The Effect of Nutrition on Infant and Child Mortality a Critique.

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RESEARCH PROPOSAL:- THE EFFECT OF NUTRITION ON

INFANT AND CHILD MORTALITY

A CRITIQUE.

YEAR:- 1988

PRESENTED TO:- DR. TIMOTHY GATARA

POPULATION STUDIES AND RESEARCH INSTITUTE

UNIVERSITY OF NAIROBI.

DECLARATION

This is my own original work and has not been presented for a
degree in any university.

CHARO JOYCE ZALE

SUPERVISOR

This project has been submitted for examination with my approval
as University Supervisor.

DR. TIMOTHY GATARA

POPULATION STUDIES AND RESEARCH INSTITUTE

UNIVERSITY OF NAIROBI

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LIST OF ABBREVIATIONS

C.B.S.	-	Central Bureau of Statistics
I.R.S.	-	Intergrated Rural Survey
MAC		Mid-Arm circumference
WA	-	Weight for Age
HA	-	Height for Age
WH	-	Weight for Height
P.E.M.	-	Protein Energy Malnutrition
N	-	Number of Specimen

ACKNOWLEDGEMENTS

SIGNIFICANCE OF THE STUDY

It is expected that the results of the present analysis will be beneficial to the government for purposes of Economic and social planning. Uniformities and differences of mortality within a country reveal the distribution of other related factors. The critique has attempted to come up with a better understanding of the relationship between Nutrition and Infant and Child Mortality. Such an understanding would be useful in the making of concrete public policies geared towards the improvement of Nutrition and health status of the districts. Mortality one of the principal variables of demographic analysis, is a key measure of health and economic status. In particular, Infant and Child Mortality rates are one of the most common indices of Socio-Economic Development.

The nutritional status of a population in one way or another affects the levels of Infant and Child Mortality rates which in turn affect the population policy of a country or region concerned through contraceptive acceptance. The improvement of the nutritional status of the population therefore indirectly helps in the implementation of the population policy of Kenya.

INTRODUCTION AND STATEMENT OF PROBLEM

From evidence that is available undernutrition and malnutrition are extremely serious problems in the developing countries. Malnutrition is an especially important though often hidden cause of mortality among children. There is a high incidence of infectious diseases among young children in most developing countries, and the resultant high morbidity and mortality is largely due to lowered body resistance because of malnutrition.

A deterioration of nutritional status is reported from many countries. The existence of malnutrition on any scale should be cause for concern.

According to Sessional Paper Number of 4 of 1984, National Food Policy, the Government of Kenya hinges on two general objectives first, the production of sufficient food to ensure provision of adequate nutrition for her population, and secondly to produce enough food surplus to guarantee some food export, to earn foreign exchange and at the same time supplement family incomes at the household level.

The above objectives have been formulated as a result of escalating nutrition related problems such as lack of protein among infants and children and acute nutritional dificiencies especially in the semi-arid areas of the country, urban areas and in large farm areas which are heavily cash-cropped at the expense of food crops.

Kwashiorkor which is a Ghanaian word meaning "A child displaced from its mother by a subsequent pregnancy" refers to severe forms of protein energy malnutrition whose principle

features include apathy, skin changes hair changes and oedema. Malnutrition is a worldwide problem and it is estimated that $\frac{1}{2}$ a billion people in the underdeveloped countries are affected by malnutrition these are mostly children under 5 years of age and lactating women especially if they come from underpriviledged and poverty stricken sectors of the society. In Africa Nutritional deficiences contribute to 30 - 50% of all hospital deaths and rank Second or third as a cause of death in children.

In rural Kenya it is estimated that nearly one third of the children under five years of age are suffering from mild to moderate protein energy malnutrition. Severe protein energy malnutrition on the other hand afflicts 2-5% of all children below five years. In a country where children under 5 years constitute 20% of the total population these figures represent a large number of children. There are many reasons why such a large number of the total population of children suffer from malnutrition. These include demographic, socio-economic and socio-cultural reasons which will be discussed later in this paper.

This project intends to study the relationship between Nutrition and Infant and Child Mortality levels.

Kenya's population growth currently presents a problem to its Socio-Economic development and nutrition, such as lack of

protein among infants and children, acute nutritional dificie-
ncies especially in the semi-arid areas of the country, urban
areas and in large farms areas which are heavily cash cropped
at the expense of food crops. In urban areas the high popula-
tion growth mainly because of rural-urban migration, low levels
of food production, low incomes and low levels of food intakes
all result in poor standards of living and poor nutrition. In
the face of heavy nutritional insult made complex by endemic
diseases and parasitism, protein - energy malnutrition is wide-
spread.

Recent studies of the effects of protein - energy malnutri-
tion have shown that apart from high mortality in clinical cases,
those children who are severely malnourished early in life and
recover, may be so mentally affected that they never achieve
their mental optimum due to the nutritional insult on their
brains. The implications of the nutritional insult on the mental
capacity of those children who recover later from malnutrition
on the coming generations and the development of the Nation are
issues of major concern.

OBJECTIVES

1. The main objective of this study is to find out the rela-
tionship between nutritional status and the level of infant and
child mortality. The study attempts to investigate whether or
not differences in nutrition affect the levels of mortality
in infants and children.

2. To find out whether differences in nutrition affect infant and

RATIONALE AND JUSTIFICATION

Although the population explosion is a global phenomenon, the rate of population growth varies from continent to continent, country to country, and region to region. In the developing countries mortality rate has significantly decreased especially infant mortality, without any change in the birth rate with the result that over the last two decades there has been a phenomenal increase in their populations. 80 percent of the annual increases in the human populations take place in the developing countries.

Protein - Energy Malnutrition (PEM) is the most widespread nutritional disease among children in all the developing countries of the world. It is not only an important cause of child mortality and morbidity but leads also to permanent impairement of physical and possibly of mental growth of those who survive.

Kenya's population has been increasing and this presents a problem to its Socio-Economic development which affects among other things the nutritional status of the country. Nutritional problems such as lack of protein among infants and children and acute nutritional deficiencies especially in the semi-arid areas of the country, in urban areas and in large farm areas which are heavily cash cropped at the expense of food crops are of great concern to the government.

In urban areas the high population growth mainly because of rural/urban migration, low levels of food production, low incomes and low food purchasing power and low levels of food intakes all result in poor standards of living and low nutritional status. In the face of heavy nutritional insult made complex by endemic diseases and parasitism, protein - energy malnutrition and other forms of malnutrition are widespread.

Severe protein - energy malnutrition and other forms of malnutrition usually require hospitalization involving the use of drugs and other resources and man-power. Severe dificiency of vitamin A may lead to permanent blindness and also affects physical growth and lack of resistance to infection.

Goitre due to Iodine dificiency may lead to physical disfigurement and other pathological complications and impairement of intellectual development and performance.

Anaemia due to iron dificiency and sometimes folate and vitamin B_{12} occur most often among pregnant women and children of pre-school age. Anaemia is associated with high morbidity and mortality at childbirth. In young children it is associated with poor growth and lack of resistance to infections.

Maternal undernutrition and malnutrition is manifested chiefly by poor weight gain in pregnancy, anaemia and low serum albumin levels. It often impaires the nutritional status of the newborn in various ways including underweight, low iron reserves and vitamin A, and may cause increased maternal and infant mortality especially post-neonatal mortality, low resistance of infant to infections and decreased production of milk by mothers.

In Kenya, the districts with the highest prevalences of
malnutrition tend to be located in the western part of Kenya or
bordering the Coast. Generally higher prevalences of malnutrition
are associated with higher rates of mortality and mobidity and
with a greater percentage of children with uneducated mothers.
The level of education discrimates well between districts with
higher and lower prevalences of malnutrition.

SCOPE AND LIMITATION

This project will be carried out at macro level. The study
hopes to use secondary data collected by C.B.S. on its previous
researches of this nature. The study also hopes to supplement
this data with primary data from hospitals.

The time and the limited resources cannot allow for a more
comprehensive study on this problem.

LITERATURE REVIEW

The earliest data on mortality in Kenya were estimated crudely
from data that were collected for other than demographic purposes.
The 1922 survey taken in the Kavirondo District indicated an infant
mortality of 418 per 1000. Epidemiological studies of mortality
by cause of death have been limited by the availability of data
and have been based mostly on hospital records. Grounds (1964a)
analysed child mortality of children six years of age in govern-
ment hospitals in Kenya, using 1962 death registers. He found
that respiratory tract infections was the leading cause of death
followed by gastroenteritis. Malnutrition ranked third. One

problem with cause of death analysis is that only the primary
cause is identified and important associated causes may be over-
looked. Grounds (1964b) in a further study of childhood mor-
tality designed a prospective study in 15 hospital beds in 1963
to measure the frequency with which malnutrition was a contribu-
tory cause of death. He found that among 243 deaths over a period
of one month, 47% of the children who died were malnourished at
the time of admission to the hospital.

Malnutrition was associated with 63 percent of the deaths
due to gastroenteritis and 26 percent of the deaths due to
respiratory infections. It is important to point out at this
juncture that it it not easy to separate malnutrition from other
diseases, either malnutrition sets in first and as a result
triggers off the other diseases or vice versa.

The UN Manual IX 1979 points out that the risks associated
with fatal deaths, birth defects, infant mortality and nutritional
depletion for women and children which can lead to an increased
risk of infection and maternal mortality can be reduced through
increase in nutritional education, especially to mothers and
overall change of the standard of living of a population.

A few other studies on the relationship between anthropometric
indicators and infant and child mortality have been carried out
in large numbers of children.

Sommer and Loewenstein (1975) carried out a study on the
predictive power of the arm circumference to height for a period
of 18 months in 8292 children from Bangladesh and found that
there was a clear relationship betweeen categories of arm circum-
ference to height and mortality.

A study was carried out at Kenyatta National Hospital which compared the difference in outcome from measles among malnourished and well nourished children. This study showed that mortality was higher among the malnourished than well-nourished children as shown by figure 6 below.

NUTRITIONAL STATE OF MEASLES SURVIVORS AND FATALITIES COMPARED WITH GOOD NUTRITION AND MALNUTRITION WEIGHTS.
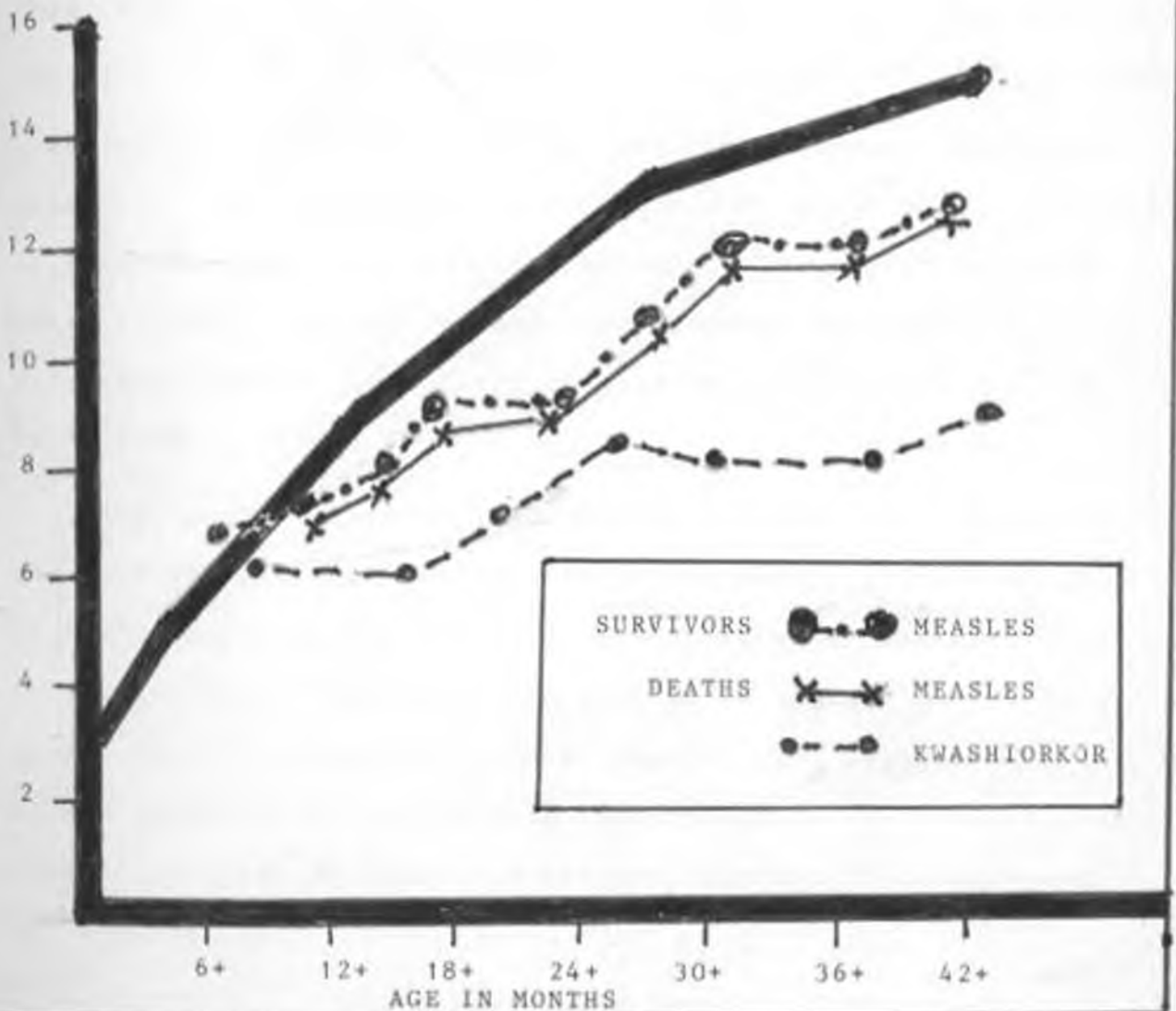
Figure 6

Source:- East African Medical Journal 48, 1978

In Kenya, studies have been carried out by C.B.S. in the
Ministry of Finance and Planning on Nutrition levels. In
February and March, 1977, 1979 and 1982, an anthropometric
nutrition survey was inco-operated into the second Intergrated
Rural Survey (IRS II). One to four year old children of rural
small holders comprised the target population. The coverage was
national but excluded arid northern regions and most pastoralists.

Height, weight and upper mid-arm circumference (MAC) were
measured. Information was obtained on sex, birth order, duration
of breastfeeding until complete weaning. The number of meals
taken normally and the frequency of food consumption from
major food groups. The first results were published by C.B.S.
in September, 1977.

The second nutritional survey was conducted during the forth
phase of the National intergrated sample survey (NISSP-IRS IV).
It was launched in October, 1987 and wound up in January, 1979.
It covered both rural and urban samples as opposed to the first
survey which covered only a rural sample. The results of the
second survey were published in 1980 by C.B.S. They found that
there was a clear relationship between nutrient dificiency and
child mortality.

THEORETICAL STATEMENT

The level of infant and child mortality are influenced by nutri-
tion through background variables such as demographic socio-
cultural and socio-Economic.

2. Poor nutrition is likely to affect the level of child mortality

OPERATION OF THE FIVE GROUPS OF PROXIMATE DETERMINANTS ON THE
HEALTH DYNAMICS OF A POPULATION

Figure 1

- 10 -
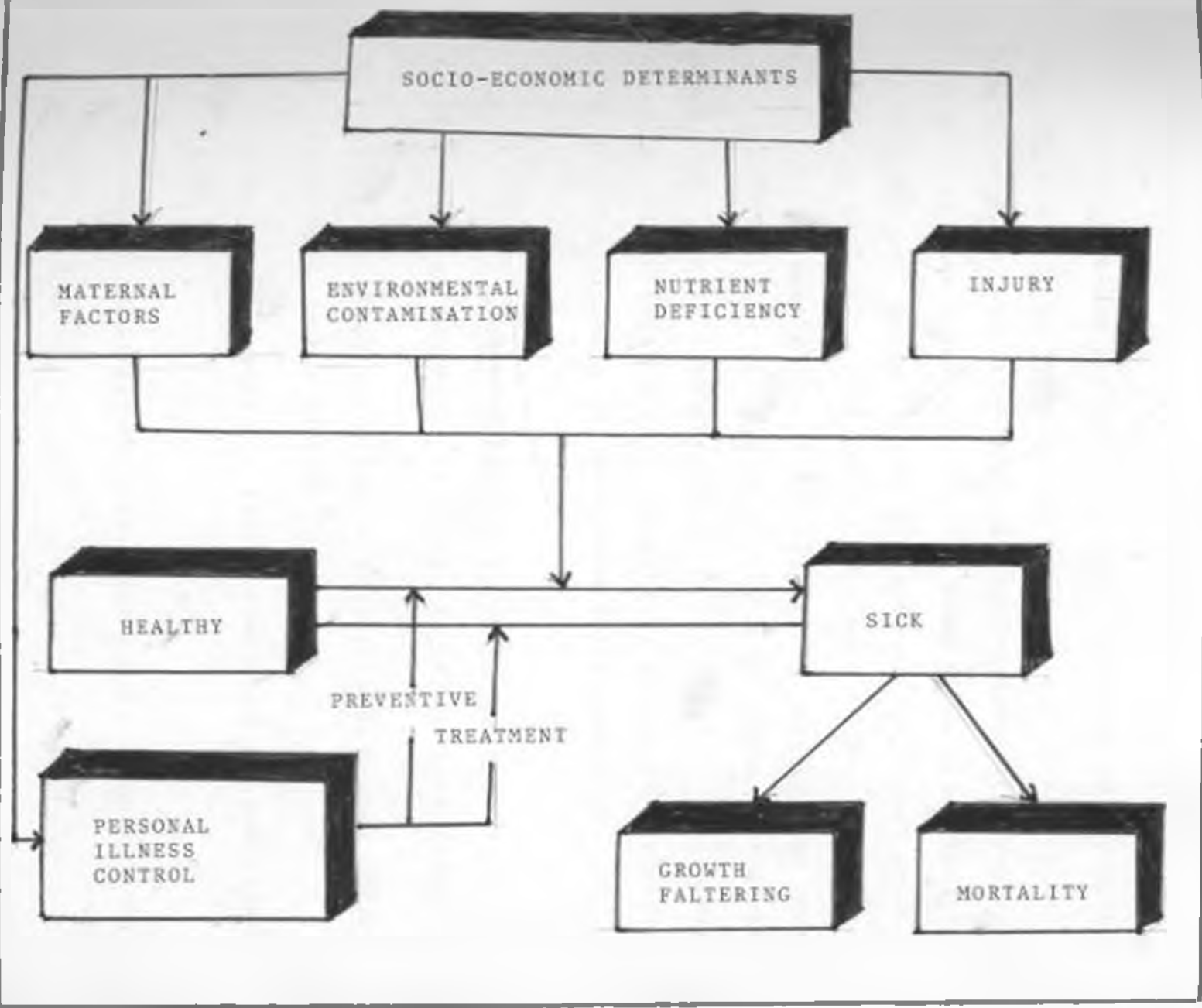
As can be seen from figure 1, mortality analysis is complex because death is the ultimate consequence of a cumulative series of biological insults rather than the outcome of a single biological event.

Socio-Economic determinants like education of the mother, income, occupation, housing, all act together to affect nutritional intakes. Maternal factors, environmental contamination, the kind of diet taken and also the kind of injuries that the child might get, these factors all interact to either produce a healthy child or a sick child. The kind of preventive medicine used and treatment given either traditional medicine or modern medicine all affect the health of the child which will either accumulate finally into the death of the child or into a healthy child. In this paper I will concentrate mainly on the effect of nutrient dificiency on infant and child mortality.

CONCEPTUAL PROPOSITIONS

1. The level of education is likely to affect nutritional intake.

2. Infant and child mortality is likely to be higher where nutritional intake is low.

3. The age of the mother is likely to affect the nutritional intake.

4. The parity is likely to affect the levels of nutritional intake.

5. Ethinicity is likely to affect the levels of nutritional intake through cultural factors.

6. Urbanization is likely to affect nutritional intake.

INDEPENDENT VARIABLES

In this study the independent variables are background variables that work through nutrition to affect the levels and nature of nutritional intakes.

These background variables are:-

1. Education of mother.

2. Ethinicity.

3. Age of the mother.

4. Parity.

OPERATIONAL PROPOSITIONS

1. Maternal education is inversely related to infant and child mortality.

2. Parity through nutrition is likely to affect infant and child mortality.

3. The age of the mother is likely to affect infant and child mortality.

4. Ethinicity is likely to affect infant and child mortality

ANALYTICAL METHODOLOGY

Anthropometric measurements will be used.

DATA LIMITATION

Not very many surveys have been done on mortality in relation to Nutrition so the data is very limited and might not therefore apply nationwide. Another limitation is that when death occurs only the primary cause is recorded and this might give a bias to the results.

DISCUSSION OF FINDINGS

It is expected that the study will find a correlation between some socio-economic socio-cultural and demographic factors that work as background variables through Nutrition to influence the level of infant and child mortality.

CONCLUSION

According to Sessional Paper Number 4 of 1984, the Government of Kenya hinges on two general objectives first the production of sufficient food to ensure provision of adequate Nutrition for her population. The Government recognizes the Nutrition problem in Kenya especially for infants and children. Once the Government can recognize the inhibiting factors to good nutrition then it is hoped that something will be done to alleviate the problem.

CHAPTER TWO

THE EXTENT OF MALNUTRITION PROBLEMS IN KENYA

There has been increased awareness since the 1970's that malnutrition as a health problem affects and is affected by all efforts to promote National Development. Economists and policy makers started to look afresh at the persistent and widespread global malnutrition problems. Conferences and seminars were held, the purpose of which was to stimulate nutritionists and development specialist to talk to each other and share information and search for ways to advance the National Development through improving the nutritional and health status of a nation's population.

An inadequate diet is unquestionably an important characteristic of a poor standard of living but obviously not the only aspect of poverty.

In most developing countries Kenya included, malnutrition is mostly a socio-economic problem. Poverty is pervasive in much of the third world and the capacity of families to purchase and or produce food is limited. Ignorance of the special needs of children and inappropriate cultural beliefs and practices often cause families to give their children diets that are less in quantity and quality than they could otherwise have provided. There is a general agreement that the small body size of children in developing countries is largely the result of poor diets and frequent infections.

In Kenya, Nutritional status of children is mainly measured through the pattern of growth the child takes. This is the simplest indicator of a child's overall health status. It is

evaluated by comparing each child's weight for that age and
sex to the reference Harvard standard. In a healthy population
there is expected some variation so that there is an expected
distribution above and below the standard as shown in figure 2.

Figure 2

WEIGHTS OF MALE AND FEMALE CHILDREN COMPARED WITH A WEIGHT FOR
AGE STANDARD.

Completed months of age

Completed months of Age
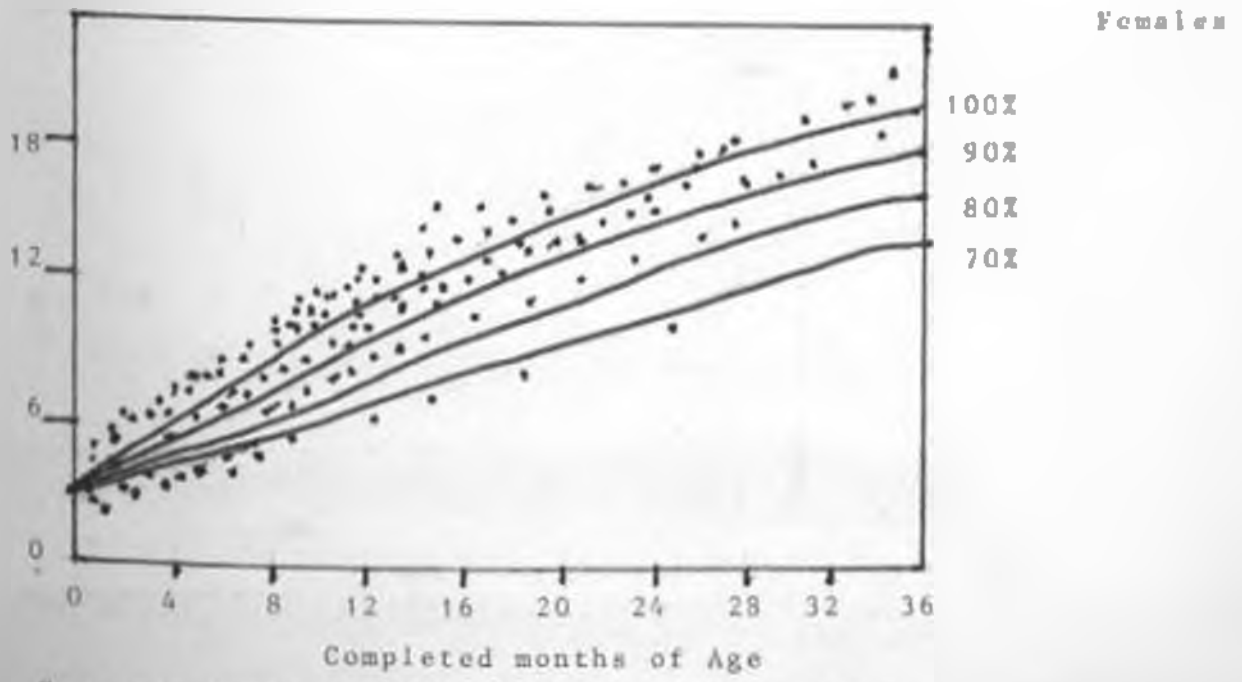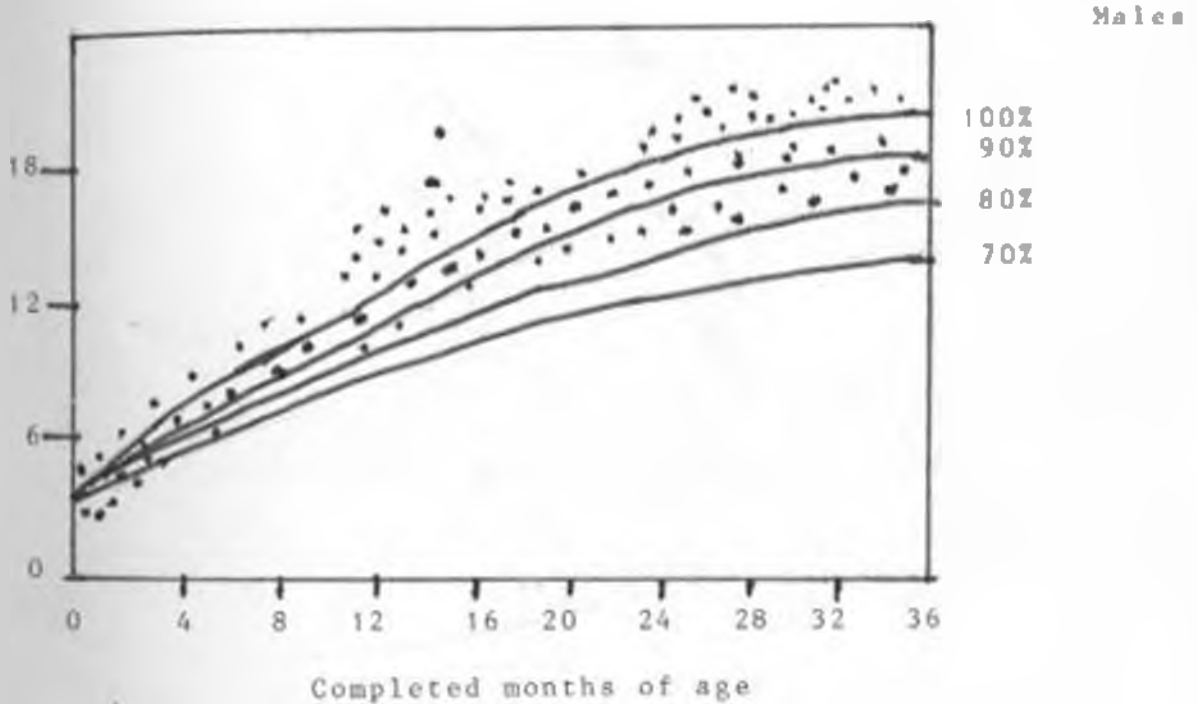
Source:- Child Nutrition in Rural Kenya C.B.S.

Figure 3

RELATIONS-IP BETWEEN MORTALITY RATES AND NUTRITION STATUS AT DISTRICT LEVEL
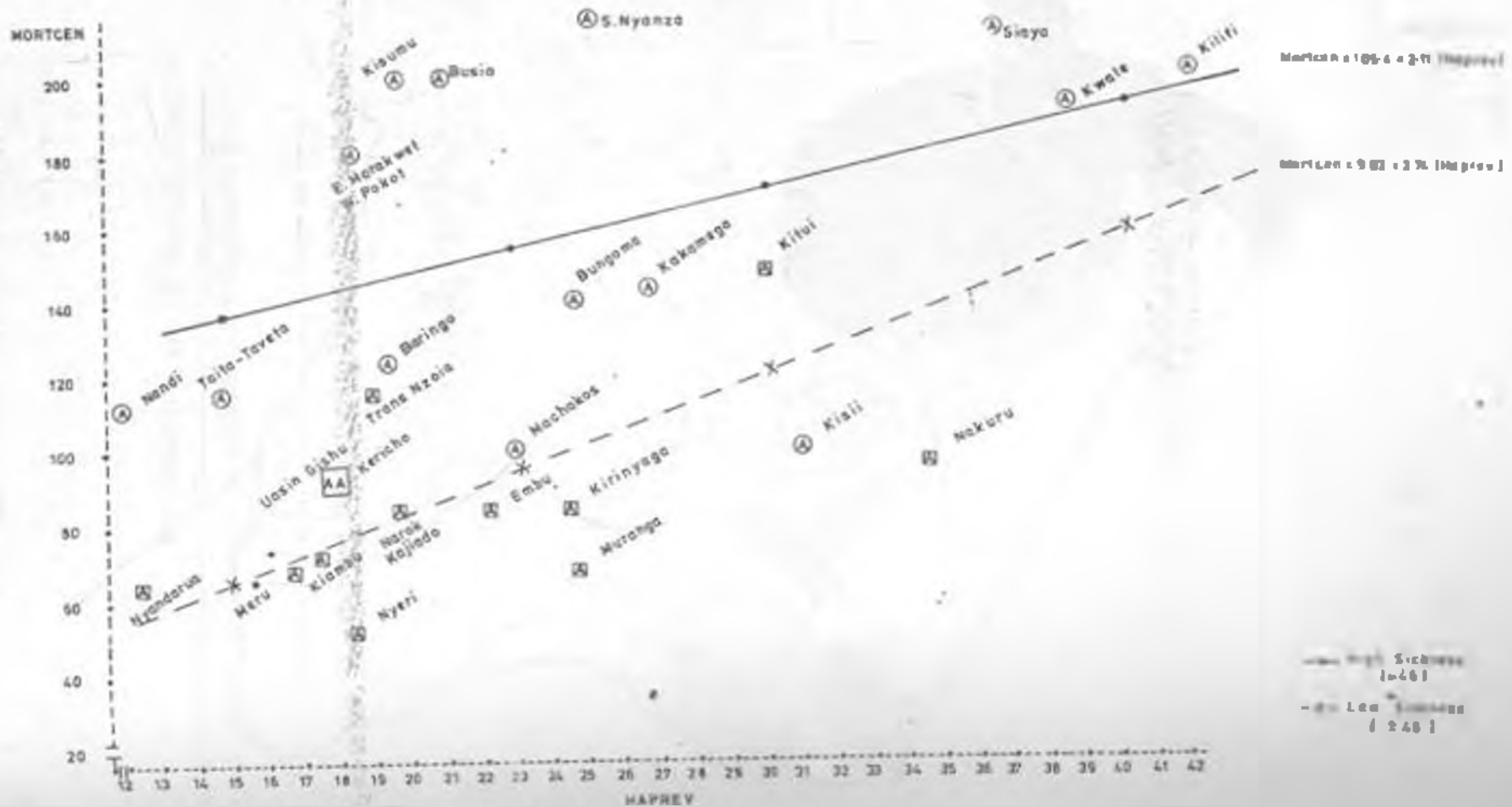
Figure 4

DISTRIBUTION AND LEVELS OF STUNTING
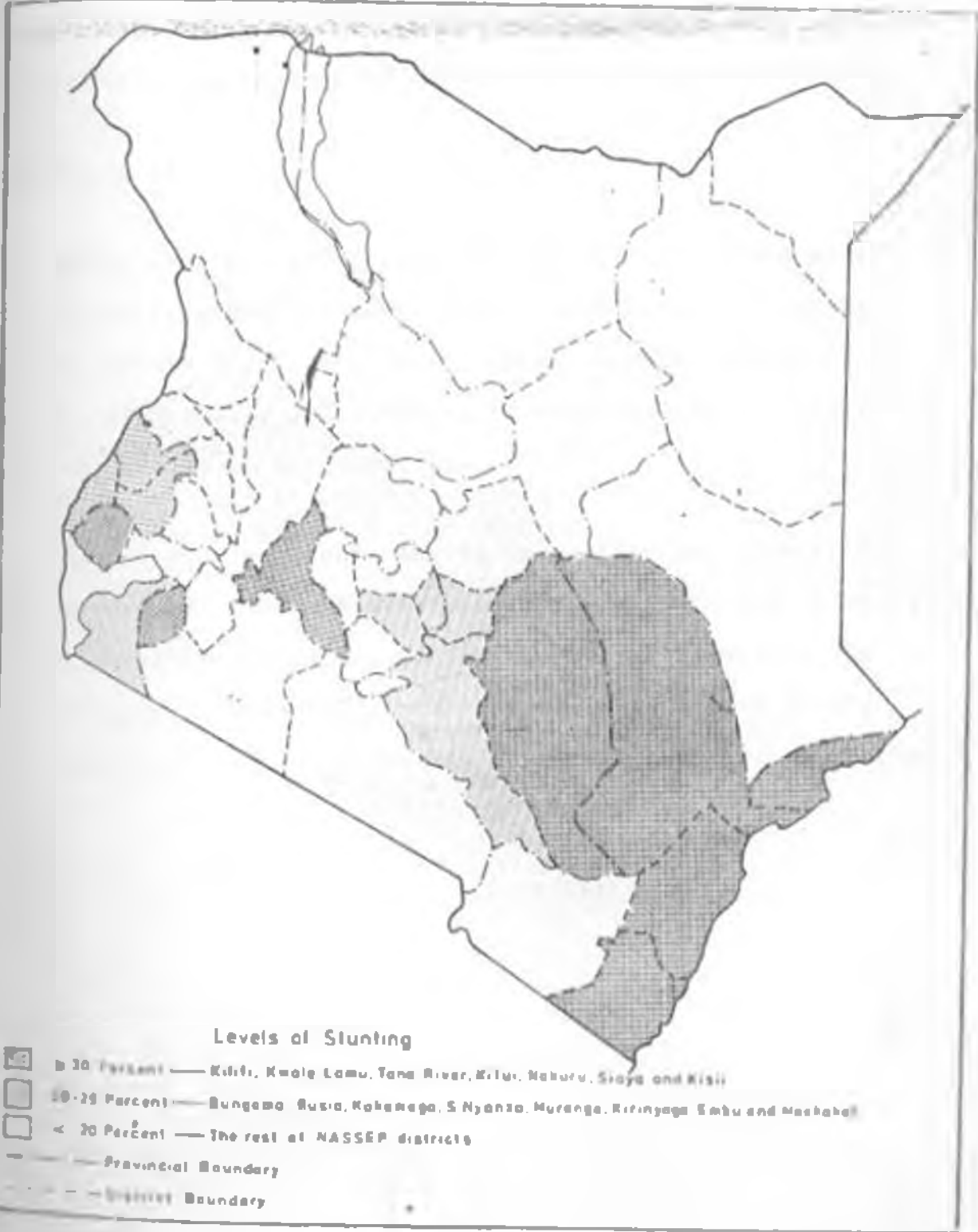
Levels of Slunting

□ > 30 Percent —— Kilifi, Kwale Lamu, Tana River, Kilui, Nakuru, Siaya and Kisii
□ 20-29 Percent —— Bungoma Busia, Kakamega, S Nyanza, Muranga, Kirinyaga Embu and Mashakal
□ < 20 Percent —— The rest of NASSEP districts
— — — Provincial Boundary
— — — District Boundary

The districts with the highest prevalences of malnutrition
tend to be located in the western part of Kenya or bordering the
Coast. Generally higher prevalences of malnutrition by district
are associated with higher rates of mortality and morbidity and
with a greater percentage of children with uneducated mothers.

(see figure 3)

Coast province is seen to have the highest child mortality
Western province has the next highest prevalence of wasting and
child mortality etc. This close correspondence emphasizes the
mutually reinforcing interactions of malnutrition and other
causes of mortality and morbidity.

Nyanza province ranks lowest in wasting and highest in
child mortality. This departure from the pattern may be caused
by other health hazards e.g. malaria, or by less access to
health services. The incidence of malaria in Nyanza province
for, example, is similar to that in the Coast and Western provinces.

RATES OF CHILD WASTING AND MORTALITY AND CHILD + ADULT MALARIA PER 1000 POPULATION BY PROVINCE

Province	Rural Wasting WH< 80 1-4 years 1977	Child mortality 1-5 years 1969	Reported malaria cases child + adult $\frac{3}{4}$ of 1975
Coast	75	24	25
Western	53	22	69
Eastern	53	19	8
Rift Valley	47	16	12
Central	35	14	9
Nyanza	26	30	27

Table I

Source:- Child Nutrition in Rural Kenya.

As seen from table I above, provincial child mortality figures ranked provinces in the same order as the percentages of wasted children with the exception of Nyanza province. The causes of malnutrition, morbidity and mortality are frequently reinforcing and interlocking.

MEASUREMENTS OF NUTRITIONAL STATUS

Nutritional status can be operationally defined in terms of either "Inputs" or "Output" type of indicators. Input indicators are mainly measures of food and nutrient intake, specific examples are home diet consumption and breastmilk ingestion. Nutrient intake though, even if perfectly measured cannot be equated with

Nutritional status. Nutritional status, can alternatively be defined in terms of output measures including clinical signs of malnutrition.

THE RELATIONSHIP BETWEEN ANTHROPOMETRIC INDICATORS AND MORTALITY

Children who are severely malnourished will have greatly increased mortality rates when compared with healthy children. Children with mild and moderate malnutrition might also be expected to show mortality rates greater than those of healthy children.

Studies show that children with mild to moderate malnutrition show some impairment in immuno competence and that they also tend to have more severe infections than healthy children. Children with mild and moderate malnutrition are expected to have high rates of mortality than healthy children because they are more likely to develop severe malnutrition.

Inadequances in Nutritional intake eventually results in many adverse effects or outcomes, but not all are manifested at the same level of severity. In situations of inadequate nutritional intake vital functions like circulation, respiration and maintenance of body temperature (basal metabolic needs) receive high priority in an organism's adjustment process through a variety of mechanisms that include accelerated nutrient absorption and retention and increased mobilization of nutrient stores, the organism attempts to maintain the normal flow of nutrients to the cells and organs. If the cellular nutrient availability becomes affected, functional imparement becomes pronounced and clinical signs become apparent.

STAGES IN THE DEVELOPMENT OF PROTEIN-ENERGY MALNUTRITION

	Physical activity	Growth rates	Biochemical indicators	Body wasting	Clinical signs
Mild	+	+			
Moderate	++	++	+	+	
Severe	+++	+++	+++	+++	+++

Cross (+) indicates deviations from Normality.

Source:- Population & Development Review No. 10, 1984

As dietary intake becomes deficient children cope by slowing their
rate of growth and by reducing physical activity, at this stage
one might observe that gains in height, weight and other measures
are less than normal. On the other hand biochemical indicators
(e.g. serum albumin) are normal.

At moderate degrees of protein energy malnutrition activity
and growth rates are affected to a greater degree and signs of
wasting and perhaps some biochemical abnormalities become evident
as well. At the final stage of severity all linear growth ceases,
physical activity is severely curtailed. Body wasting is
marked and clinical signs e.g. hair, skin, oedema etc are apparent.

Studies that have been done by different bodies show that
there is a high correlation between WA, HA and WH.

Table 2:

Correlation between WA, HA and WH

Between Varia-bles	CBS National Rival 12-48 months n=1327	Medical Research Council Nyanza Province 1-48 months n=1366	Six health centres mostly in Mochakos 7-6 months n=476
WA WH	0.6	0.69	0.69
HA WA	0.71	0.74	0.74
HA WH	-0.08	0.08	-0.03

Source:- Child Nutrition in Rural Kenya. C.B.S.

These correlations of WA, HA and WH as shown in table 2 are typical of values found internationally.

CORRELATION BETWEEN DIFFERENT ANTHROPOMETRIC INDICATORS

WH begins dropping as a child becomes malnourished. HA will begin to fall after sometime if the situation persists. A continually low WH or a series of drops and recoveries may predict a low HA in the future, but at any one point in time HA and WH are uncorrelated. WH may recover rapidly if intake or absorption is improved but HA responds slowly at best.

A child malnourished sometime in the past may still have a low HA. Weight itself may increase or decrease but height does not decrease as a result WH measures acute P.E.M. and HA measures chronic P.E.M. Their near zero correlation at one point in time implies that acute and chronic dimensions are instantaneously independent. WA is highly correlated with both the other ratios.

District	% Stunted	% Wasted	Mortality Census	Mortality Survey	% Sick	Malaria % of cases	% children with mothers with no education	% without piped H₂O	% without sewage facilities	Persons/Sq km	Personaly/Arable Sq km	Child population 0-4 years x 1000	Number of children stunted x 1000
Kilifi Tana River Lamu	42.?	5.4	206	15.7	64.1	25.8	85.8	74.7	64.9	10	70	105(a)	44
Kwale	38.5	4.9	190	19.4	43.4	23.8	83.0	86.0	81.5	35	100	53	20
Siaya	36.6	6.3	241	20.4	61.1	32.6	54.5	98.1	36.1	187	187	88	30
Nakuru	34.5	2.3	97	8.2	43.6	9.2	54.9	85.8	14.3	74	158	101	35
Kisii	33.?	5.0	101	9.5	57.7	20.9	51.6	99.0	17.4	395	395	180	56
Kitui	30.0	1.8	148	10.2	37.4	25.0	70.9	100.0	72.1	16	39	83	25
Kakamega	26.7	2.0	143	14.0	56.2	31.0	46.2	96.5	16.4	293	293	201	54
S. Nyanza	25.3	1.5	216	16.1	58.4	37.6	56.9	99.5	68.8	143	143	145	37
Murang'a	24.8	4.2	68	7.3	42.1	1.3	28.1	76.2	2.8	262	310	127	31

District	Kirinyaga	Machakos	Embu	Busia	Narok/Kajiado	Kisumu	Baringo/Laikipia	Trans-Nzoia
% Stunted	24.5	23.1	22.3	21.1	19.8	19.8	19.4	19.1
% Wasted	1.9	2.9	2.0	2.1	2.5	3.4	6.4	2.8
Mortality Census	82	98	83	198	87	199	128	114
Mortality Survey	7.9	7.9	8.8	17.3	4.9	20.0	12.7	12.1
% Sick	35.3	46.9	45.0	72.6	32.1	60.7	47.7	41.8
Malaria % of cases	14.4	19.6	16.7	27.6	15.8	34.7	12.2	17.5
% children with mothers with no education	43.3	38.3	34.9	88.4	72.6	36.5	55.4	44.5
% without piped H_2O	77.7	95.3	89.1	99.3	93.2	87.5	93.0	86.8
% without sewage facilities	4.1	36.8	19.3	26.6	79.2	7.8	41.7	25.3
Persons/Sq km	203	72	91	183		232	17	105
Personaly/Arable Sq km	270	114	104	183	39	232	89	125
Child population 0-4 years x 1000	53	189	51	56	906	86	80c	53
Number of children stunted x 1000	13	44	11	12	18	17	16	10

District	Nandi	Nyandarua	Taita Taveta	Meru	Kiambu	Uasin Gishu	Kericho	Nyeri
% Stunted	12.1	12.4	14.7	16.8	17.5	17.8	18.1	18.9
% Wasted	3.3	2.0	4.7	3.3	1.2	2.7	3.0	3.0
Mortality Census	110	64	116	75	70	92	91	49
Mortality Survey	9.8	5.5	10.1	7.3	7.7	9.9	7.2	3.2
% Sick	48.1	25.4	46.4	41.0	30.6	24.7	28.4	44.9
Malaria % of cases	13.8	1.7	23.9	15.7	4.5	19.8	16.9	16
% children with mothers with no education	46.1	35.2	40.9	43.9	40.1	41.6	64.8	13.4
% without piped H_2O	79.6	82.4	80.5	68.4	75.0	95.2	85.7	78.6
% without sewage facilities	53.1	2.0	14.7	14.1	0	48.5	66.4	0
Persons/Sq km	109	66	9	84	280	79	130	148
Personaly/Arable Sq km	128	88	284	247	375	92	167	130
Child population 0-4 years x 1000	58	47	26	160	125	57	128	87
Number of children stunted x 1000	7	6	4	27	22	10	23	16

** Number of children dying in the first 2 years of life/1000 based on 1979 census estimates by Mr. Kibet P.S.R.1. as presented by the child mortality in Kenya map Unicef Social Statistics programme.

 * Calculated for each child as number of sibling died/number of children ever born to the mother (percent).

Source:- Percent malaria cases Minitry of Health information
         Bulletin Kenya 1980.

Land Areas:- Kenya Population Census 1969 volume IV CBS.

Population figures - Kenya Population census 1979 volume ICBS

CHAPTER THREE

REASONS FOR NUTRITIONAL PROBLEMS IN KENYA

It is now recognized that the primary cause of PEM can be overcome only by significant changes in the Socio-Economic characteristics of the communities. A basic feature of the present situation is the extreme inequality in the distribution of food among different socio-economic groups. Thus inadequate diets that result from insufficient purchasing power are a common problem among the desperately poor in the slums of the major cities, even more widespread are diet deficiencies among the rural population where small farmers, tenants and landless labourers are often unable to produce or buy sufficient food to meet their nutritional requirements. These problems are particularly pronounced in areas characterized by scarcity of arable land and also in regions where rainfall is erratic and only marginally adequate for farming in a normal year.

Most developing countries are faced with overwhelming problems of poverty with increasing numbers displaced from the land and unable to obtain adequate employment. These problems of poverty and unemployment, heavy pressure of population on land, low productivity of agriculture, uneven distribution of income and consumption, poor environmental sanitation, illiteracy and cultural deprivation are difficult to overcome because of resource constraint, industrial backwardness and a low level of modern science and technology.

There is a growing awareness that malnutrition is largely

a result of poverty arising from this complex of interrelated factors often aggravated by glaring socio-economic inequalities. Nutritional status as an outcome reflects the effects of all the socio-economic determinants because its proximate determinants include not only diet and feeding habits but also the factors that determine experience with infectious disease.

The determinants of overall child growth as measured by the proportion exceeding 90 percent of standard weight are sex of the child, housing, quality and maternal education. Sex operates through its social impact on diet and feeding practices, and on preventive and sickness care. Housing quality presumably operates through hygienic practices through multiple paths.

In a nutritional survey done by CBS in the Ministry of Finance and Planning on the main ingredient of weaning in Kenya it was found that:-

The main ingredient of the weaning porridge usually given to young children by province and urban or rural location, more than $\frac{1}{2}$ of the children in rural areas and nearly $\frac{3}{4}$ of urban children were given porridge the main ingredient of which was maize, maize mixed with millet was the next most popular main ingredient, followed by millet alone, cassava either alone or mixed with cereals was the main ingredient only in rural Nyanza. 12.2% of the children in rural Western province 2.2% bananas were the main ingredient of 5.8% of children in rural Eastern province as seen from figure 5.

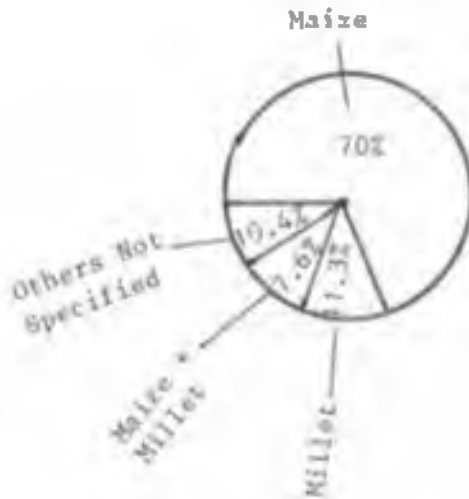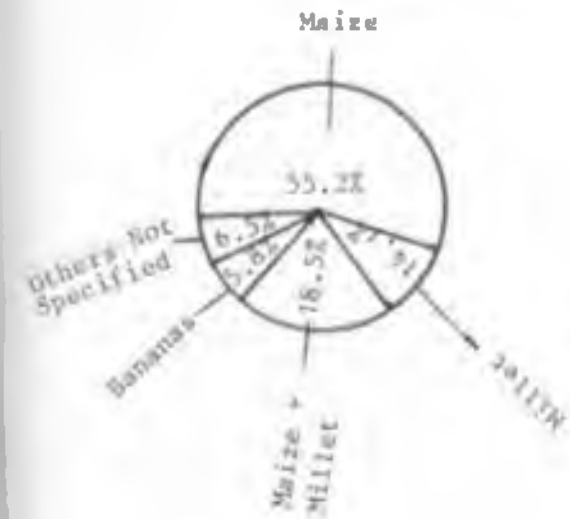MAIN INGREDIENTS OF WEANING PORRIDGE BY PROVINCES

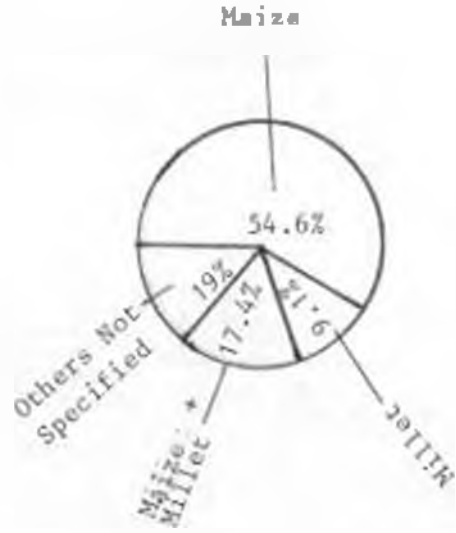Central Rural

Coast Rural
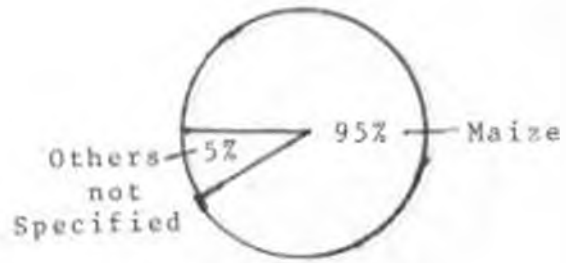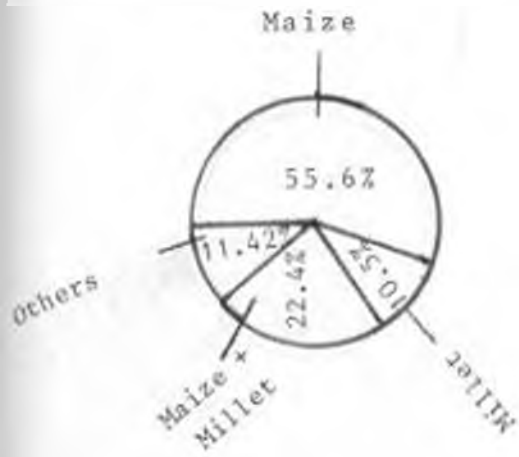
Eastern Rural

Nairobi Urban

MAIN INGREDIENTS OF WEANING PORRIDGE BY PROVINCES

Nyanza Rural

Rift Valley Rural

Western Rural

Coast Urban

Figure 5

Source:- Nutrition Survey, 1979
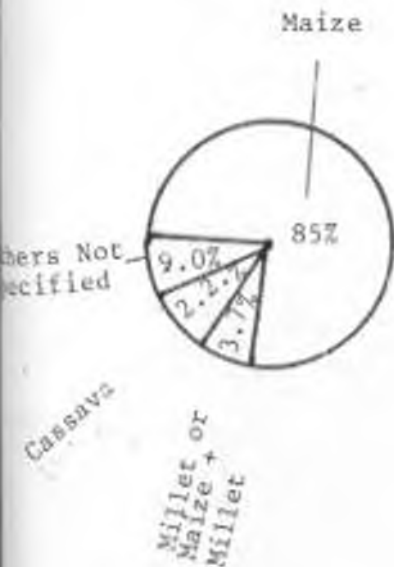
As can be clearly seen from figure 5 the main ingredients for weaning porridge given to children in Kenya is mainly carbohydrate. In rural Coast province for example 95 percent of the porridge is maize. In Coast urban 81 percent of the porridge is maize. In Nyanza rural 70.1 percent is maize and in Western Kenya 85 percent is maize. These low nutrition weaning meals could be because of either poverty to purchase high nutrition diets or ignorance of the best weaning diets implying, low nutritional education.

Incidentally these are the same regions in Kenya with very high infant and child mortality, i.e. Coast 200 per 1000 live births, South Nyanza 220 per 1000 live births and Western province 212 per 1000 live births.

The association of low nutritional status for the living children with high mortality is striking. Children of low nutritional status below 90 percent of the standard appear to be at approximately double the risk of dying compared with other healthy children.

The relationship between nutritional status and child mortality is striking. At district level mortality is closely associated with nutrition where the sickness rates are average or below average but the relationship is less strong in areas of high morbidity i.e., South Nyanza, Busia and Kisumu districts. Areas with high prevalences of malnutrition overlap substantially with those where malaria is widespread.

Conditions of environmental sanitation are typically deficient and combined with limited access to preventive and curative health care result in high incidences and increased severity of infectious diseases. Problems that in turn adversely affect nutrient utilization.

In the past the attitudes of planners towards malnutrition and other aspects of human well being were much affected by the assumption that poverty and malnutrition were a necessary price to pay for rapid economic growth as well as simply a characteristic of low level of development.

Thus in order to accelerate development and hasten progress toward a situation where a country could afford to raise its consumption levels, present consumption was to be minimized in favour of investment. Nutritional improvement was seen largely in terms of specific nutritional programmes. It is not suprising that as with many programmes of social welfare they were regarded as unimportant.

URBANIZATION AND MALNUTRITION

In the urban areas the main reason for malnutrition is that a large proportion of the people migrating to the cities are ill-equiped in terms of paper qualifications, experience or skills for the very few jobs available in the cities. Consequently the majority of the in-migrants are not employed. Unemployed people represent a waste of potential labour force and live

as parasites, drawing on the meagre food and economic resources
of their urban hosts. As of now the old traditional customs
of social rights and obligations by which communities or family
units share food and other resources to offset hardship are
breaking down so that there is neither social nor economic support
for relatives without jobs or income.

The malthusian principle that the unemployed should have
no claim or right to the smallest portion of food is the order
of the day. This is why hunger and malnutrition have become
widespread in many urban communities. It is well known that
income is intimately linked with food intakes, while in the
countryside peasant families produce or gather their own food
and spend very little on food purchases, in the cities cash is
very important and in-migrants to the cities are often faced with
problems of having to pay for fuel, vegetables and fruits which
they used to gather freely in the villages the quality and
patterns of urban diets therefore depend essentially on the
earnings and purchasing power of the urban families.

Feeding habits in urban centres contribute in no small
way to incidences of malnutrition in Africa Kenya, included.
Many urban families do not take the normal three meals a day
and infants and young children normally need to be fed 4 or more
times daily.

In this connection one cannot but mention the deleterious
infant and child care feeding practices in urban areas. Urbani-
zation has jeopardized the natural equilibrium and traditional
settings in African households.

The relationship between factors that affect nutritional intakes. (see figure 7 below)

The relationship between urban mothers and their infants and other pre-school children is very gloomy and deplorable partly because of the high cost of living in urban areas and the fact that urban mothers are hungry for material wealth and western luxury goods and the contemporary philosophy of sex equality for women to do what the men folks can do. Most urban women are now forced to work at long distances away from home leaving the care of their young children to iliterate maids and grandmothers who are ignorant of modern methods of child rearing. Increasing numbers of working mothers are no longer breast-feeding their babies for $1-1\frac{1}{2}$ years the normal African tradition-al practice. Instead there has been a tremendous increase in the utilization of bottle feeding techniques, unhygienic condi-tions coupled with over-dilution of weaning feeds have aggravated the incidence of infections and protein energy malnutrition.

EDUCATION LEVELS AND MALNUTRITION

Among infants and young children in urban settings, the level of education discrimates well between districts with higher and lower prevalences of malnutrition. Whether education itself is the important factor or whether it is reflecting other aspects of socio-economic status can not be distinguished from present data, as the education indicator correleted with the indicators of access to sewage and distance to water source. Population density also appears to affect nutritional status.

The education of the mother is a very important variable
influencing the quality of care the child receives from
conception through the early years of life.

Studies done in many countries have consistently shown
a strong inverse relationship between mothers' education and
child mortality (Behm 1979, Caldwell 1979, Caldwell and McDonald
1981) mothers' education has been found to be important in its
own right. Its major role relates to the skills and knowledge
that a more educated woman may have about appropriate measures
for prevention and treatment of diseases. It also reflects a
change in her status in the family and community.

It is also known that short birth intervals contribute to
higher child survival risks due to both biological disadvantages
of maternal depletion (low birth weight) and child competition
for care (mata 1983 WFS 1983).

Usually education is associated with better occupations
and higher incomes. The higher the education, the higher the
income. Income can be defined as the current flow of economic
resources to the family. It indicates the family's capacity to
purchase health through market inputs such as food medical ser-
vices and household amenities. Education of the mother also
affects the opportunity cost of time that the mother spends with
her children.

MOTHER'S AGE AND MALNUTRITION
Mother's Age at child birth is an important variable

influencing the quality of care the child gets.

Very young mothers (< 18 years) and very old mothers
(> 40 years) exhibit different mortality risks than mothers in
prime child bearing years. A young age reflects maternal
immaturity while old age is associated with increased likelihood
of birth defects. Age may also measure mother's experience with
child care and may be related to the likelihood that the child
is wanted.

Ethinicity is a variable that captures the influence of
unobserved factors that vary among ethinic groups and affect the
quality and quantity of the diet taken as well as the care given
to children as far as health medicine etc. is concerned. Each
Ethinic group has its own traditions and customs which are rooted
in its values norms and beliefs and they affect the total behaviour
of a people.

Among the districts with high prevalences of malnutrition
there seems to be two groups which account for the majority of
the high priority districts, high population density, high
morbidity and poor education are consistently associated with
malnutrition in some areas., i.e. the districts in the west and
possibly parts of central province there is evidence that part-
icularly in the western parts of Kenya the average size of
landholdings already low has been decreasing. This land
fragmentation may contribute to the high levels of malnutrition.

The second group of districts consists of areas such as

Kwale and Kitui where population density is relatively low, sick-
ness rates about average but education and other indicators are
low e.g. water availability and sewage facilities.

Overall there are probable explanations for many of the
districts rankings in terms of a number of effects, incidence
of sicknesses notably malaria, educational levels population
density and the associated land fragmentation and in the
eastern province and parts of central province drought seems
to play the major role.

Kilifi, Tana River and Lamu contribute the greatest number
of malnourished children of any sampling stratum. The greatest
number of children come from Kilifi district. The Kilifi, Tana
River Lamu areas has a high rate of sickness at 64% associated
with a high incidence of malaria and a very high proportion of
uneducated mothers 86 percent. Kwale has a much lower popula-
tion of pre-scholars but has an extremely high mortality rate
a lower mobidity rate than Kilifi and an equally high propor-
tion of uneducated mothers 83 percent. Problems in these
districts may be related to low agricultural production in the
arid coastal areas, a climate which tends to foster more disea-
ses and low levels of scientific development, within the districts
variations in the level and degree of development tend to
influence infant and child mortality. Thus the effective control
of mortality and morbidity among infants and young children is
obviously a function of the levels of nutrition (Kibet).

CHAPTER FOUR

FACTORS INFLUENCING THE DEVELOPMENT OF MALNUTRITION

- Education of the parents (especially of the mother)

- Mother's occupation

- Mother's income

- Amount of money spent on food

- Weaning practices

- Place of permanent residence

- Ethinic group

- Low contraceptive use

- Age and sex of child

- Geographical area

- Food production (See figure 7)

Mortality is higher at the Coast, Kilifi district, Kwale, Siaya and South Nyanza. This was associated with high calorie, low protein, weaning diets especially maize and cassava porridge.

Infections may also have a role to play in these areas which have the highest rates of illnesses amongst children and these are well known malaria areas.
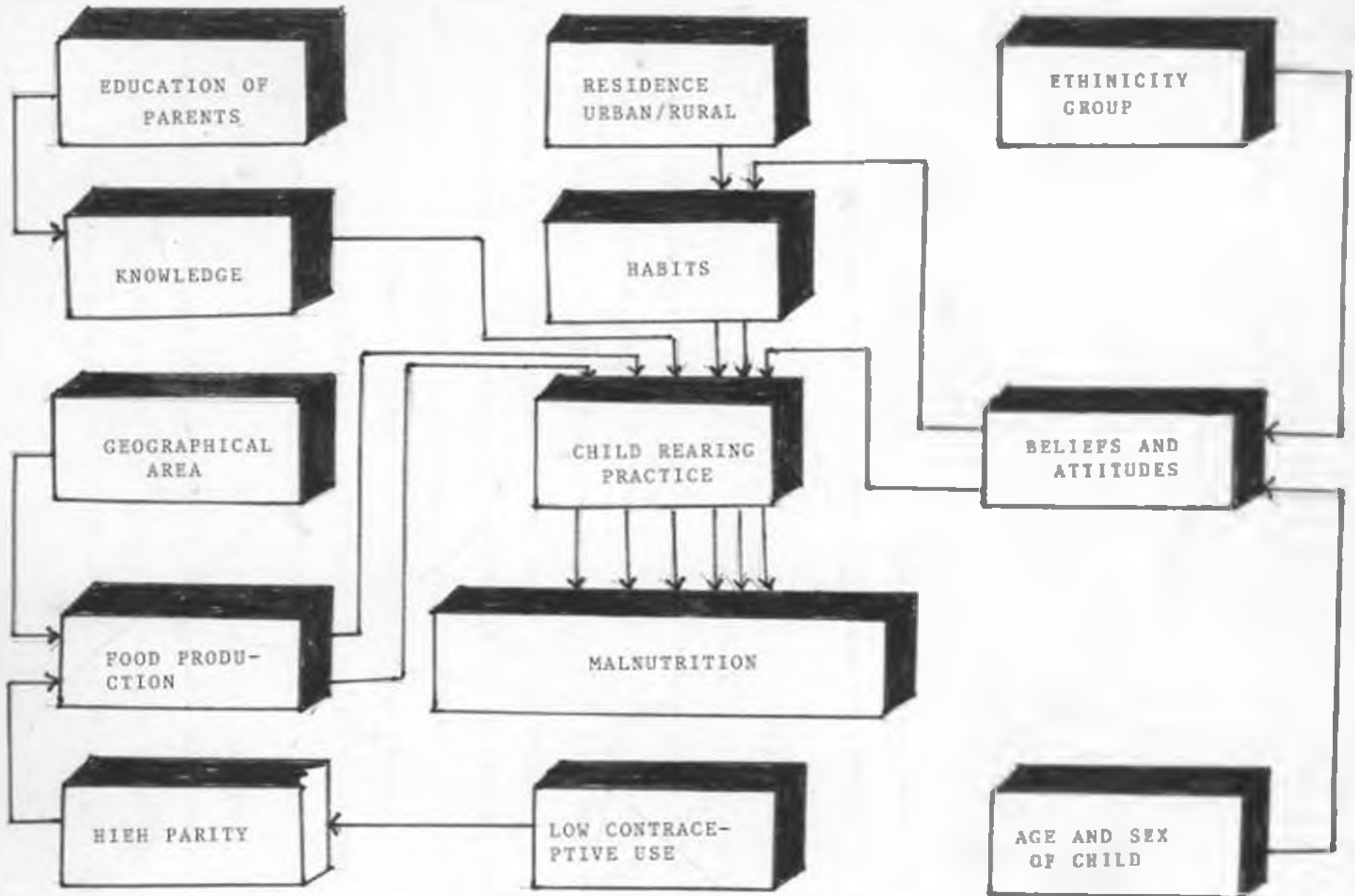
According to studies done, it has been found that, most mothers with malnourished children are between 20-27 years were found to have significantly lower formal education than mothers with well fed children.

Normally the mothers are either single or in polygamous unions or divorced or separated. They normally have no occupation and for those who have they are unskilled workers like cleaners and factory hands. As such these mothers would have lower incomes than mothers of well-nourished children. It follows then that these mothers would spend less money on food. It is well known that the high protein foods like eggs, meat, milk are normally very expensive, the foods bought by such a mother would there- fore be those foods cheaper (normally carbohydrate foods). This would lead to lowered nutrient intake which automatically leads to malnutrition.

Because of the low standard of education these mothers have, they would therefore have low contraceptive use which leads to high parity and therefore low food production which leads to malnutrition.

Migration may also have a role in the aetiology of mal- nutrition. In Kenyatta National Hospital many of the children who had malnutrition had just recently arrived in Nairobi from their rural homes. It is likely that women left alone in rural homes with children to raise without economic support from their husbands are unable to provide adequately for the children's nutritional needs. Prolonged breast-feeding over one year

supplemented with low protein weaning diet of maily maize and cassava uji. Change in dietary pattern with exclusion of some high protein foods such as millet, sorghum and fish.

Increased sicknesses especially malaria split families with women and children left in rural homes while men are employed in urban areas.

As mentioned at the beginning low nutritional status gives rise to high mortality and therefore it is not a coincidence that the districts with more malnourished children are the same districts with very high infant and child mortality rates. (see figure 3)

It is recommended therefore that the concerned authorities should give these regions first priority in planning of Nutritional activities to alleviate high mortality.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS FOR IMPROVEMENT
OF NUTRITIONAL STATUS

From the findings it has been seen that the education of the parents especially that of the mother contributes alot to the kind of care given to the infant right from the time it is in its mother's womb and even later in its life.

Education opens up channels for improvement of nutritional intake by improving the family's income which is the key to better purchasing power especially in urban areas. This influences the amount of money spent on food, and has a direct effect on the weaning practices used by the family or community in question.

The place of permanent residence either rural or urban is tied up with income. Normaly the higher income people live in better houses with better health facilities for example, piped water, electricity etc. which make good hygenic conditions possible and therefore better health.

Ethinicity is a variable which though hard to measure has a alot of influence on the feeding habits of a people. Kenya is a country that is made up of many ethinic groups, and each has its own values and beliefs about the kind of foods eaten and the kind of weaning methods practiced. In most cases the foods used for weaning practices depend on the foods grown localy and the methods available for preparation. So it is clear that the geographical area influences the kinds of foods used for weaning. In the northern semi-arid areas for example, fresh fruits and vegetables are almost impossible to grow.

From figure 3 it can be seen that Coast province has the highest number of stunted children 44 per 1000. The same region has the highest percentage of children with mothers with no education 85.8%.

Low contraceptive use leads to high parity which in turn leads to less care given per child especially nutrition wise this obviously leads to high mortality. According to the demographic transition theory high mortality is tied up with high fertility because parents tend to "replace" the dead children thus, leading to high parity. This is a cyclic kind of situation.

In African societies the sex of the child is very important, the male sex being more prefered than the female sex, and this means a male child is normaly given better care than a female child. Theres therefore a strong correlation between the level of nutritional intake and mortality. A low nutritional status obviously accelerates the level of mortality. From the above findings malnutrition affects all age groups but the major impact is on mothers and young children particularly in the most deprived populations.

It is logical therefore that intervention and health programmes should be concentrated on this age/sex groups in urban slums and in rural areas. Family planning programmes are commonly intergrated with mother and child care services under the same umbrella of family health. Several studies have shown that the nutritional status of children in a family is closely correlated with family size and that serious cases of malnutrition are commonly encountered among children of high parity. Similarly the nutritional status of mothers is greatly influenced by parity and intervals between successive births. These findings support the need for including family planning among

measures for improving nutritional status. It is also recognized that high mortality among young children is deterrant to acceptance of family planning measures.

NUTRITION EDUCATION

One aspect of nutrition planning that needs to be given more attention is the formulation of programmes to encourage a desirable dietary pattern and to stimulate effective demand for appropriate food.

Nutrition education is carried out by several ministries, (Agriculture, Health, Education) and may also be a component of the programmes of non-governmental welfare agencies.

One priority area for nutrition education is the protection and promotion of breast-feeding. Early weaning without adequate supplements of high protein foods is the major cause of malnutrition in the infant.

Breast milk apart from providing the necessary nutrients that the body needs at a lower cost also contains antibodies against infection and most important it is not a vehicle for transmitting infectious diseases.

It is recommended that even though acceptable measures cannot be found to reduce the basic causes of malnutrition, the immediate condition of the malnourished can still be improved through health strategies, nutrition education and direct intervention programmes.

It is increasingly appreciated that simply increasing food supplies does not of itself solve the problem. More attempts to increase existing supplies by the amount by which the intakes of the malnourished are estimated to be in aggregate deficient may do little to raise the intakes of the malnourished.

DIRECT MEASURES FOR NUTRITIONAL IMPROVEMENT

Some of the direct intervention programmes, particularly those involving food aid are costly and make large demands on technical and administrative manpower. The programmes should not work in isolation. They should be co-operative efforts of all relevant services available in the community, i.e., health services, agricultural extension, community development schools etc. Since particularly in regard to nutrition the skills and responsibilities are complimentary it is also emphasized that the success of such programmes will depend very much on the extent of community involvement in establishing priorities and encouraging participation.

FOOD FORTIFICATION

Where there is a widespread deficiency of one essential nutrient or a narrow group of such nutrients, legislated fortification of a food or water may be an effective measure. Programmes of demonstrated effectiveness are fluoridation of water as a preventive of dental caries and iodization of salt in regions where goitre is endemic. Food fortification with vitamin A is also promising. These programmes should not be

viewed as cheap substitutes for required basic improvement of
the food intakes of people but rather as ancillary measures
designed to alleviate as specially as possible conditions that
often cut across social and economic strata.

SUPPLEMENT FOODS AND FEEDING PROGRAMMES

Supplementary feeding programmes are a direct measure for
providing the most deprived population groups with the additional
food that they need to satisfy their minimum requirements and
which they could not obtain otherwise. These programmes do not
however correct the underlying problems and may even favour
their perpetuation by relieving the sense of urgency and thus
diverting attention from the need to implement more fundamental
measures, because of this and because great expenditure is
involved for efficient management and supervision.

These programmes should be limited to population groups
in which need, is documented and effectiveness is reasonably
assured.

The foods to be used in supplementary feeding programmes
in addtion to meeting nutritional and management criteria
should be considered in the context of the overall food and
nutrition situation of the country or region.

CONTROL OF INFECTIONS

Infectious diseases are an important conditioning factor
of moderate forms of malnutrition but even more importantly they

precipitate severe forms of malnutrition for example, diarrhoeal diseases and communicable diseases.

Intestinal parasites often cause greater and more rapid nutrient loses that can be compensated by food intake. The magnitude and relative importance of the disease - induced nutrition problems such as failure to eat withholding of solid foods, poor digestion and malabsorption are topics requiring further study, but the sum of the effects is an additional drain upon a body whose ntritional reserves are already low on account of inadequate food intake the outcome is severe malnutrition. The effect of health programmes aimed at preventing the nutrition- al wastage from communicable and parasitic diseases is usually far more enduring and less costly than more direct nutrition interventions. It is recommended therefore that further research should be done in this area for a better understanding between factors that affect nutritional intake and the level of mortality. Priority should be given to areas that are hard hit by this problem.

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