size in the project area was 2.0 acres compared to 1.75 acres in the non-project area. A majority of the households (45.7 %) reported owning between one and two acres of land in both areas while, 33.6% of households in the project area reported owning less than half an acre of land compared to 44.3% in the non project area.

4.3.2 CROPS CULTIVATED

Crops cultivated by households during the season preceding the survey included Maize cultivated by 94.6% of the households, sorghum (20%), Cassava (40.4%), Sweet potatoes (36.4%), Beans (85.4%), Cowpeas (37.1%), Vegetables (35.4%), and fruits (62.1%).

4.3.3 LIVESTOCK OWNED

The highest number of animals owned by the households included chicken (82.9%), followed by goats (56.8%), cows (47.9%), sheep (13.6%), rabbits (8.9%), donkeys (5.7%) and pigs (1.1%).

4.3.4 SOURCES OF INCOME

Earnings from various economic activities were combined (for members of the same household) to come up with a mean household income. Casual labour (37.1%) followed by formal employment (33.6%), sale of farm produce (32.9%) and own businesses (32.1%) were reported as the main sources of income as shown in table 4.2. Given that only a small proportion of the households cultivated the various crops as discussed earlier, and owned very few livestock, the socio economic situation among the households can be very precarious, with adverse consequences on children who happen to be very vulnerable to the effects of scarcity of resources at household level.

Table 4.2: Percentage Distribution of Households by Source of Income

	Division		
Source of income	**Kaiti N=140**	**Kilungu N=140**	****Total**
Formal employment	24.3	42.9	33.6
Sale of livestock	15.7	5.0	10.4
Sale of farm produce	34.3	31.4	32.9
Own business	32.9	31.4	32.1
Casual labour	40.0	34.3	37.1
Help from relatives	7.1	7.1	7.1

*Figures are presented in percentages   ** Multiple responses given

4.3.5 INCOME LEVELS

A number of the respondents (14.6%) reported their monthly incomes as less than Kenya shillings (Kshs) 2000, while 76.8% earned between Kshs 2,000-7,999 and 8.6% over Kshs 8,000 (appendix 6). Although these figures will be used as they are in the analysis to follow, their credibility could be a subject of doubt given that people have a tendency of being reluctant to declare their true incomes.

The minimum total income reported was Ksh 600, while the maximum income reported was Ksh 30,000. The range was therefore Ksh 29,400 with a median of Ksh 3500 and a mode of Ksh 3,000 for both areas. Because of the big range in income levels the mean was not considered, as the large differences would distort the mean

4.3.6 OVERALL HOUSEHOLD INCOME

The overall household incomes for the project and non-project area are shown in Table 4.3 and Figure 4.2. An analysis of households by total amount of income brought to the household by the various members shows that, a majority of the households in the project area (80.5%) are in the low income bracket (appendix 6) while only 19.5% of the households in the non project area were in the low income bracket. 55.8% of the households in the project area were in the middle income group compared to 44.2% in the non-project area. In the high income group the number of households were the same at 50% in each area.

Table 4.3: Distribution of Households by Income Groups in Project and Non Project Areas

Division	Income Group					
	Low (Ksh. 0-1,999) N=41		Middle (Ksh 2,000-7,999) N=215		High (> Ksh 8,000) N=24	
	N	%	N	%	N	%
Kaiti	33	80.5	95	44.2	12	50
Kilungu	08	19.5	120	55.8	12	50

Figure 4.2: Income Groups
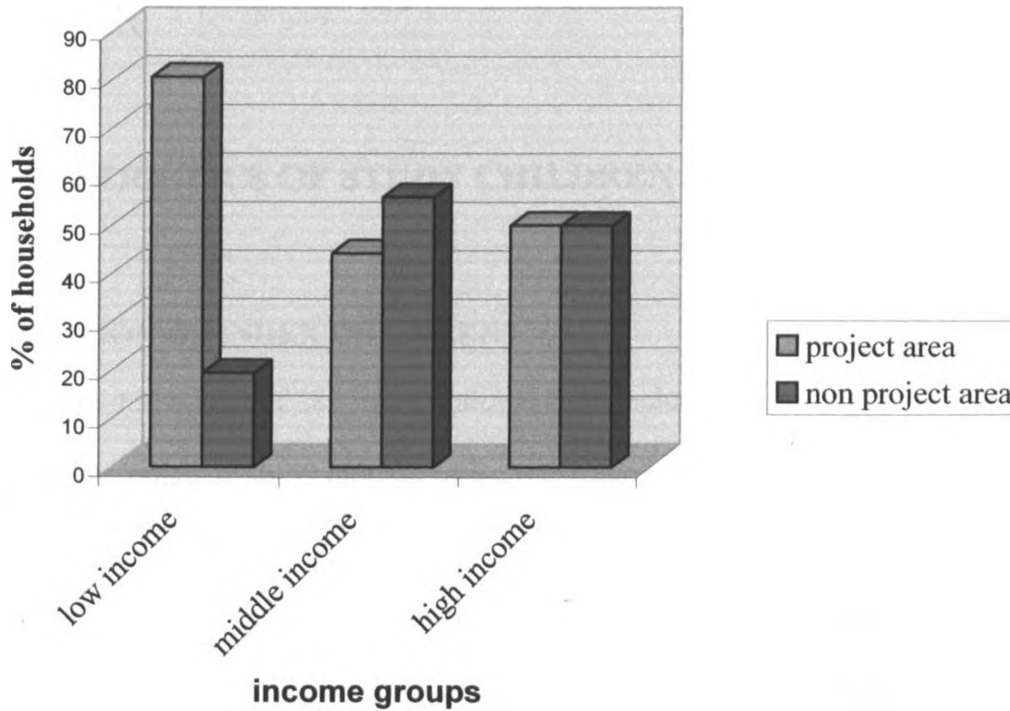
4.3.7 AMOUNT OF MONEY SPENT ON FOOD

The respondents were asked to estimate the amount of money spent on purchasing food items for consumption by the household in a day/month from the total household income. The results show that the mean daily expenditures on food for households in both the project and non-project area was Ksh 92.50. The project area reported a daily average of Ksh. 89.50 and the non-project area, Ksh. 95.46. (80.5%) of households with low incomes in the project area and 19.5% in the non-project area reported a minimum daily food expenditure of Ksh. 63.17 compared to Ksh. 91.32 reported by households in the middle income bracket (Ksh 2000-7,999) and Ksh. 153.33 by households in the high-income bracket (above Ksh 8,000).

4.4 CHARACTERISTICS OF STUDY CHILDREN (36-59 Months)

4.4.1 DISTRIBUTION OF INDEX CHILDREN

As shown in Figure 4.3, a total of 280 index children were included in the study. They were in the age range of 36-59 months with a mean age of 48.8 months and a SD of 7.70. Out of these, 39.3% were aged between 36-47 months, while 60.7% were aged 48-59 months. Slightly more than half (51.4%) of the study children were males with a mean age of 49.80 months and SD of 7.377, while 48.6% were females with a mean age of 48.08 and a SD of 8.02 (Figure 4.2). However, the T-test showed that these differences were not statistically

significant (t=1.865, p= 0.063, 95% CI = -9.51E-02 – 3.5297). In the age range 36-47 months there were more females than males in both the project and non-project areas, while in the age range 48-59 months there were more males than females in both areas.

Figure 4.3 Distribution of Index child population by age and sex
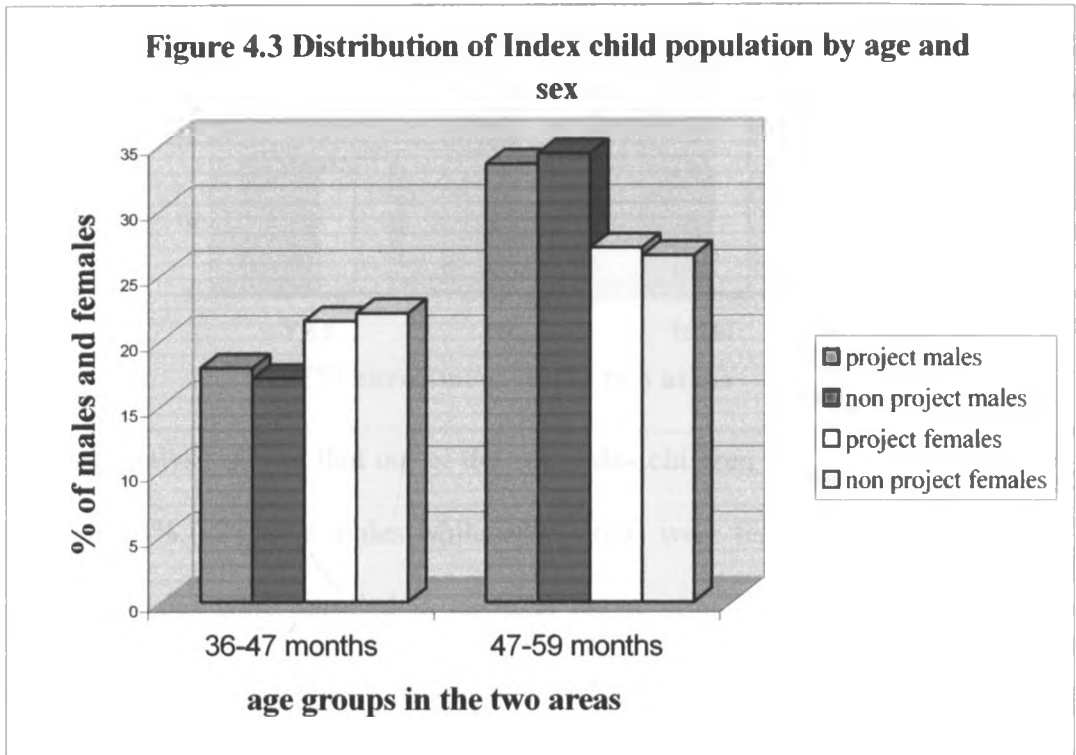
4.4.2. ENROLMENT AT ECD CENTRES

Two thirds (67.1%) of the children in both areas were not enrolled in ECD as shown in figure 4.4. Only 17.2% of the boys are enrolled in ECD project area compared to 15.7% in the non project area while 15.7% of girls are enrolled in ECD in the project area compared to 17.2% in the non project area. Out of the 32.9% of the children enrolled in ECD centres in the project area, only 47 (33.6%) had ECD cards while majority (66.4%) did not have the cards.

Figure 4.4: Distribution of Index children by enrolment in ECD
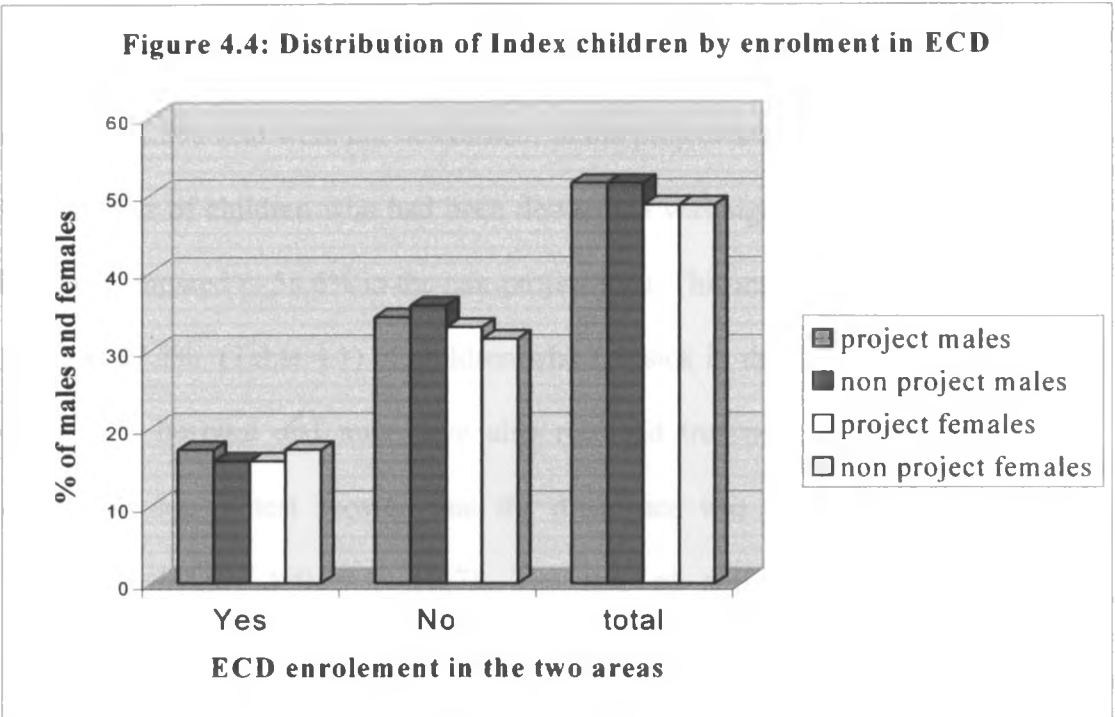
Further analysis shows that out of the 140 index children surveyed in the project area, 51.4% (72) were males while 48.6% (68) were females. Out of these 24 (52.2%) males were enrolled in an ECD centre compared to 22 (47.8%) who were enrolled in an ECD centre. 51.2% (48) of the males were not enrolled in an ECD centre compared to 48.9% (46) of females. Chi square tests however, showed that these differences were not significant (p=0.902, CI 0.516 – 2.118). 55.3% (26) of the males in the project had ECD cards compared to 44.7% (21) females. Majority of the children 49.5% (46) males and 50.5% (47) females did not have the ECD cards that enable a child access treatment when they fall sick. Chi square test showed that the difference was not statistically significant (p=0.513, CI 0.626 – 2.558).

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4.4.3. DEWORMING AND VITAMIN A SUPPLEMENTATION

In general, 47.5% of the index children in the study area were dewormed compared to 52.5% who were not dewormed. In the project area, it was observed that the number of children who had been dewormed was significantly lower at 36.4% (51) compared to 58.6% in the non-project area. This may be explained by the fact that 87.5% (Table 4.1) of children who fell sick in the non-project area were taken to hospital and may have also received treatment against worm infection. Chi square test showed that the difference was highly significant (p=0.000, OR=0.41, CI=0.24 – 0.67). The risk of suffering from worm infestation was about 0.6 times lower in the non-project area compared to the project area. Out of the 36.4% (51) children who were dewormed in the project area, 76.5% (39) were enrolled in an ECD centre while the remaining 23.5% (12) were not enrolled in any ECD centre but had been dewormed. Of the 63.6% (89) children not dewormed in the project area, 92.1% (82) were not enrolled in any ECD centres. Chi square tests showed that these differences were highly significant (p= 0.000, OR=38.071, CI=13.907 – 104.226).

Overall, only 61(21.8%) of the children received vitamin A supplements while the majority 219 (78.2%) were not supplemented. The project area had 33.6% (47) of the children supplemented with Vitamin A while only 10% (14) were supplemented in the non-project area. Chi square test showed that the difference was highly significant (p=0.000, OR=4.55, CI=2.27 – 9.24). The risk of suffering from Vitamin A deficiencies was about 3.4 times lower in the project area

compared to the non-project area. Of the 47 (33.6%) supplemented in the project area, majority 39 (83%) were enrolled in ECD centres. Only 8 (17%) children not enrolled in ECD centres benefited from the supplements compared to 86 (92.5%) of children who were not enrolled in any ECD centre and did not benefit from the supplements at all.

4.4.4. MORBIDITY PATTERNS

Malaria, acute respiratory infections (ARI) and diarrhoea were major causes of childhood mortality in Kenya (KDHS, 2003). To obtain information on how childhood illnesses are treated, the mothers/caregivers of the index children were asked whether the child had experienced any of the following symptoms in the seven days before the survey: diarrhoea, cough, common cold and nasal discharge (ARI), fever with shivering and joint pains (suspected malaria) and abdominal pain.

Table 4.4 gives the percentage distribution of the index children by incidence and type of sickness in the last one week prior to the survey. Overall, close to half (48.9%) of the children were reported having been sick. Out of the sick children (n=137), 68 (49.6%) were male while 69 (50.4%) were female. Among those who reported sick (n=137) a large proportion (63.6%) were in the project area compared to 34.6% in the non project area as shown in Table 4.4. More of the project females (52.8%) were sick compared to non-project females (45.8%), while fewer of the project males (47.2%) were sick compared to the non-project males (54.2%). Within the project area, the age-group 47.1-59 months reported a

higher proportion of sick children (58.4%) compared to 41.6% in the age-group 36-47 months. This was also similar in the non-project area where the age-group 47.1-59 months reported a higher proportion of sick children (64.6%) compared to 35.4% in the age-group 36-47 months. There were more sick children reported in the age-group 36-47 in the project area (41.6%) compared to 35.4% in the same age-group in the non-project area. In the age-group 48-59 months, the non-project area reported a higher proportion of sick children (64.6%) compared to the project area (58.4%).

Table 4.4: Prevalence of sickness by age and sex in the study areas

	Project Area		Non Project Area	
Age group	N=89		N=48	
	N	%	N	%
36-47 months	36	41.6	17	35.4
48-59 months	52	58.4	31	64.6
Sex	N=89		N=48	
	N	%	N	%
Male	42	47.2	26	54.2
Female	47	52.8	22	45.8

N: refers to the total number of persons who reported sick in the one-week prior to the survey.

4.4.5. TYPES OF SICKNESS

The most prevalent type of illness among the project and non-project children were skin disease (31.8%), followed by Cough, common cold and nasal discharge (30.4%), Fever, shivering, joint pains (suspected malaria) (12.9%), abdominal pain (11.8%), diarrhoea (5.4%) and eye infections (3.6%). The results

show highly significant differences between the project and non-project areas, with regard to the different types of sicknesses except for fever (suspected malaria) which showed no significant difference between the two areas (p = 0.074).

Table 4.5: Distribution of children by type of sickness in the study areas

Sickness	Project Area N=140		Non-project Area N=140		Total N=140		P value	Odds Ratio	Confidence Intervals
	N	%	N	%	N	%			
Diarrhoea	15	10.7	0	0	15	5.4	0.000*	-	-
Cough/cold/nasal discharge	54	38.6	31	22.1	85	30.4	0.003**	2.21	1.27-3.86
Skin disease	68	48.6	21	15.0	89	31.8	0.000**	5.35	2.92-9.87
Fever/shivering/ Joint pains (malaria)	23	16.4	13	9.3	36	12.9	0.074**	1.92	0.88-4.22
Abdominal pain	29	20.7	4	2.9	33	11.8	0.000*	8.88	2.86-30.77
Eye infection	9	6.4	1	0.7	10	3.6	0.019*	9.55	1.22-204.00

* = Fishers exact test   * * = Chi square test

NB: Some of the children reported more than one illness hence the percentages do not add up to one hundred

4.4.6. HEALTH SEEKING BEHAVIOURS

Majority of the households in the non-project area 132 (94.3%) take their children to hospital when they fall sick compared to 125 (89.3%) in the project area. The number of children falling sick by type of action taken for the project and non-project areas is given in Table 4.6. In the project area, more than half of

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the households 74 (59.2%) took the sick children to hospital while 47 (64.4%) bought medicine from the shop/pharmacy to give to the children.

Table 4.6: Percentage distribution of children reporting illness action taken to treat them in the two areas

	Take child to hospital		Herbal treatment		Buy medicine		Do nothing	
Project area	N=	%	N	%	N	%	N	%
Yes	74	59.2	6	85.7	47	64.4	89	63.6
No	51	40.8	1	14.3	26	35.6	51	36.4
Total	125		7		73		140	
Non project area	N	%	N	%	N	%	N	%
Yes	42	31.8	1	100	15	31.2	48	34.3
No	90	68.2	0	0	33	68.8	92	65.7
Total	132		1		48		140	
P value	0.500*		0.421*		0.168**		0.000**	

   * = Fishers exact test   * * = Chi square test

4.4.7. USE OF INSECTICIDE TREATED MOSQUITO NETS (ITNs)

The respondents were asked whether the index child slept under a mosquito net and whether the nets were treated or not. Only 17 (6.1%) of the households reported that the index child slept under a net and only 11 households (3.9%) reported having treated the bednets with insecticide as shown in Figure 4.5. Ownership and use of mosquito nets was higher among households in the project area (10.7%) than among the non-project area (1.4-%). This result cannot be directly attributed to the ECD project since the project did not distribute any mosquito nets but held education sessions with the parents on the importance of using mosquito nets as reported in the Key informant interviews (section 4.7).

4.4.8. FEEDING PRACTICES

4.4.8.1 BREASTFEEDING AND COMPLEMENTARY FEEDING

To find out the caregivers' perceptions on issues of breastfeeding, the respondents were asked to state for how long a child should be exclusively breast

Figure 4.5: Distribution of children using mosquito nets
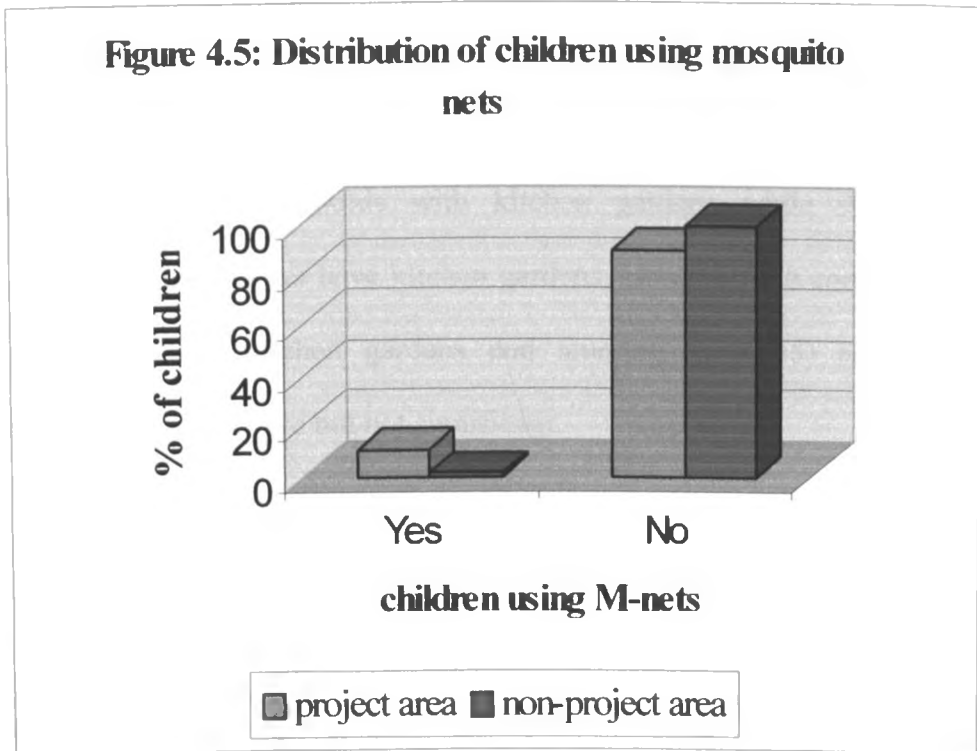
fed, length of breast feeding, and best age at which to introduce weaning foods. The results show that in both areas 16.4% reported a child should be exclusively breastfed for six months, 21.1% for four months and 41.1% for three months. The rest reported as follows: 11.1% two months, 5.4 one month and 5% five months. On the frequency of breastfeeding, 73.9% reported that the child should be fed on demand, 1.4% twice a day, 7.9% three times a day and 16.8% more than three times a day.

4.4.9. PARTICIPATION IN ECD ACTIVITIES

4.4.9.1. KITCHEN GARDENS

The respondents were asked if they practised any kitchen gardening and the results show that there was no significant difference between the project and non-project households in terms of establishing kitchen gardens ($p = 0.699$). Out of the 280 households interviewed only 30 households (8.9%) had established kitchen gardens. Out of these, 14 (10%) were in the project area while 16 (11.4%) were in the non-project area. Out of the 86 children that were stunted, 8% were from households with kitchen gardens while 92% were from households that did not have kitchen gardens. However, the correlation between households with kitchen gardens and stunting ($p=0.055$) and underweight ($p=0.035$) was negative but not significant.

4.4.9.2 TYPES OF CROPS GROWN

The most common types of crops grown in the kitchen gardens were sukumawiki (kale), which was grown by 83.3% of the households (N=30). 26.6%, 23.3%, 16.6% and 16.6% of the households grew Onions, cabbages, tomatoes and potatoes (Irish potatoes) respectively.

4.4.9.3. ATTENDED ECD SEMINAR

The respondents were asked if they have ever attended a meeting, seminar or workshop organised by the Ministry of Education's ECD project. The results

showed that there was a highly significant difference (p = 0.000) in attendance of ECD meetings between the two groups. The project area had 17.9% of the respondents who reported having attended an ECD meeting compared to only 2.1% in the no-project area.

4.4.9.4. GROWTH MONITORING

Over half (58.6%) of the index children were taken for growth monitoring. A further analysis of the results for the growth monitoring and promotion activity shows a highly significant difference between the two groups (p = 0.000) with the non-project area having a higher proportion (69.3%) of children undergoing growth monitoring activities compared to the project area with 47.9%. This may be because most of the households (94.3%) in the non-project area take their sick children to hospital compared to 89.3% in the project area. One of the activities carried out at the health centre is growth monitoring. Of the 164 (58.6%) children that were taken for growth monitoring, 40.9% attended ECD centres while 59.1% did not attend any ECD centre. Out of the 116 (41.4%) children that were not taken for growth monitoring, 25 (21.6%) attended ECD while, 91 (78.4%) did not attend ECD.

There was a negative but not significant correlation (p<0.01) between taking the children for growth monitoring and nutritional status of the children. More of the children (54.7%) who were taken for growth monitoring were identified as stunted compared to 45.3% who were not taken for the exercise. The results were

similar for underweight and wasting. This underscores the importance of growth monitoring for detection of cases that need attention.

4.5 CHILDREN'S NUTRITIONAL STATUS

Malnutrition places children at increased risk of morbidity and mortality and has also been shown to be related to impaired mental development (KDHS, 2003). Anthropometry provides one of the most important indicators of children's nutritional status. In this study, height and weight measurements were obtained for children aged between 36-59 months. The height and weight data were used to compute three summary indices of nutritional status: height-for-age; weight-for-age; and weight-for height. The WHO expresses these three indices as standardised scores (Z scores) or standard deviation units from the median for the international reference population recommended. The children who fall more than two standard deviations below the reference median are regarded as undernourished, while those who fall more than three standard deviations below the reference median are considered severely undernourished (KDHS, 2003).

In general, results show that the population was moderately undernourished using NCHS/WHO 1977/85 standards, with a mean height for age Z score (HAZ) of –1.40. The mean weight for age Z score (WAZ) was –0.99 and weight for height Z score (WHZ) was –0.16. The mean height for age Z score (HAZ) for the project area was –1.5319 (SD = 1.24) compared to –1.269 (SD = 1.18) for the non-project area. The mean weight for age Z score (WAZ) was –1.08, (SD = 1.05) in

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the project area and –0.91 (SD=0.88) in the non-project area. The mean weight for height Z score (WHZ) was –0.1754 (SD=1.038) in the project area compared to –0.1560 (SD=0.813) in the non-project area. Further analysis using T-test showed that the differences observed between the two areas were not statistically significant. For WHZ (t=-0.174, p=0.862 95%CI= -0.2387 – 0.2000), WAZ (t=-1.454, p=0.147, 95% CI = -0.3979 – 5.977E-02), HAZ (t=-1.807, p=0.072, 95% CI=-0.5478 – 2.339E-02).

The prevalence of malnutrition by different indices of nutritional status based on height for age, weight for age and weight for height are shown in Figure 4.6 and Table 4.7. They are represented using nutritional indicators stunting, underweight and wasting. The three indices height for age, weight for age and weight for height reflect different aspects of nutritional status. Prevalence of stunting was 30.8%, underweight 17.1% and wasting 4.3% (figures combine both moderate and severe cases).

Stunting rates in the project and non project area were 35.7% and 25.7% respectively. The figure for stunting in the project area was higher than the national figure (30.3%), Eastern Province (32.5%) (KDHS, 2003) and the figure reported in the ECD baseline survey for Makueni District (25%) (MOEST, 2000). During the national baseline carried out by MOEST, stunting and underweight was most serious amongst children aged 3-4 years (MOEST, 2000).

The prevalence of chronic malnutrition manifested as stunting was higher but not significantly different (p=0.069) in the project area compared to the non-project area (Table 4.7).

Figure 4.6 : Prevalence of malnutrition among children in the project and non-project area
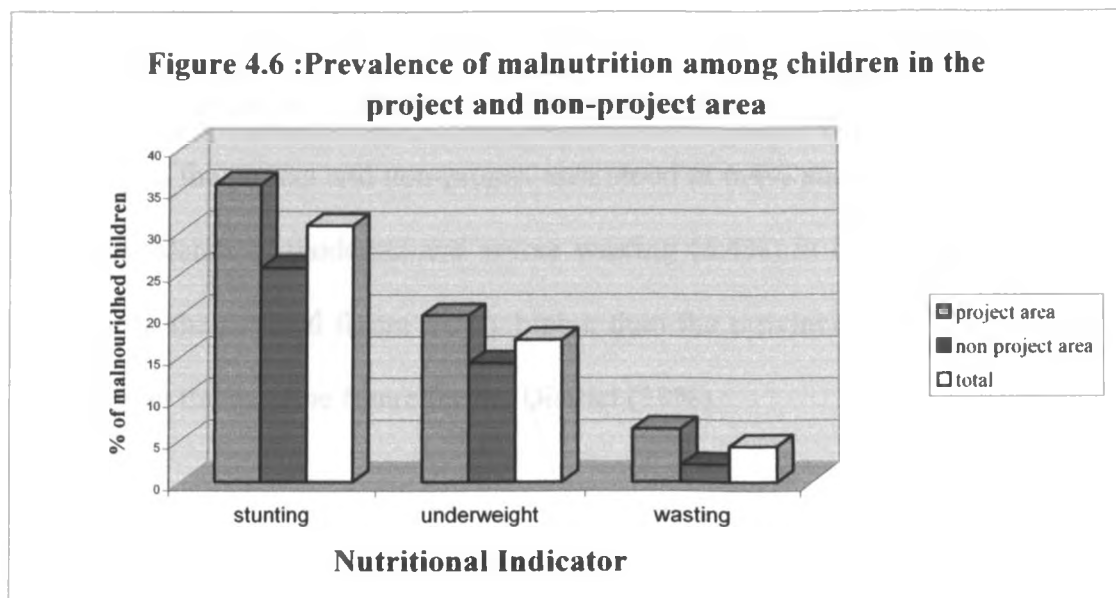
Table 4.7: Prevalence of malnutrition in the project and non-project areas

	Project Area N=140			Non-Project Area N=140			p-value
	Normal >-2SD	Global Malnut rition <-2SD	Acute Malnut rition <-3SD	Normal >-2SD	Global Malnut rition <-2SD	Acute Malnut rition <-3SD	
Wasting	131 (93.6)	8 (5.7)	1 (0.7)	137 (97.9)	3 (2.1)	0 (0)	0.076
Underweight	112 (80)	27 (19.3)	1 (0.7)	120 (85.7)	19 (13.6)	1 (0.7)	0.204
Stunting	90 (64.3)	35 (25)	15 (10.7)	104 (74.3)	22 (15.7)	14 (10)	0.069

Figures in brackets = percentages

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The percentage of underweight children in the study area was 17.1% with only 0.7% of the children being severely underweight (weight for age of <-3SD). The prevalence of underweight was slightly lower than the national figure (20%) and that for Eastern Province (21%) (KDHS, 2003), but was much higher than the figure observed during the ECD baseline (10%) (MOEST, 2000).

A very small number of children were wasted in both areas. Moderate and severe wasting in the project and non-project area stood at 6.4% and 2.1% respectively. The prevalence of moderate and severe wasting (6.4%) in the project area was similar to the national figure (6%), higher than the provincial figure (4.2%) but lower than the baseline figure for the District (10%).

4.5.1 NUTRITIONAL STATUS BY AGE AND SEX

A higher proportion of males were stunted in the project area (13.6%) compared to the non-project area (7.1%) (table 4.8). The same trend was found with females, with 11.4% of the project females being stunted compared to 8.6% in the non-project area. However, these differences were not statistically significant as shown in table 4.8 below. Global malnutrition is a combination of mild and moderate malnutrition.

Table 4.8: Prevalence of malnutrition according to sex and age in the two areas

SEX	Project Area		Non-Project Area		
Stunting	N 140	Global Malnutrition <-2sd	N 140	Global Malnutrition <-2sd	P-value
Male	72	19 (13.6%)	72	10 (7.1%)	0.172
Female	68	16 (11.4%)	68	12 (8.6%)	0.573
Underweight					
Male	72	15 (10.7%)	72	12 (8.6%)	0.574
Female	68	12 (8.6%)	68	7 (5%)	0.490
Wasting					
Male	72	4 (2.9%)	72	2 (1.4%)	1.000
Female	68	4 (2.9%)	68	1 (0.7%)	0.476
AGE					
Stunting					
36-47 months	55	9 (6.4%)	55	14 (10%)	0.507
48-59 months	85	26 (18.6%)	85	8 (5.7%)	0.010
Underweight					
36-47 months	55	19 (13.6%)	55	10 (7.1%)	0.340
48-59 months	85	8 (5.7)	85	9 (6.4%)	1.000
Wasting					
36-47 months	55	7 (5.0%)	55	2 (1.4%)	0.610
48-59 months	85	1 (0.7%)	85	1 (0.7%)	0.477

Chi square tests. Significance at 0.05 level

A higher proportion of both boys (13.6%) and girls (11.4%) in the project area were stunted compared to boys (7.1%) and girls (8.6%) in the non-project area. The results were also similar for underweight and wasting for both areas (Table 4.8). Between the ages of three to four years, stunting levels were lower (6.4%) in the project area compared to the non-project area (10%). This may be due to the fact that there were more children (17.4%) attending ECD compared to 13.0% in the non-project group. Among the age group 4-5 years, the stunting levels were higher (18.6%) in the project area compared to the non-project area (5.6%). This may also be explained by the fact that at age 4-5 years, fewer

children (82.6%) in the project area were enrolled in ECD compared to 87.0% enrolled in the non-project area. Chi square tests showed that this difference was highly significant (p=0.010). Underweight levels on the other hand were higher in the age group 3-4 years in both the project area (13.6%) and non-project area (7.1%) compared to the age group 4-5 years which had 5.7% in the project area and 6.4% in the non-project area. Chi square tests showed that these differences however were not statistically significant as shown in Table 4.8.

Results for wasting were similar in both the project and non-project areas in the age group 4-5 years while in the age group 3-4 years the project area reported higher proportions (5.0%) compared to the non-project area (1.4%) (Table 4.8).

4.5.2 NUTRITIONAL STATUS AND MORBIDITY

Higher prevalence of malnutrition was associated with higher morbidity rates as shown in Table 4.9. In the project area, the prevalence of stunting was found to be higher among children who had suffered from skin disease (18.6%), cough and common cold (15%), abdominal pain (7.9%), fever /suspected malaria (6.4%) diarrhoea (5.7%), and eye infections (0.7%). All these figures were much lower than those observed in the non-project area (Table 4.9). These results were similar for underweight and wasting.

Table 4.9: Distribution of index children by nutritional status and type of sickness

Type of Sickness	Nutritional Indicators											
	Project Area						Non-project Area					
	Wasting		Stunting		Under weight		Wasting		Stunting		Under weight	
	n	%	n	%	n	%	n	%	n	%	n	%
Diarrhoea	1	0.7	8	5.7	4	2.9	0	0	0	0	0	0
Cough/cold	4	2.9	21	15.0	10	7.1	0	0	5	3.6	5	3.6
Skin disease	4	2.9	26	18.6	11	7.9	0	0	5	3.6	4	2.9
Fever, shivering, joint pains (malaria)	3	2.1	9	6.4	7	5.0	1	0.7	4	2.9	4	2.9
Abdominal pain	1	0.7	11	7.9	6	4.3	0	0	1	0.7	1	0.7
Eye infection	2	1.4	1	0.7	3	2.1	0	0	0	0	0	0

N= number of children who are sick and also malnourished
* Percentages are calculated within the specific categories

4.5.3 NUTRITIONAL STATUS OF CHILDREN IN RELATION TO ECD ATTENDANCE

Results in Table 4.10 show that 16.3% of children attending ECD centres were

stunted, 10.4% underweight and 8.3% were wasted. For children not attending

ECD centres 83.7% were stunted , 89.6% underweight and 91.7% were wasted.

Table 4.10:Distribution of Index children by nutritional status, and ECD attendance

Severe/Moderate	Child attend ECD Centre				Total	
	Yes		No			
	N=20	%	N=126	%	N=146	%
Stunted	14	16.3	72	83.7	86	59
Underweight	5	10.4	43	89.6	48	32.8
Wasting	1	8.3	11	91.7	12	8.2

4.5.4 NUTRITIONAL STATUS OF CHILDREN IN RELATION TO MATERNAL EDUCATION AND OCCUPATION

Table 4.11 shows the distribution of children by levels of malnutrition according to mother's/caregiver's occupation and level of education. In both project and non-project areas, a high proportion of children whose mothers were housewives or businesswomen were stunted. A higher percentage of children whose mothers were housewives were underweight in the project area (12.9%) than in the non-project area (7.9%). Wasting levels were higher for those children whose mothers were housewives (5.7) in the project area compared to 0.7% in the non-project area. In the non-project area, higher wasting levels (1.4%) were observed among children whose mothers were casual labourers than in the project area.

Table 4.11: Distribution of Index children by nutritional status, occupation and education status of mothers/caregivers

Maternal Characteristics	Nutritional Indicators											
	Project Area						Non-project Area					
Occupation	Stunting N=50		Underweight N=28		Wasting N=9		Stunting N=36		Underweight N=20		Wasting N=3	
	N	%*	N	%*	N	%*	N	%*	N	%*	N	%*
Housewife	31	22.1	18	12.9	8	5.7	21	15	11	7.9	1	0.7
Casual labourer	5	3.6	3	2.1	0	0	4	2.9	5	3.6	2	1.4
Formal employed	2	1.4	1	0.7	0	0	1	0.7	1	0.7	0	0
Business	11	7.9	6	4.3	1	0.7	7	5.0	1	0.7	0	0
Farming	1	0.7	0	0	0	0	2	1.4	2	1.4	0	0
Education attained												
Primary	41	29.3	24	17.1	7	5.0	28	20	16	11.4	3	2.1
Secondary	5	3.6	2	1.4	1	0.7	7	5.0	4	2.9	0	0
College	3	2.1	1	0.7	1	0.7	1	0.7	0	0	0	0
None	1	0.7	1	0.7	0	0	0	0	0	0	0	0

* Percentages are calculated within the particular categories

Stunting levels were higher in both areas for those children whose mothers had attended primary school. For those children whose mothers had attended secondary school, stunting levels were higher in the non-project area (5%) than in the project area (3.6%). Wasting levels were higher in the project area (5.0%) for those children whose mothers had only attained primary education than in the non-project area (2.1%).

4.5.4 NUTRITIONAL STATUS OF CHILDREN IN RELATION TO SIZE OF HOUSEHOLD

Analysis on household size and child nutritional status was carried out for both the project and non-project area. Household sizes were grouped into three to four member household, and five to seven member household. Results in Table 4.12, show that prevalence of malnutrition in children as measured by all the three indices increased as the household size increased in both the areas.

Table 4.12: Distribution of Index children by nutritional status and household size

Household Size	Nutritional Indicators											
	Project Area						Non-project Area					
	Stunting		Underweight		Wasting		Stunting		Underweight		Wasting	
	<-2 SD		<-2 SD		<-2 SD		<-2 SD		<-2 SD		<-2 SD	
	n	%*	N	%*	N	%*	n	%*	N	%*	n	%*
3-4 members (N=133)	22	28.9	13	17.1	5	6.6	11	19.3	5	8.8	1	1.8
5-7 members (N=147)	28	43.8	15	23.4	4	6.3	25	30.1	15	18.1	2	2.4
Total	50	35.7	28	20.0	9	6.4	36	25.7	20	14.3	3	2.1

The 3-4 member households in the project area had 28.9% stunting, 17.1% underweight and 6.6% wasting compared to 19.3% stunting, 8.8% underweight and 1.8% wasting reported in the non-project area. The prevalence of malnutrition was higher in the 5-7 member households with the project area reporting 43.8% stunting, 23.4% underweight and 6.3% wasting compared to 30.1% stunting, 18.1 underweight and 2.4 wasting in the non-project area. The differences were significant for stunting ($p=0.028$) and wasting ($p=0.031$), while underweight ($p=0.086$).

4.5.6. SELECTED HOUSEHOLD SOCIO–ECONOMIC INDICATORS AND OTHER FACTORS RELATED TO THE NUTRITIONAL STATUS OF THE STUDY CHILDREN

In order to assess the Socio economic and other factors responsible for the nutritional outcome of this study, an inter-variable correlation analysis was done (Table 4.13). The Pearson's correlation matrix shows that the relationship between independent variables and nutritional status indicators does not automatically imply causal relationship.

Table 4.13: Pearson correlation coefficients for some variables with specific nutritional indicators for children in the project and non-project areas

Characteristic	Project Area			Non-project Area		
	Stunting	Wasting	Under Weight	Stunting	Wasting	Under Weight
Stunting	1.000	0.018	0.671**	1.000	-0.031	0.715**
Wasting	0.018	1.000	0.750**	-0.031	1.000	0.672**
Underweight	0.671**	0.750**	1.000	0.715**	0.672**	1.000
Child age	0.118	0.176*	0.214**	0.252**	-0.071	0.156
Household size	-0.152	-0.118	-0.189*	-0.155	-0.122	-0.193
Maternal age	-0.019	0.007	-0.008	-0.071	0.036	-0.026
Household income	-0.043	-0.017	-0.039	-0.032	0.090	0.041
HH monthly food expenditure	-0.029	0.043	0.014	0.055	-0.033	0.022

** Correlation is significant at the 0.01 level (2 tailed)
* Correlation is significant at the 0.05 level (2 tailed)

In the project area, a significant positive relationship was observed between child age and wasting and child age and underweight at significant levels 0.05 and 0.01 respectively. While in the non-project area, a significant positive relationship between child age and stunting was observed.

A negative and significant relationship between household size and underweight was observed in the project area. The relationship was significant at level 0.05 using a two-tailed test. From previous analysis (Table 4.11) it was observed that malnutrition (stunting, underweight and wasting) increased with household size in both areas.

4.5.7. REGRESSION ANALYSIS

Simple and multiple regression analysis was done to determine whether child age, education, household size, Maternal age and household expenditure on food influence the nutritional status (stunting) of the child. Nutritional status (stunting) was used as the dependent variable. Results from the multiple regression analysis (Table 4.14) show that when considered together, the four independent variables do significantly determine a child's nutritional status (p=0.007).

Table 4.14: Multiple Linear Regression (t-value, significance and coefficient)

Independent Variable	t-value	P-value	Coefficient Correlation
Mother's age	-0.130	0.897	-0.008
Household expenditure on food	0.231	0.817	0.014
Age of Index child	2.993	0.003	0.177
Household size	-2.168	0.031	-0.133

Model F=3.165   df=4   P=0.007

About 50%   (R^2 = 0.050) of the variation observed in stunting in the index children can be explained or predicted by the mother's age, household expenditure on food, age of the index child and household size Table 4.14. However, individual analysis of each of the independent variables done through simple regression showed that only age of index child and household size showed significant difference with the child's nutritional status as shown in Table 4.15.

Table 4.15: Simple Linear Regression (t-value, significance and coefficient)

Independent Variable	t-value	P-value	Correlation Coefficient	Confidence Interval
Mother's age – 0.012	-0.606	0.545	-0.036	-0.022
Household expenditure on food – 0.004	0.203	0.839	0.012	-0.003
Age of Index child – 0.047	3.037	0.003	0.179	0.010
Household size - -0.018	-2.258	0.025	-0.134	-0.268

4.6 QUALITATIVE DATA

4.6.1 FOCUS GROUP DISCUSSION

A total of four focus group discussions were held two in each of the study areas, to verify data collected using a questionnaire administered to the respondents.

Malaria/fever (seasonal), skin diseases (ringworms), coughs and common colds and malnutrition were the most common diseases among children in the study area. The majority of the mothers treated the diseases by taking the children to hospital or buying medicine from the shop/pharmacy. Some mothers however reported that they could not afford the twenty shillings charged to get an ECD card that enables a mother to take her under five to hospital for treatment.

For those children enrolled in the ECD programme, treatment was free (after an initial purchase of an ECD card worth Ksh. 20) whenever they fell sick,. The MOEST supplies a range of drugs to the local dispensary to be availed to the children when taken there for treatment. But it was noted that the supply of the

drugs was not regular. The ECD cards were also not always available whenever needed.

The mothers were the principal caregivers in the home, but when not present, the older children, grandparents, neighbours, house-helps and occasionally the father assisted them. The father's role in the childcare was to cater for financial needs, and discipline the child. However, some fathers played no key role because of cultural reasons. The mothers' child care activities included: food preparation for the child, bathing, and washing the child's clothes and taking the child to hospital when sick. The mothers were also involved in other activities such as domestic chores, small businesses, office work and casual labour. Majority of the mothers however were housewives.

It also emerged that following the severe drought that the country was experiencing, the MOEST had withdrawn the School Feeding Programme from the two study areas for the last two years inorder to feed children in the totally arid divisions in the district that were badly affected. The parents felt that this had also affected the nutritional status of their children, as they were not getting any food at the ECD centres anymore. This could easily explain the high levels of chronic malnutrition (stunting) that had persisted in the area.

4.6.2 KEY INFORMANT INTERVIEWS

Ten pre-school teachers (five from each division) who were involved in the implementation of the ECD program were selected and interviewed in-depth on the subject matter. These interviews provided individual variation and clarified information obtained from FGDs and other data collection methods. Also interviewed were two ECD secretaries co-ordinating ECD activities in the division, and the clinical officers at the local health centres. The Key informants were selected on the basis of being officers implementing various aspects of the ECD program then in the District/Division.

The ECD teachers in Kaiti division confirmed that growth monitoring and promotion exercise is carried out once a term at their ECD centres, while the ECD teachers from Kilungu confirmed that the Health and Nutrition component of ECD had not been started in the division yet. From both groups it was established that the ECD programme had not distributed any mosquito nets to the children.

There were no feeding arrangements at any of the ECD centres as the MOEST had suspended all feeding arrangements under the WFP/GOK school-feeding programme for the last two years.

Interviews with the ECD secretaries who co-ordinate the programme at divisional level confirmed that growth promotion and monitoring was being done

in Kaiti but had not started in Kilungu. Essential drug administration was also being done at the local dispensaries. This was also confirmed by the clinical officers' incharge of the local dispensaries who were interviewed. In both divisions teachers had been recruited and trained for two years at the Kenya Institute of Education. Sensitisation on ECD drugs and administration modalities had been done for the ECD teachers in Kaiti division and was in the pipeline for ECD teachers in Kilungu. The sensitisation was done by the Ministry of Health (MOH), District Centre for Early Childhood Education (DICECE) and ECD office. The ECD teachers and the community was sensitised on drug administration using a set guidelines agreed upon by the community, ECD teachers, DICECE, ECD and MOH officials (appendix 7).

Drugs administered at the ECD centres by ECD teachers include: Vitamin A capsules, Iron/Folic Acid tablets, Mebendazole tablets, Multi vitamin syrup, Benzoic acid ointment, Gentian Violet crystals, Tetracycline Hydrochloride 3% skin ointment, and paracetamol tablets (for first Aid).

The health centres were given a range of essential drugs with which to treat children enrolled in the ECD programme when they reported sick at the health centre. The children were eligible for treatment upon production of an ECD treatment card, which is purchased at the ECD centre at a fee of Ksh. 20. The

ECD child treatment record cards were under the custody of the ECD teachers and were obtained from there and returned there after treatment. This also applied for children who are not enrolled at the ECD centre. The health institutions account for all drugs issued to them by MOEST.

The most common diseases reported at the local health centres in both divisions were respiratory tract infections (RTI), skin infections, malaria, diarrhoea, eye infections and intestinal worms Table 4.16.

Table 4.16: Percentage distribution of types of sickness reported at health centres between February – July 2004 by project and non-project areas

Project Area	Month of reporting						
Disease	N	Feb 05	March 05	April 05	May 05	June 05	July 05
RTIs	2392	451 (18.8)	364 (15.2)	263 (10.9)	443 (18.5)	403 (16.8)	468 (19.5)
Skin Infections	1127	213 (18.8)	192 (17.0)	178 (15.8)	215 (19.0)	164 (14.5)	165 (14.6)
Malaria*	3758	575	653	529	770	551	680
Diarrhoea	409	45	58	75	119	49	63
Intestinal worms	721	51	137	176	179	53	125
Eye Infections	152	15	36	17	37	18	29
Malnutrition (Underweight)	289	51	29	47	67	26	69
Non-Project Area							
Disease	N	Feb	March	April	May	June	July
RTIs	2211	120	212	167	306	373	1033
Skin Infections	70	5	7	4	25	3	26
Malaria*	2113	155	331	235	365	289	738
Diarrhoea	275	12	32	49	43	44	95
Intestinal worms	241	31	35	76	50	2	47
Eye Infections	69	5	2	6	5	4	47
Malnutrition (Underweight)	34	6	7	6	6	3	3

* Figures include adults   () figures in parenthesis are percentages

However, the hospital data is biased since only those children who are sick are taken for treatment and hence weighed. This data does not reflect the true morbidity and nutritional situation in the area but can give us a rough indication of what the situation is like for comparison purposes.

CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

This chapter discusses the results of the observations and findings of this research.

5.1 CHARACTERISTICS OF THE STUDY POPULATION

5.1.1 POPULATION SIZE AND STRUCTURE

The results of this study show that the size and structure of the study population that is shown exhibits a young age structure. Over 50% of the population fell under age 15 with only slightly above 2% falling above 65 years. The same pattern was observed in the KDHS (2003) in which the household population age-sex structure is still wide based with the population under 15 (45%), 15-64 (52%) and over 65 years (2%). The large proportions aged under 15 years as well as the proportion above 65 years combine to give high dependency ratios since the producers aged 15-64 are outstripped by the consumers aged under 15 and above 65 years. The dependency ratios for project and non-project areas were 115 and127 respectively which was higher than the national ratio of 92 (KDHS, 2003).

Households in both areas were found to have almost similar characteristics that are reflective of the general characteristics of Eastern Province. The average household size in both the project and non-project area was 4.5 and 4.9

respectively. These findings are similar to the national average, which is 4.4 and for Eastern province which is 4.7 (KDHS, 2003). This is a slight improvement from the average household size of 6 persons in Eastern Province which was reported in the national development plan (GOK, 2002). However, the findings differ slightly from those of a similar study carried out by Macharia (2002), and ANP (2000), where household sizes were found to be 6.1 persons.

Study findings suggest that large household sizes have a negative implication on nutritional status and food security perhaps because the land holdings are small. Thus, adequate food for the households cannot be produced. A study carried out in cash crop growing areas in Western and Nyanza Provinces of Kenya by Niemeijer *et al,* (1988) established that large household sizes were food insecure and more at risk of having poor nutritional status. This is further supported by observations in the fifth nutrition survey in Kenya (GOK/UNICEF, 1996) in which the number of persons a household caters and cares for relates very closely with the nutritional status of the members of the household. Often, poor nutrition is usually characteristic of unmanageably large households where the head may not be in a position to cater for the members nutritionally.

5.1.2 EDUCATION LEVEL, OCCUPATION AND SOURCES OF INCOME

The education level is relatively low with only 3.9% of both males and females attaining college education in both areas. These findings are slightly higher than

those observed in the KDHS (2003) for Eastern Province where only 2.3% of the respondents had completed college education.

Low education levels may account for the high ranking of casual labour (37.1%) as a source of income compared to formal (salaried) income in both areas. This explains the poor economic status of the households in both areas since returns from casual labour are generally low. Further, during the dry season, there is almost no work to be done in the farms (ROK, 1997). These observations explain the fact that most mothers were available at home to be interviewed since most were either housewives or had not got any casual work to do. These findings also compare with those of a study carried out in Tharaka Nithi which found out that most malnourished children came from households occupied in casual labour (ANP, 2000). It is therefore clear that education, income and occupation have an impact on nutritional status because they determine how much and what type of food is purchased (ACC/SCN, 1991).

Education is a prerequisite to development and elimination of intellectual poverty and is one of the Millennium Development Goals and major goals outlined by the Government of Kenya in its 2000/2003 poverty eradication strategy document. Access to employment opportunities increases with increasing levels of education. Research has shown that education of mothers and the wider community has important implications on the health and nutritional status of children. Hence the need to encourage school enrolment.

5.2   CHARACTERISTICS OF STUDY CHILDREN

5.2.1   ENROLMENT AT ECD CENTRES

A notable proportion (67.1%) of eligible children (by age) was not enrolled in
any ECD centre in both areas. This can be explained by the fact that with the
introduction of free primary education in Kenya in 2003, most parents withdrew
their children from ECD centres since ECD attracted some user fees payable per
term, which most parents could not afford. This was observed during the FGDs.

The NACECE guidelines for ECD in Kenya indicate that children learn and
develop better if they are actively involved in the learning process and hence the
need to attend ECD (NACECE/KIE, 1999). Similarly, data from a study carried
out in Ghana established that there were considerable differences between
enrolled and non-enrolled children in their nutritional status, with non-enrolled
children being more malnourished (Drake et al, 2002). A review of Early
Childhood Policy and Programmes in Sub-Saharan Africa by Colleta and
Reinhold (1997), acknowledges that investment in ECD (especially in health,
nutrition, and cognitive and social development) is imperative in ensuring
smooth transition into primary school.

5.2.2   MORBIDITY PATTERNS AND HEALTH SEEKING BEHAVIOURS

Incidences of ARIs, malaria, skin diseases and diarrhoea were most prevalent
among the project and non-project children. This trend is similar to that observed

in the country where malaria, acute respiratory infections (ARI) and diarrhoea are the major causes of childhood mortality in Kenya (KDHS, 2003). More children in the project area 16.4% reported suffering malaria compared to 9.3% in the non-project area. The health seeking behaviour of the study households showed that more households in the non-project area 94.3% took their children to hospital when they fell sick compared to 89.3% of households in the project area. Prompt medical attention when the child has symptoms of any of these illnesses is crucial in reducing child deaths. The major diseases affecting the people in Makueni district are malaria, ARIs, skin diseases, diarrhoea and intestinal worms. Malaria has remained the major cause of morbidity in the district (ROK, 1997).

Diarrhoeal diseases were reported in 10.7% of the study children in the project area. Poor hygiene contributes to the spread of disease, especially diarrhoea. Skin diseases and diarrhoea are associated with lack of safe and clean water for domestic use and this was observed during the focus group discussions and key informant interviews. Studies indicate that the immediate causes of child deaths (for children under-five years) are attributed to malnutrition and diseases. Malnutrition has been linked to food insecurity at household level and presence of diseases that influence food intake, absorption and utilisation of the food by the body (UNICEF, 1990, and 1998). This definitely impacts negatively on the nutritional status of the pre-school children.

Half of the children in the project area (48%) and 15% in the non-project area had skin diseases. This was confirmed by the high number of children being treated for skin infections at the local dispensaries. This is despite the fact that a large number of the households grow fruits (62%) and vegetables (36%). However, most of the farm produce is sold to enable the household earn an income as was reported by 32.9% of the households (table 4.2). With most of the farm produce being sold this limits the sources of vitamin C in the diet which is helps to maintain the immunity of the body (Piwoz and Preble, 2000).

5.2.3   USE OF INSECTICIDE TREATED MOSQUITO NETS

Malaria affects 20 million Kenyans annually. Results from this study indicate that only 6.1% of the index children were sleeping under insecticide treated mosquito nets yet one of the interventions in the fight against malaria is sleeping under insecticide treated mosquito nets. This exposes the children to malaria infection making them vulnerable. It is estimated that, annually 26,000 children under five years of age die from the direct consequence of Malaria infection (KDHS, 2003). The low usage of insecticide treated mosquito nets by households in the study area is far below the national coverage of 22% (households in Kenya that have mosquito nets) as was observed during the demographic and health survey carried out in 2003. The low coverage can be explained by the fact that

the ECD project had not distributed mosquito nets to the pre-school children in both areas although these had been purchased.

5.3 PARTICIPATION IN ECD ACTIVITIES
5.3.1 ESTABLISHMENT OF KITCHEN GARDENS

Quite a small proportion (8.9%) of the study households had established kitchen gardens. This can be explained by the fact that traditionally, kitchen (home) gardening is neglected in most development strategies yet it is an important food security strategy and in particular, a strategy for meeting micronutrient needs (FAO, 1997). Available evidence clearly suggests that home gardening (kitchen gardening) can result in tangible benefits for the household, including food on the table, extra income and healthy children (FAO, 1997).

There was a negative correlation observed between stunting (p=0.055) and underweight (p=0.035) and number of households with kitchen gardens. However this relationship was not significant. This implies that there were more malnourished children in households that did not have kitchen gardens compared to households that had them (see section 4.4.9.1). These results are similar to findings from an FAO supported project in the Niger in which households that produced and consumed Vitamin A rich foods had more healthy children than households that did not (IVACG, 1994). In an integrated nutrition/home

gardening programme supported by Hellen Keller International in Bangladesh, most of the income earned from home garden produce was spent on food thus reducing the prevalence of malnutrition among children of participating households (FAO, 1994).

For home garden initiatives to be successful and sustainable it is necessary for all stakeholders to work closely with local farmers, especially women farmers. This will also ensure that availability of garden foods translates into nutritional benefits for the whole family.

5.3.2   GROWTH MONITORING

Over half (58.6%) of the index children in both areas were taken for growth monitoring. A further analysis of the results for the growth monitoring and promotion activity shows a highly significant difference between the two groups (p = 0.000) with the non-project area having a higher proportion (69.3%) of children undergoing growth monitoring activities compared to the project area with 47.9%. This may be because most of the households (94.3%) in the non-project area take their sick children to hospital compared to 89.3% in the project area. One of the activities carried out at the health centre is growth monitoring. Quite a number (59.1%) of the children that were taken for growth monitoring were not attending ECD centres yet it is at the ECD centre that the children could have received food, screening for medical attention and education.

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There was a negative but not significant correlation (p<0.01) between taking the children for growth monitoring and nutritional status of the children. More of the children (54.7%) who were taken for growth monitoring were identified as stunted compared to 45.3% who were not taken for the exercise. The results were similar for underweight and wasting. This underscores the importance of growth monitoring for detection of cases that need attention. The general goal of most growth monitoring programmes is to identify children who are malnourished or whose growth pattern is faltering and to offer particular interventions to improve their condition before it reaches emergency status (UNICEF, 1985).

From the focus group discussions it was established that the growth monitoring results are used to identify children who need medical attention. It also emerged that it is the mothers and caregivers that take the children for growth monitoring. This is in agreement with observations by UNICEF in which one measure of the impact of a growth monitoring programme is its effect on mothers and their willingness to change daily practices to improve their children's growth patterns and thus their nutritional status (UNICEF, 1985).

5.3.3 DEWORMING, VITAMIN A SUPPLEMENTATION AND NUTRITIONAL STATUS OF THE STUDY CHILDREN

The number of children dewormed in the project area was significantly lower than those dewormed in the non-project area. 29.3% of those who had been dewormed in the last one year before the visit were stunted while 13.5% were

underweight and 3.0 were wasted. For those who had not been dewormed in the last one year, 32.0% were stunted, 20.4% underweight and 5.4% were wasted. Recent studies on the effect of de-worming on growth have reported varied impact. Research suggests that helminth infection suppresses children's appetites and that treatment results in weight gains (Drake *et al*, 2002).

A study carried out in Egypt found out that the prevalence of worm infections was higher in children who were not enrolled in school (Drake *et al*, 2002). Quite a large percentage of the children were not enrolled in the ECD programme, this might explain the large numbers of children who had not been dewormed since they had no access to the drugs provided by the ECD program for deworming.

More children were supplemented with Vitamin A in the project area (33.6%) compared to 10% in the non-project area. This may be explained by the fact that the non-project area did not have any Vitamin A supplementation programme as the project was yet to be implemented. The levels of Vitamin A supplementation in both areas are clearly quite low. Although results show that there was no significant relationship between vitamin A supplementation and the three nutrition indicators, several studies have shown that Vitamin A deficiency causes blindness and death in children. On a global basis it is estimated that 251 million children of pre-school age are at risk of VAD. Data obtained from the National Micronutrient Survey in Kenya indicates that VAD situation in 1999 was 80% (GOK/UNICEF, 2001).

Deficiencies of Vitamin A, iron and iodine are major problems for school-age children in low income countries and low income families. It has been shown that such deficiencies can negatively impact on growth, increase susceptibility to infection and also impair the mental development and learning ability of pre-school children (Drake *etal*, 2002)

5.4   NUTRITIONAL STATUS OF THE STUDY CHILDREN

The results show that the prevalence of malnutrition in the study area among the under five year olds is still high and clearly confirm that malnutrition is still a wide spread health problem. This is precipitated by many factors such as health seeking practices, education levels, occupation, enrolment and attendance in ECD programs and general socio-economic status.

5.4.1   PREVALENCE OF MALNUTRITION OF THE STUDY CHILDREN

In general, the prevalence of malnutrition in this study seemed to compare closely with earlier studies of KDHS 1998 and 2003 in which malnutrition among the under fives in the country were high. Differences observed in the malnutrition levels between the KDHS (2003), Baseline (MOEST, 2000) and

current study findings may be due to the fact that, the KDHS covered wide areas than the present study and carries out the studies at different times of the year.

Stunting levels observed were slightly lower (30.8%) than the levels reported in the 2003 KDHS for Eastern Province (33%) but the project area reported a higher figure (35.7%) compared to the National; and Provincial figures. These figures are almost similar to those reported for developing countries by Drake *et al*, (2002) in which the African region has the highest estimated prevalence of stunting (20.2-48.1%) and has the lowest rate of improvement. A longitudinal study of changes in height and weight of school-age children on Pemba Island, Zanzibar showed the prevalence of stunting increased with age (Drake *et al*, 2002). These findings were also similar to those of findings reports on ongoing operational, economic and sector work carried out by the World Bank and member governments in the Africa region where approximately 30% of children under five years suffer from chronic malnutrition (Colletta *et al*, 1997).

The prevalence of underweight and wasting follows a similar pattern to stunting for the study children. The study prevalence for underweight and wasting are comparable to the KDHS (1998, 2003). Similarly, the study findings are comparable to estimates for prevalence of underweight pre-school children in Africa in the year 2000 which ranged from 14-36.5% while wasting stood at 9.6% (Drake *et al*, 2002). Underweight among the pre-school children, like stunting can reflect a broad range of nutritional problems. Nevertheless, wasting

rates can change rapidly in situations of acute food crisis, with school children becoming severely malnourished in such situations (Drake *et al*, 2002). At the time when this study was being carried out, the country was facing a major famine which had even been declared a national disaster and Eastern Province (Makueni District) was one of the places severely affected by the drought. The MOEST had also suspended all feeding activities at ECD centres. This may have contributed to the high prevalences of stunting and wasting that were observed in both study areas.

5.4.2 NUTRITIONAL STATUS OF THE STUDY CHILDREN BY AGE AND SEX

In Kenya, the rate of stunting peaks between 12 and 23 months followed by 24-35 months, 36-47 months and 48-59 months. Stunting reflects failure to receive adequate nutrition over a long period of time and may also be caused by recurrent and chronic illness (KDHS, 2003). The results of this study showed more children stunted in the project area in the age group 48-59 months than the non-project area. Underweight and wasting were highest at 36-47 months. In the project area, stunting was higher in males than females although the difference was not statistically significant. Also the males were more underweight and wasted than the females in both areas. Similar results of higher prevalence in stunting, underweight and wasting in males compared to females by age have been reported in Ghana, Tanzania, Indonesia, Vietnam and India (Drake *et al*,

2002) and in Kenya (KDHS, 2003). The high prevalence of underweight and stunting is also similar with findings observed in a survey for drought prone districts of Kenya (Kogi-Makau *et al*, 2000). This implies that the situation is worse off in this area than that of the average area in Kenya. Despite the fact that stunting, underweight and wasting were high among the male children and while the female children had slightly better nutritional status, sex of the child was not significantly associated with the nutritional status of the children.

5.4.3 MORBIDITY AND NUTRITIONAL STATUS OF THE STUDY CHILDREN

Malnutrition is considered a key risk factor for ARIs, therefore maintaining good nutritional status is important in preventing infection (Tomkins and Watson, 1990). Many children reported ill before the study suffered from various diseases, dominated by skin diseases, ARIs and Malaria. Higher prevalence of malnutrition was associated with higher morbidity rates (section 4.5.2). From the analysis of the data presented, it is evident that there is a direct relationship between child morbidity and nutritional status of a child. Malnourished children are more vulnerable to infection and have more episodes of disease attacks than well-nourished children. Illnesses threaten nutritional status by decreasing the appetite, inhibiting the absorption of food r diverting the utilisation of food from proper bodily use. Malnutrition and illness however tend to occur together. A malnourished child is likely to fall ill and a sick child to become malnourished (GOK/UNICEF, 1996). However in this study there was no significant

relationship between morbidity and the three nutritional indicators except for malaria and underweight which was significant (p=0.032). This was not suprising as the study period was too short to expect any influence on the indicators. On the other hand, a number of studies suggest that diarrhoeal illness in childhood contributes to secondary malnutrition and that this effect is more severe in malnourished children (Kogi-Makau *et al*, 2000., Sanghvi and Murray, 1997).

5.4.4 SELECTED SOCIO-ECONOMIC CHARACTERISTICS AND NUTRITIONAL STATUS OF THE STUDY CHILDREN

5.4.4.1 Maternal Education

There was no significant relationship between maternal education and the child nutritional status variables. However, stunting of study children was high among mothers with low (primary) education (37.6% in project area and 28.9% in the non-project area) compared to those with higher education. It is clear from the data that mothers with better education had fewer children stunted compared to those with little or no education. From this it is possible to conclude that education of mothers can influence nutritional outcome of a child as has been shown in several studies (CBS, 1996; KDHS, 1998 and KDHS, 2003). These findings may be a reflection of inadequacy of nutrition and health relevant components in the education curriculum especially in primary schools, the level of which most mothers attended school in the study area. The nutrition

information that mothers receive is mostly through Maternal and Child Health (MCH) services which mothers attend (KDHS, 2003).

The levels of maternal education are likely to cause poor nutritional status. Maternal education has been shown to have a positive impact on the role of the woman in food preparation and childcare (Mwadime, 1992).

5.4.4.2 Maternal Occupation, and Expenditure on Food

The results indicate that 55.4% of the mothers/caregivers are housewives while the rest are either self employed, casual labourers or engaged in small-scale farming. Children of mothers who were housewives were more malnourished (stunted, wasted and underweight) in both areas than the rest. This means that the mothers in this study depend on their spouses to give them money to buy nutritionally rich foodstuffs for their children. Given that only a small proportion is formally employed (6.8%) this limits the amount of money that they can spend on food for the children. Results from a recent National survey (KDHS, 2003) show that cash employment increases women's decision making power in the household including decision making on what foods to purchase and cook for the family.

5.4.5.3 Household income, and expenditure on food and nutritional status

There was an association between nutritional; status and monthly family income, with malnutrition (stunting) being present in 34.1% of children of families in the low income bracket (Ksh. 0-1,999) compared to 30.2% in the middle income bracket (Ksh. 2,000-7,999) and 29.2% in the high income bracket (Ksh. 8,000 and above) (chi square p=0.087). The substantial proportion of households that belonged to the low income and middle income groups could be explained by the nature of employment. The majority of the households earned between Ksh 2,000 – 7,999 per month from the occupation, hence little income available for buying food at household level resulting in poor nutritional status of the children.

These finding agree with other studies (Niemeijer *et al*, 1988) carried out in Kenya in which for pre-schoolers, caloric adequacy was significantly better in children from high-income families. In general, malnutrition (wasting, stunting and underweight) was high in households that spent less amount of money on food.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

From the study, the following conclusions can be drawn:

1. The results of this study show that the study population exhibits a young age structure with a high dependency ratio and large household size. It is therefore concluded that the large household sizes have a negative implication on nutritional status of the study children and food security of the households and this is aggravated by the small land holdings. Thus, adequate food for the households cannot be produced.

2. There was no significant difference in the morbidity patterns for project and non-project children. Incidences of ARIs, malaria, skin diseases and diarrhoea were most prevalent among the project and non-project children.

3. Participation by the community in ECD activities was minimal. This is reflected by the number of children who were not enrolled in ECD centres (67%) hence were not benefiting from ECD health and nutrition services such as deworming, Vitamin A supplementation, and growth monitoring.

4. No significant difference was noted in the nutritional status of pre-school children in both areas. Therefore the alternative hypothesis is rejected and the null hypothesis that "there was no difference in the nutritional status for pre-school children in the two areas" accepted. Chronic malnutrition among children is still a problem as reflected by the high prevalence of stunting

observed among the pre-school children. This may have been aggravated by the withdrawal of the School Feeding Programme by the MOEST from the ECD centres.

6.2 RECOMMENDATIONS

The responsibility for the nutritional well being of pre-school children rests primarily on the children and their families. But the Educational system cannot take a passive stance in regard to the health and nutritional status of pre-schoolers. The ECD programme in the MOEST is primarily aimed at improving the health and nutritional status of the pre-schoolers. It is recommended that;

1. The pre-school education programme should involve the community more actively in ECD activities such as nutrition education programmes, growth monitoring, deworming, Vitamin A supplementation and create awareness on the importance of the ECD programme to the community.

2. Encourage more parents to enrol their children in the ECD centres so that they can benefit from the health and nutrition programme of ECD.

3. Public health measures to control malaria, ARIs and diarrhoeal diseases such as hygiene, sanitation, prompt treatment and use of insecticide treated mosquito nets be encouraged as possible ways of contributing to reduction of malnutrition in the area.

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APPENDIX 1: HOUSEHOLD QUESTIONNAIRE

A COMPARATIVE STUDY OF THE IMPACT OF THE EARLY CHILDHOOD DEVELOPMENT PROGRAM ON THE NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN: A CASE STUDY OF KAITI AND KILUNGU DIVISIONS IN MAKUENI DISTRICT, KENYA

A. HOUSEHOLD COMPOSITION   Q No._____

DIVISION_____   DATE OF INTERVIEW_____
LOCATION_____   NAME OF INTERVIEWER_____
SUBLOCATION_____   HOUSEHOLD NO._____
VILLAGE_____   RESPONDENTS NAME_____

List selected details about usual household members in the table below

No	Name	Relationship with head of household	Sex	Age in years	Marital status	Education level	Occupation	Religion
1								
2								
3								
4								
5								
6								
7								

CODES

RHHLD
Self
Spouse
Son
Daughter
No relation
Other
Other (specify)

SEX
Male
Female

MARITAL STATUS
1. Married
2. Separated
3. Divorced
4. Single
5. Widow (er)
6. N/A

OCCUP
1. Student
2. Formal Employment
3. Casual labour
4. Own Business
5. Farming
6. Housewife
7. N/A
8. Other (specify)

EDLEVEL
1. Primary
2. Secondary
3. College
4. None
5. Pre-school
6. N/A

REL
1. Christian
2. Islam
3. Other (specify)

B. HOUSEHOLD SOCIO-ECONOMIC STATUS
Please circle the correct response

2. How much land does your family own in acres?
    1= less than half an acre
    2= Between one-two
    3= Between two –three
    4= Between three –four
    5= More than four

3. What food/cash crops did you grow in the last harvest season?

	Food/Cash crop	1=Yes 2=No	No. of Bags Harvested
1.	Maize		
2.	Sorghum		
3.	Cassava		
4.	Millet		
5.	Sweet potatoes		
6.	Beans		
7.	Cowpeas		
8.	Vegetable		
9.	Fruits		
10.	Others (specify)		

*1 Bag = 90 Kg

4. Does your family keep any of the following domestic animals? How many?

	Animal	1= Yes 2= No	Number
1.	Cows		
2.	Goats		
3.	Sheep		
4.	Donkeys		
5.	Poultry (Chicken, Ducks)		
6.	Pigs		
7.	Rabbits		
8.	Others specify		

5. Which of the following activities were sources of income for your family during the last three months and how much money did you get from it per month?

	ACTIVITY	Codes	AMOUNT IN KSH PER MONTH
1	paid employment		
2	sale of livestock		
3	sale of farm produce		
4	Own business (e.g. Hair salon, selling prepared foods e.t.c)		
5	other specify		

Codes

    1= paid employment

    2= sale of livestock

    3= sale of farm produce

    4= business

    5= other specify

6. How much money do you spend on food in one day

Ksh._____

C. CHILD HEALTH AND NUTRITIONAL STATUS

Name of the index child_____

11. Age of child in

years_____

12. Sex of child

    1= Male   2= Female

13a). Is the child enrolled in an ECD centre?

        1= Yes   2= No

   b). If yes what is the name of the centre?_____

14. Does the child have an ECD card?

        1= Yes   2= No

15. Has the child been dewormed in the last one year?

        1= Yes   2= No

16. Has the child received Vitamin A supplementation in the last one year?

        1= Yes   2= No

17. Has the child been sick in the last one week?

        1= Yes   2= No

18. If yes what kind of illness was it?

	1= Yes	2= No
Diarrhoea		
Cough, common cold, and nasal discharge		
Skin disease		
Fever with shivering and joint pains (suspected malaria)		
Abdominal pain		
Others specify		

19. Does the child sleep under a mosquito net?

     1= Yes   2= No

20. Is the Net treated?

     1=Yes   2=No

D. PARTICIPATION IN ECD ACTIVITIES

21. What action do you take when a child is sick?
    1. Take the child to hospital
    2. Administer herbal treatment
    3. Buy medicine from the shop/pharmacy
    4. Take child to herbalist
    5. Do nothing
    6. Others
       specify_____

22. For how long should a child be exclusively breast fed before introducing other foods _____months

23. When is the best age to introduce weaning foods_____months

24. How many times should a child be breast fed in a day?
        1= On demand
        2= Once a day
        3= Twice a day
        4= Three times a day
        5=More than three times a day
25 a). Do you have a kitchen garden?
        1= Yes   2= No

b). If yes which crops do you grow in the garden?_____

26. Have you ever attended a meeting organised by the MOEST ECD program in the last three years?

   1= Yes   2= No

27. Do you take your children for growth monitoring and Immunisation?
   1= Yes   2= No

E. ANTHROPOMETRY

28. Name of Child: _____

29. Sex of Child
   1=Male   2=Female

30. Date of Birth_____

31. Age in Months_____

	Measurement	First Reading	Second Reading	Average
32	Weight in (Kg)			
33	Height in (Cm)			

34. Presence of Oedema?

    1=Yes 2=No

APPENDIX 2:FOCUS GROUP DISCUSSION GUIDELINE QUESTIONS

LOCATION_____

VENUE_____DATE_____

NAME OF MODERATOR_____

QUESTIONS

1. What are the common childhood diseases in this area?
2. How has the ECD program influenced how you treat your children when they fall sick?
3. Who looks after young children in the home?
4. What are the main activities of the mother in the home in this area?
5. Who takes care of the children when the mother is away?
6. What do you think of the ECD program?
7. How have you benefited from the ECD program
8. What lessons have you learnt from the ECD program?
9. How can we sustain the ECD program?

NOTES FOR THE RECORDER

TIME OF START_____   TIME ENDED_____

No. OF PARTICIPANTS_____

NAMES AND CHARACTERISTICS OF PARTICIPANTS

	Name of Mother	Age	Occup	Ed. Level
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

APPENDIX 3: KEY INFORMANT INTERVIEW GUIDELINE QUESTIONS ECD DISTRICT PROGRAM OFFICER

Name of Enumerator_____

Name of Respondent_____

Sex of Respondent_____

1. What activities are being carried out under ECD Health / Nutrition component in your district/division?
2. Have you establish links with Ministry of Health regarding implementation of ECD (H/N component)?
b) If yes, what type of links
3. How many children benefited in your district/division from the ECD H/N component? (Please give the data by division, sex and age i.e. 3-5 years and < three years)
4. What is the community's perception of the Health and Nutrition Program?
5. What are some of the effects and impacts of the program?
6. How many members of the divisional Health Inspection committees have been trained (ask for number trained in Kaiti and Kilungu divisions also)
7. On what issues have they been trained?
8. From your records, how many children are :
    (Ask for district and divisional data)
    - Undergoing Growth Monitoring
    - Have been dewormed
    - Have received Vitamin A supplementation

9. Who do you consider to be a wealthy person in this community?

10. What constraints did you face in implementing the ECD program (health & nutrition component)

11. What are some of the lessons learnt in implementing the ECD program?

12. How can we sustain the ECD program?

APPENDIX 4; KEY INFORMANT INTERVIEW GUIDELINE QUESTIONS FOR PRESCHOOL TEACHER

Name of Enumerator_____

Name of Respondent_____

Sex of Respondent_____

Name of centre_____

Division_____   Zone_____

No of Boys:_____   No of Girls:_____   Total:_____

QUESTIONS

A. CHILD HEALTH AND NUTRITION

1. Does the ECD centre confirm Immunisation of the child before admitting at the centre?

    1=Yes   2=No
2. Does the ECD centre have an Immunisation program?
    1=Yes   2= No
3. If yes which one is it _____

4. Does the ECD centre carry out growth monitoring on the children?
    1=Yes   2=No
5. If yes how often do you do growth monitoring on the children?_____

6. Has the ECD centre received Mosquito nets from MOEST this year (or before)?
    1=Yes   2=No
7. If yes how many nets?_____

8. Have they been distributed to the children
    1=Yes   2=No
9. If not why_____
10. Have the children been dewormed in the last one-year?
    1=Yes   2=No
11. Have the children received Vitamin A during Immunisation?
    1=Yes   2=No

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12. Does the ECD centre have any nutrition support project/activity
    1=Yes   2=No

13. If yes what type of project/activity is it?_____

B. FEEDING ARRANGEMENT

14. Is there any feeding arrangement at the centre?_____
    1=Yes   2=No
15. How many meals are served per day?
    1=Mid morning meal
    2=Mid morning meal + lunch
    3=lunch
    4=Any other specify_____

16. What does the meal consist of?_____
17. How much (quantity) is served to each child?_____
18. How many children aged 3-5 years are served this meal?_____
19. What are their ages in months?

AGE IN MONTHS	BOYS	GIRLS	TOTAL
36-47			
48-59			
60-72			
TOTAL			

C. DELIVERY AND SUPPLY OF ESSENTIAL DRUGS

20. Do you receive essential drugs at the ECD centre?
    1=Yes   2=No
21. Who administers the drugs at the ECD centre?
    1=Teacher
    2=Health worker
    3=Other
    specify_____
22. Have the ECD teacher and Management committee been oriented on Health
    and Nutrition activities?
    1=Yes   2=No
23. If not, why?_____

D. LESSONS LEARNT AND RECOMMENDATIONS

24. What lessons have you learnt and what recommendations can you make
    about the program?

25. How can we sustain the ECD program?

APPENDIX 5: KEY INFORMANT INTERVIEW GUIDELINE QUESTIONS FOR HEALTH OFFICER AT THE LOCAL HEALTH CENTRE

Name of Enumerator_____

Name of Respondent_____

Sex of Respondent_____

QUESTIONS

1. What are some of the common childhood diseases in this area?

	Name of Disease	No. of Cases reported last month	No. of cases reported in a year
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

* Verify this information from the Hospital records

2. What kind of collaboration/activities have you established with the MOEST regarding the implementation of the ECD program?
3. Do you receive any essential drugs for administration from the ECD program?
4. What does the drug kit consist of?
5. Who benefits from these drugs?
6. How has the ECD program influenced the health and nutritional status of children in this area?
7. How can we sustain the ECD program?

APPENDIX 6: SOCIO-ECONOMIC INCOME CLASSIFICATION

To enable analysis of SES in terms of income levels, the study population will be categorised into three income groups as given in the GOK economic survey of 2002 as follows:

- Ksh 0   to   1999   Low income group
- Ksh 2000 to   7999   Middle income group
- > Ksh 8000   High income group

Source GOK (2002) Economic Survey

APPENDIX: 7 ECD DRUG ADMINISTRATION MODALITIES AND GUIDELINES

1. The role of distribution of the drugs to MOH institutions and ECD centres is placed upon the DICECE
2. ECD teachers only administer First Aid drugs, health promotive and disease preventive drugs at the ECD centre
3. Health institutions will handle curative drugs and treat all children (0-8 years old) referred to them by the ECD teacher or community for treatment
4. The ECD child treatment record card developed by the DICECE and issued to ECD children at a cost of Ksh. 20.00 will be used for treatment and issue of drugs, growth monitoring and promotion, deworming and assessment of the children at the health institution and at the ECD level
5. The funds realised from the sale of the ECD child record treatment cards would be managed by the DICECE for the purpose of procuring more cards and ECD drugs sustenance
6. The zonal health and nutrition implementation and supervisory committee be formed and contain the following members: One zonal inspector of schools (coordinator), two ECD teachers, two parents (one male and one female), one headteacher, and one medical officer of health (to oversee the administration of the drugs)
7. All ECD children will be accorded free services both at the ECD centre and at the health institutions
8. Growth monitoring and promotion for children not enrolled at the ECD centres will be charged Ksh. 50.00 by the ECD teacher serving the child at the centre for equipment maintenance and the subsistence needs of the ECD teacher
9. Only children with the ECD treatment card will be administered with the ECD drugs
10. Awareness creation on the exercise will be carried out at all levels in the community to ensure optimum participation by the community members

11. MOEST and MOH collaboration in the exercise will be essential and determine the success of the programme at both the district and community levels
12. A bank account for ECD health and nutrition sustenance is opened by the DICECE to deposit all funds realised from the exercise.

APPENDIX: 8 INVITATION LETTER FOR FGD

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

EDUCATION OFFICE
NUNGUNI ZONE
P. O. Box 568
NUNGUNI.
When replying please quote

Our Ref:_____

Your Ref:_____

11 August, 2007.

REPUBLIC OF KENYA

THE HEADTEACHER

_____

_____

RE: **E.C.D TEACHERS MEETING ON 14TH SEPTEMBER 2004 AT THE DIVISIONAL EDUCATION OFFICE – NUNGUNI. TIME 10.00 AM.**

You are kindly requested to release one E.C.D teacher to attend the above-mentioned meeting as scheduled.

The main agenda of the meeting will be to discuss the impact of the E.C.D program on the Nutritional status of pre-school children in Kilungu Division.

Your co-operation in this exercise will be highly appreciated.

Be punctual.

Yours Faithfully,

J. NDIVO
For Z.I.S
NUNGUNI ZONE.

APPENDIX 9: MAP OF KENYA

LOCATION OF MAKUENI IN KENYA