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Protein-Energy Malnutrition and the Home Environment

A study among children in Coast Province, Kenya

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PROTEIN-ENERGY MALNUTRITION AND THE HOME ENVIRONMENT

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Contents

Acknowledgements	2
List of Tables	4
Summary	5
1. Introduction	7
2. Kilifi District and Mijikenda Society	8
2.1 Kilifi District	8
2.2 Mijikenda Society	10
3. Child Care Practices among the Kilifi Mijikenda	13
4. Theoretical Background of Malnutrition	17
5. Methods	20
6. Interview Schedules and Observation Forms	23
7. The Socio-Economic Characteristics of Mothers Admitted to Kilifi Family Life Training Centre	24
8. Environmental Factors Associated with Malnutrition	33
9. Conclusion	41
References	45
Appendix 1 Kilifi Family Life Training Centre : Admissions 1984/85	47
Appendix 2 FLTC-Questionnaire	48
Appendix 3 Observation Schedules	50
Appendix 4 Comparison of Scores on Feeding Scale for Index and Control Group	59
Appendix 5 Comparison of Scores on Hygiene Scale for Index and Control Group	60
Appendix 6 Comparison of Scores on Parental Care and Stimulation Scale	61

List of Tables

1. Age distribution of all children admitted at Kilifi FLTC	25
2. Age distribution of children by nutritional condition	26
3. Nutritional condition of malnourished children	27
4. Weight for age of all children by nutritional condition	27
5. Weight for age of malnourished children at admission and at discharge	28
6. Acres per holding	29
7. Marital status of women	30
8. Education of women	31
9. Occupation of head of household	33
10. Acres per holding	34
11. Incidence of unfavourable conditions	34
12. Number of pre-school children under five years in household	35
13. Averages and distribution of anthropometric measurements of children under five for index and control group	36
14. Average scores on home-environment scales	39

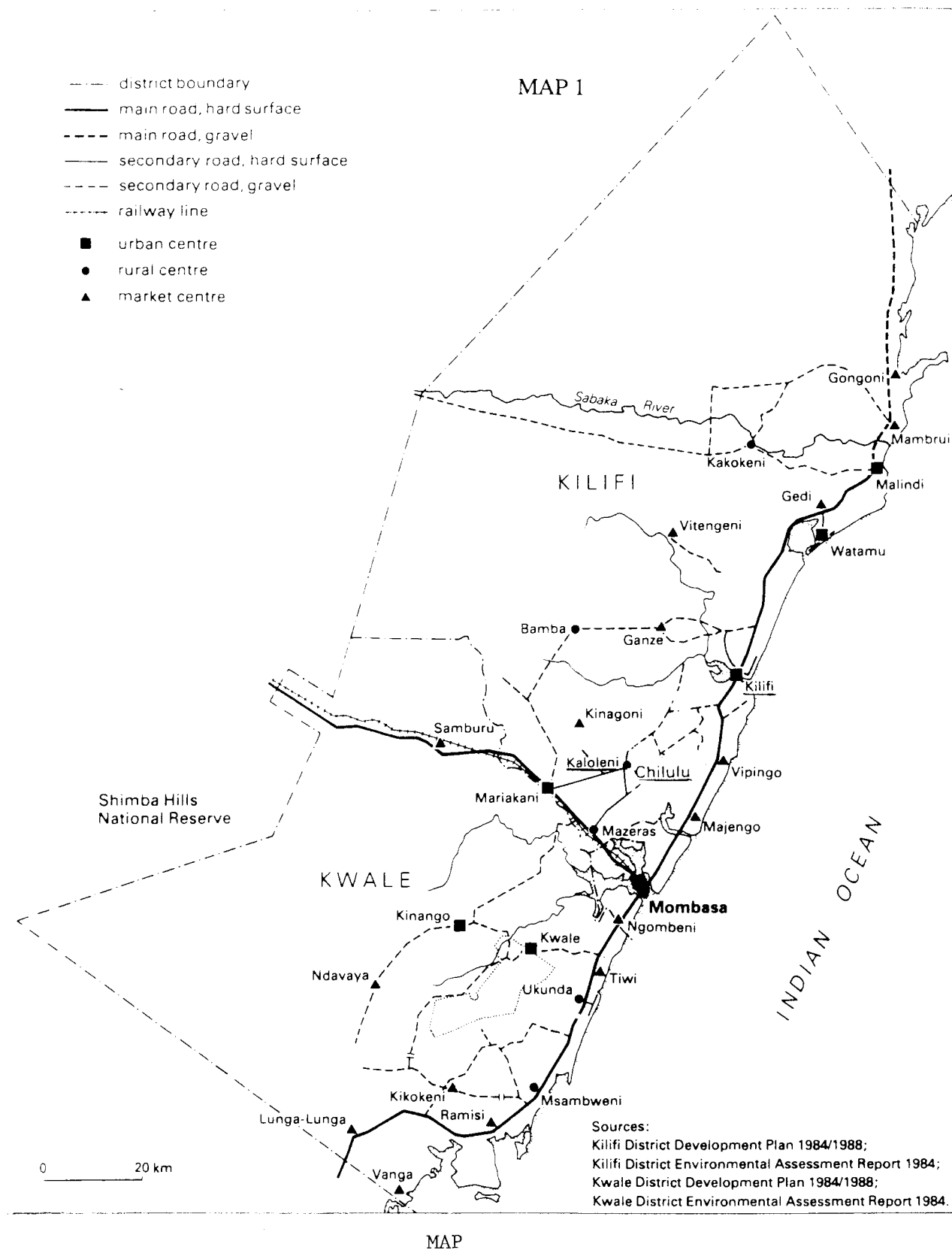
Summary

This report contains an account of a study concerning the occurrence of childhood malnutrition in Kilifi District, Kenya.

First, an analysis is presented of the socio-economic characteristics of women with malnourished children who attended Kilifi FLTC in the year 1984/1985. It was found that, although the women generally experienced a lack of resources, they did not differ from the general population of Coast Province.

Next, the possible influence of intra-household factors on the occurrence of childhood malnutrition was further looked into. In comparing two groups of ten mother/child pairs attention focused on feeding and weaning patterns, hygiene, parental care and home-stimulation. Important variations were found, as regards child-caretaker relationships. In households where no malnutrition had occurred, children were fed more regularly and were provided with more types of stimulation.

Finally, a critical discussion of the present study and its limitations points out that the question remains whether a malnourished child generates a lower level of stimulation on the caretaker's part, or whether lack of stimulation of the caretaker leads to an increased risk of malnutrition. However, the present findings indicate not only that a relationship between childhood malnutrition and home-stimulation exists but that it persists beyond the acute episode and subsequent rehabilitation. Consequently, it is recommended that emphasis during rehabilitation should not only be on nutritional requirements and general child care but also on individual attention and stimulation given to the child.



1. Introduction

Protein-Energy Malnutrition (P.E.M.) among young children is one of the most common problems in many developing countries and one of the major causes of high child mortality rates. Although the food situation in Kenya is generally regarded as favourable in that probably enough food is grown to provide for the population, the incidence of childhood malnutrition is comparable to that in other Sub-Saharan countries (USAID, 1976; 1978a; 1978b). As elsewhere, different forms of intervention exist in Kenya to ameliorate the nutritional situation. Several Ministries, notably the Ministry of Health, the Ministry of Agriculture and the Department of Social Services as well as various non-governmental organizations attempt to redress or lessen the incidence of childhood malnutrition in the country.

In some regions of Kenya and among certain sub-groups, however, there still exists a considerable incidence of childhood malnutrition (Haaga et al., 1986). As indicated by the surveys of the Central Bureau of Statistics, Coast Province has the highest provincial level of stunting in Kenya (CBS, 1984, section 4: 55). Four out of the six districts have mortality rates of more than 160 per 1000. Two districts, Lamu and Kilifi, have rates of more than 195 per 1000 while in Kilifi childhood mortality amounts to 212 per 1000 (CBS, 1980;1982;1983;1984).

During 1985-1987 the Food and Nutrition Studies Programme carried out field surveys on the effects of climatic seasonality and drought periods in Coast Province, as well as surveys covering agricultural production, food supply, food consumption and the nutritional status of smallholder families in various agro-ecological zones in Kwale and Kilifi Districts. One of the aims of the surveys was to identify groups at risk of malnutrition and to supply information regarding the occurrence and the possible causes of childhood malnutrition (FNSP, 1985a; 1985b).

The present report contains the results of an exploratory study of the influence of environmental factors on the occurrence of protein-energy malnutrition. The research was carried out in Kilifi District and consisted of two parts. In the first part attention focused on cases of malnutrition admitted at Kilifi Family Life Training Centre, with special reference to the socio-economic characteristics of these cases. In the second part attention concentrated on cases of malnutrition who had been admitted to the centre and had already returned to their homes.

2. Kilifi District and Mijikenda Society

2.1 Kilifi District

Coast Province and Kilifi District are located in the easternmost part of Kenya (see maps). The region has a monsoon type climate: it is hot and dry from January to March/April and there are two rainy seasons; the long rains starting in April and continuing until July and the (unreliable) short rains which tend to fall in October and November.

According to the latest census, the total population of Kilifi District numbered to 430,986 (CBS.,1982). The 1984/1988 Development Plan estimates that the population will reach 580,000 by the year 1988 (Ministry of Finance and Planning, 1984:11).

About 90% of the population lives in the rural areas. The district covers a total area of 12,523 sq km, including 109 sq km of water surface and is administratively divided into four divisions, 31 locations and 113 sub-locations. Malindi with its considerable tourist sector and a population of about 43,000 (1983), is the most important urban centre of Kilifi District. Kilifi town, the second largest, with a population of 10,000 (1983), is the district's administrative centre (CBS, 1981)

The economy of Kilifi District is mainly based on agricultural production. Paid employment is relatively insignificant and most of it is in the tourist industry. Manufacturing is of limited importance and confined to agro-processing industry. Most of the farming and livestock activities are carried out on a small scale. The fertility of the soil is not high and the amount of rainfall is modest. Important food crops in the district are maize, bananas, cassava, cow peas, sorghum, groundnuts, rice, sweet potatoes and green grams. According to the Ministry of Planning and National Development the production of the food crops has shown improvement in terms of acreage, but yields of all the crops are reported to be still very low. There is a relatively high degree of rural poverty in the district. As agriculture has expanded in the district, there is need for more market outlets and more road facilities as the currently existing roads are overutilised. During the wet seasons some roads are impassable and Ganze, Kaloleni and Malindi Divisions are difficult to reach.

The government health facilities in the district are the following: three hospitals, five health centres, one sub-health centre and 40 dispensaries (Ministry of Finance and Planning, 1984:11). The distribution of the health facilities over the divisions is as follows: Southern Division with 35% of the population has 42% of the facilities. Bahari and Northern Divisions, with approx. 18% and 15% of the population respectively, have 13% and 10% of the health facilities.

2.2 Mijikenda Society

A number of sources are available on the origin and history of the Mijikenda of Kilifi District. For this review Spear (1978) and Salim (1973) and Champion (1967) were consulted. The Mijikenda inhabit Coast Province and consist of nine sub-groups: the Giriama who are living all over Kilifi District, six other sub-groups Rabai, Ribe, Kambe, Jibana, Chonyi and Kauma who are living mostly in the southern part of the district - they are relatively small in number - and the remaining sub-group the Duruma and Digo who are living in Kwale District.

The Mijikenda originally came from Singwaya in the Southern Somali hinterland at the turn of the 17th century. They migrated south with other Bantu speaking peoples - the Pokomo and the Taita - and had close relations with the Galla pastoralists, the Waata hunters and the Kamba and Swahili traders who were their neighbours. In earlier days the Mijikenda settled in nine separate "Kayas". These "Kayas" were large palisaded villages located in the midst of dense forest on the peaks of the coastal ridge. Each "Kaya" had his own variant of general Mijikenda culture; its own clan and subclan; its own dialect (such as "Kigiriama" of the Giriama subclan) and each Kaya traced its own migration within the overall migration from Singwaya. The different dialects of the nine "Kayas" developed into the present nine Mijikenda languages (Spear, 1978). With the migration away from the "Kayas" and the decline of their centralised institutions and rituals, the clans have lost their former significance. Nowadays, sub-clan and lineage membership are the main determinants of descent.

The Kilifi people have experienced a great deal of Muslim influence, arising from the old historical and social interactions with the Arabic groups. The first Europeans to have an impact on the Mijikenda were the missionaries. A first Protestant mission station in the District was established by Krapf and Rebmann for the Church Missionary Society at Rabai in 1846, later followed by the United Free Methodist Station at Ribe established by Krapf and Wakefield. Both these missions slowly developed outstations

now scattered over much of Mijikenda area. A Protestant mission built Kaloleni Hospital and is still managing it today (Spear, 1978). At present about 54% of the Mijikenda are Muslim, 12% is Protestant, 3% is Catholic and 31% follows traditional belief systems (CBS, 1982).

Champion did research on traditional beliefs with regard to health and disease among the Mijikenda in general and the Giriama in particular, and found these beliefs still to be quite strong. Death, disease or misfortune were seen to be the result of the deliberate or inadvertent neglect of some departed spirit or even of a living family member. When misfortune had befallen a family or when a member of the family had become seriously ill a medicine man was called in to diagnose the trouble and to prescribe certain sacrifices that could appease the anger of the spirit. There were medicine men or "waganga", persons who had been instructed in spiritual matters and whose business it was to diagnose, to prescribe, to offer sacrifices and to prepare charms or fetishes to placate evil spirits (Champion, 1967:29). According to Parkin, who studied traditional medicine in this area, the hospital services were only used either in conjunction with traditional medicine, as last resort, or for "understandable" reasons like child-bearing. He argued that the legitimacy of traditional medicine rested on the belief that there were certain afflictions which are best, or even only, assuaged by the use of herbs and roots and with the help of a "mganga" (Parkin, 1972). Research from elsewhere in East Africa indicates that afflicted people may switch between use of "western" and "traditional" medicine, but this does not appear to undermine the legitimacy of the latter. Hospital services are used more often than before but traditional beliefs are still strong (Slikkerveer, 1983).

The residential pattern of the Mijikenda is patri-local. Sons marry and settle on the land of their fathers or acquire land elsewhere to strike out on their own. After marriage women leave the parental homesteads and follow their husbands. The most common residential situation is that land is occupied by an extended family. Monogamous unions

as well as polygamous unions are common. Houses are often shared with relatives of male members of the family.

Most people live in houses built with mud on wooden frames with thatched roofs made of palm leaves ("makuti"). In small houses the kitchens are often combined with the living room but in larger houses there are separate rooms or even separate buildings for cooking. Most of the houses have no inside plumbing or electricity. Those who are lucky have a nearby watertap. Those less fortunate use watertaps at some distance. Most family activities take place out-of-doors. Guests are received in the clearing around the house and other activities such as cooking, washing of clothes and eating also take place there. Most housewives still prepare meals over wood fires. If a man has several wives they cook alternately. Usually a family eats three meals a day: breakfast mostly consisting of leftover "ugali" (stiff porridge of maize flour) and tea; a second meal taken early in the afternoon, between 1 and 3 o'clock, consisting of ugali or cassava eaten with vegetables or small dried fish, and the last meal, which is similar in composition to the second, is taken between 7 and 9. Between these meals people often drink tea. Maize and cassava are the staple crops. Green vegetables are only available in the rainy seasons. During the dry season "kunde" (beans) sweetened with coconut juice and green grams are prepared as vegetables, but in poor households meals consisting solely of "ugali" with water and salt are quite common. Cow's or goat's meat is regarded as special and served in festive dishes at circumcision, burial and second burial¹ ceremonies. Chicken-meat is mostly served at marriage ceremonies. For a wife who has just delivered chicken-soup is prepared.

¹This ceremony is held one year after a person's death.

3. Child Care Practices among the Kilifi Mijikenda

Mijikenda infants are usually breastfed until the age of one and a half to two years but they receive additional foods from the age of three to five months. First, they are given uji (thin porridge of maize flour and sometimes cow's milk diluted with water). Later on they receive maize flour and mashed bananas or cooked beans with creamed coconut without maize. They are also given small portions of food at family meals which they attend on their mother's lap or very close beside her, such as snacks of sweet potatoes, cooked bananas, pawpaw and mango, but in general fruits are classified as unimportant and often excluded from the diet. Towards the end of their first year, when children begin to chew, they eat lumps of ugali dipped in vegetable, fish - or meat sauce. In the course of their second year (the exact moment varies) they start sharing a bowl with an older brother or sister or a grandmother.

During the first four to six weeks of a baby's life, the mother honours its need for food with maximum indulgence. The greater part of the day the infant sleeps on a bed and its mother confines her agricultural work to light chores in the field nearest to the homestead. She will not leave her child before she has first fed and washed him so that she can expect him to sleep for the duration of a brief absence. As the child grows older, his mother's radius of action widens again but she takes care not to stay away any longer than one and a half to three hours depending on the age and appetite of the baby. When she is not disposed to breastfeed her baby, she will apply gentle negative sanctions to keep the child still, but if he cries long and loud enough she will feed him again. The breast is a source of both food and comfort. Gradually a definite feeding pattern will develop which yields time for the mother to carry out household and farm duties.

In general, when still very small, the infants are bathed at least three times a day, mornings and evenings with heated water and soap, if available, afternoons with cold

water, after which they are often rubbed with coconut oil. Once the child is over a year old its mother dispenses with heating water except when mornings are cold. Whenever a mother suspects that her infant is crying because it feels warm and sticky, she will pour cold water over it. As the infant grows older and starts to crawl and walk it is bathed less often. A two-year-old child mostly takes one bath in the late afternoon, a quick wash of head and hands in the morning and before meals.

Toilet training starts at about the age of one or two months when the baby, supported under the arms, can sit up and hold its head erect without help. Toilet training takes place in stages. First the child learns to keep its mother's back and bed clean. Then, when it can walk, it learns to avoid dirtying the house and the direct yard outside. It is much later that the child learns to use a pitlatrine if there is one, and when old enough not to fall in the pit.

A Mijikenda infant spends much of its time in immediate physical contact with others. It sleeps beside his mother. Her presence keeps her child warm and enables her to breastfeed during the night, without rousing the whole family. Long after the baby is six months old, the mother continues to carry it on her back, and when her milk cannot stop his tears, she will offer it a secure position on her back as the next best comfort and very often it will fall asleep. While the mother is at work, an older sibling between the age of six and eight frequently will assume the major responsibility for the child's wellbeing. And until another baby is born, it remains common practice for a mother and her daughters to continue to carry the infant of the family on their backs. The father plays a less direct role in rearing the infant. He may hold the baby or play with it if there are no outsiders present, and look after it when the mother is working. But generally as soon as an infant starts crying the father surrenders it to his wife. In her absence the child's brothers and sisters are often more effective pacifiers than the father. However, the father has significant responsibilities where the infants' health is concerned. If

necessary he purchases medicines from the shop, arranges transport to the traditional healer or hospital and meets expenses.

Parents generally leave children to keep themselves occupied as long as they do not fight and do not damage property. Every now and then mothers give assistance to the smallest of their offspring, the two- and three- year olds, but children seldom if ever come to show them things which they have made and do not involve them in play. Older sisters and brothers have a more stimulating effect on child playing. The older children amuse the infant or appease it in distress by chattering, singing, beating drums or making other distracting movements. As soon as the child can sit, siblings will give it objects to play with: tins, old rags, corncobs and twigs and, with support from parents and other adults they start to repeat names of persons and things to the baby as soon as it develops the cognitive ability of repeating what it hears spoken. They also correct errors and often praise, just like the parents. The relationship of an infant to its older brothers and sisters is usually characterized by deep trust on the infant's part.

Minor ailments such as colds, headaches and sores are usually attributed to natural causes. Headaches are cured with aspirin, burns are treated with honey and nosebleeds are halted with a sniff of tobacco, and when a young child has diarrhoea, which often occurs during weaning, the parents give it milk diluted with water or the child is given nothing at all for a short while (this type of treatment can cause dehydration). If a sick child does not recover in one or two days a mother may consult her father-in-law about visiting a traditional healer. If he doubts the natural cause of the child's disease no more home-medicines will be offered and traditional help will be sought, notably that of the traditional healer, the "mganga". Some diseases, such as tetanus and polio, are directly attributed to super natural causes and especially diseases in children are often regarded as being due to evil spirits, the infraction of taboos or spells.

Early research by Gerlach showed that the Digo once held the belief that the primary cause of what is now called P.E.M. was the result of the transgression of sexual taboos by the parents of the child and was called "chirwa"². In particular, if a pregnant woman or her husband committed adultery, their unborn child would be affected and either it would be born weak and never get strength, or it would be born in a normal condition and look healthy for some months and then suddenly show symptoms of "chirwa". This condition was seen as progressive and incurable unless the parents admitted their transgressions and called a "mganga" or medicine man skilled in countering and curing "chirwa" (Gerlach, 1959). However, there was "anti-chirwa" magic in the form of amulets which protected infants, although people were aware that such amulets could fail from time to time. Today, children wearing these amulets in the Kilifi Family Life Training Centre show that Gerlach's findings are still relevant. Since many Mijikenda remain convinced that "chirwa" may be the cause of conditions labeled as malnutrition by western medicine, the remedy should be accordingly, i.e. "anti-chirwa" and medicines and ritual, while western medicines only are used as a last resort.

²"Chirwa" is the passive form of the verb kuchira meaning "to pass". The Digo language does not use "kuchira" in this general sense, but only in the special sense of "to pass a bad path" that is "kuchira njira mbaya" meaning to break a taboo.

4. Theoretical Background of Malnutrition

W.H.O. gives the following general definition of protein-energy-malnutrition (P.E.M.):

"A range of pathological conditions arising from coincident lack, in varying proportions, of protein and calories, occurring most frequently in infants and young children and commonly associated with infection" (cited in Alleyne et al., 1977, p. 2-5). The conditions concerned range in severity from mild, through moderate to severe. The experts have hitherto been unable to agree on a single universally accepted means of classification, but in general usage the term P.E.M. encompasses a spectrum of syndromes ranging from simple growth failure alone to pure and mixed syndromes of marasmus and marasmic-kwashiorkor. Marasmus is characterized by gross wasting of muscle and subcutaneous tissues, marked stunting and no detectable oedema. The highest incidence is in infancy. Psychological changes, hypothermia, motor retardation and weakness are common features. Anorexia is less common and the appetite is often good. The marasmic infant is usually irritable but may also display apathy, misery and inactivity. Kwashiorkor is found predominantly in older infants and young children whose requirements for protein and energy have not been met for some time. Characteristically these children are apathic, irritable, weak and inactive and have oedema and a fatty liver. Weight deficit is almost always present. Anorexia, diarrhoea and vomiting after feeds are frequent complaints and there is usually a regression in motor development (Alleyne, et al. 1979, p. 2-5).

The factors which cause the severe body wasting in marasmus, and those which produce oedema and the fatty liver so characteristic of kwashiorkor are still not fully understood. Worminfestations, infections and of course inadequacy of diet are often mentioned as possible causes (Alleyne et al., 1977; McLaren & Burman, 1976; Morley, 1972; Ebrahim, 1982; Nabarro, 1981). Worm infestations may hinder a good absorption of food, weaken the infant and can thus lead to a condition of malnutrition.

Infections reduce the appetite of the child, increase requirements and may lead to malabsorption and malnutrition. The occurrence of infections may be heightened through lack of hygiene. With regard to dietary inadequacy, the quality and quantity of food intake i.e. sufficient intake of protein, calories and vitamins; the duration of breastfeeding and weaning are frequently pointed out as relevant in relation with malnutrition. Children are viewed as the group in any population most vulnerable to poor nutrition, not only as regards nutrient intake but also in respect of the type of foods they eat. Regular feeding i.e. more than three times a day, is needed to meet requirements.

The causes of child malnutrition are complex and may vary from one community or region to another. In combination with the medical factors mentioned above, social-cultural practices with regard to child care, religious norms and expectations also have their influence on child welfare and child nutrition. By themselves these factors, sometimes called environmental factors (Cravioto and Delicardie, 1975), would rarely be serious enough to create such severe dietary deprivation as to result in kwashiorkor or marasmus, but in combination with medical factors they can exacerbate an already difficult situation.

Among the factors that are indicated some are said to be of especial significance in relation to the occurrence of malnutrition (Jelliffe and Bennett, 1960; Foster and Anderson, 1978; Nabarro, 1981; Cravioto and Delicardie, 1975). They are called "risk" factors and cover: local food ideologies, food classifications, customs related to breastfeeding, and weaning, attitudes to life, death and disease related to illness treatment.

To start with food ideologies: Foster and Anderson state that real insight in the complex field of child malnutrition requires above all knowledge regarding food preferences. Many cultures have different ideas about what is edible and what is not, which

consequently limit their access to certain foods. This may leave little opportunity to diversify in times of shortage. For an item to be consumed, it needs a cultural stamp of approval, of authenticity. No group, even under conditions of extreme starvation, utilizes all available nutritional substances. As a result of religious norms and health belief some nutritionally sound items are excluded from the child's diet.

These same writers indicate that in every culture food is classified in a wide variety of ways: what is appropriate to each formal meal, what as a snack between meals; and according to ideas of status and prestige, social occasions, age, symbolic and ritual values. They argue that probably all cultures classify food in relation to health and illness and to stages in the life cycle. This partly accounts for pre-and postnatal food restrictions and diet limitations, at times of illness (Foster and Anderson, 1978).

Finally, illness treatment may be strongly influenced by indigenous attitudes and customs related to death, disease, breastfeeding and weaning. Disease, especially in children, is often regarded as being due to such ultra-human forces as divine visitation, evil spirits, magic, the infraction of taboos or spells, or to poisoning, and it is because of these cultural attitudes that the parents have confidence in the traditional healer.

All these social-cultural factors described by various researchers are relevant in relation with malnutrition although it is clear that, whatever social-cultural practices are common within different societies, malnutrition never occurs alone. It occurs in conjunction with low income, poor housing and bad sanitation, in other words in the context of poverty. This is what is often called the meso-environment; i.e. the factors that are to a large extent outside the control of individuals. But the question remains why malnutrition only occurs in some households and not in others suffering from the same unfavourable conditions. There must be other causative factors interacting with the factors mentioned to produce malnutrition. Researchers have speculated about factors that may be involved including hygiene, feeding and parental care and attitudes at household level, i.e. the

micro-environment (McLaren & Burman, 1976; Barrett et al., 1982), and a new strand of research has been developed lately on what are called home-stimulation factors. The term home-stimulation mainly entails parental or familial care and support. Researchers argue that parents and/or relatives who can give only hurried and preoccupied attention are unlikely to develop close sensitivity to the child's needs and become unresponsive to all interactions. The nourishment that the child will receive, the protection from environmental hazards including microbial and parasitic infestations and the learning experiences of the child will largely depend upon parental understanding and stimulation and the ability of the parents to cope in a very difficult situation (Cravioto and Delicardie, 1975; Pollitt and Thomson, 1980; Rebelsky, 1973).

5. Methods

The aim of the present study was to explore the causal background of malnutrition in Kilifi District, concentrating on the role of economic, social-cultural and home-stimulation factors. The study consisted of two parts: One part aimed to provide additional insight in factors influencing the incidence of child malnutrition at the meso-environment level, the other part focused on factors conducive to child malnutrition associated with the micro-level.

In the first part attention was focused on cases of malnutrition admitted at Kilifi Family Life Training Centre. The Family Life Training Programme resorts under the Ministry of Culture and Social Services. The Programme combines nutrition rehabilitation with an educational approach. Through interviews with mothers admitted to Kilifi FLTC and examination of the clinic records, information was collected on their socio-economic characteristics and general living conditions.

In the second part of the study attention focused on cases of acute malnutrition which had been admitted to the FLTC but had since returned home. A comparison with households of similar socio-economic characteristics but with children of satisfactory nutritional status, allowed closer analysis of factors possibly associated with child malnutrition. Various suggestions and ideas connected to child health care and possibly connected to child malnutrition which arose during the research in Kilifi FLTC, were incorporated in this study. Information was collected by means of in-depth interviews and observation. During repeated visits to the homes of the selected cases the following topics were given attention: childfeeding and weaning; hygiene; parental care and home-stimulation, and indigenous beliefs and values regarding child health care.

Whenever necessary the interviews were conducted with the help of research assistants. The research assistant at the Kilifi FLTC was also working as an employee of the FLTC. She was "housemother" and as such responsible for the daily care of the admitted mothers with malnourished children. An advantage of her tie with the centre was that the assistant was known and trusted by the respondents. This facilitated the interviews. Disadvantageous was that the respondents associated the assistant with "western" health care, because she worked for the centre. This made the subject "traditional health care" more difficult to discuss.

During the second part of the research the interviews were conducted with the help of two assistants. These assistants were local Giriama women, aged 20 and 35 years with some years of secondary education. In turns they located the households that were to be visited, made appointments, and assisted during the interviews.

Subject of study during the first part of the research were women with malnourished children admitted to the Kilifi FLTC in the course of the year October 1984-October 1985, and women who were admitted during the research period i.e. from the beginning of December 1985 till mid-January 1986. From the former group the records

were studied, the later group was interviewed and observations of child care practices were recorded. It has to be pointed out that although the women who attended Kilifi FLTC represented mothers with malnourished children, their presence at the centre had probably been influenced by variables such as distance to the centre; acquaintance with the centre and available money. These FLTC-attendants therefore cannot be considered as an aselect sample of all women with malnourished children in Kilifi District.

The second part of the study concentrated on factors at household level (the micro-environment). A small number of mother/child pairs (10) who had been admitted to Kilifi FLTC, and who had since returned home, were selected from Kaloleni Location since the Annual Report of the FLTC singled out this area as being one of the problem areas with a large number of mothers with malnourished children (See Appendix 1). A comparison group was selected from the standing FNSP-sample in neighbouring Chilulu (see map). The information available for this sample included data on the socio-economic characteristics of the households. Both Kaloleni location and Chilulu possess the following ecological characteristics: they are situated in an agro-ecological zone defined as coconut-cassava zone. Coconut, casava, cashew, mango, banana, maize and cowpeas are the dominant crops. Most of the people in the areas are small-scale farmers and many of them have off-farm jobs.

In this way, ten mother/child pairs from Kaloleni with previously malnourished children were matched on several household variables with ten mother/child pairs from Chilulu without cases of malnutrition. Matching of households groups was done on the basis of two characteristics i.e. the number of acres owned by the household and the occupation of the head of the household (see p. 33,34). Education and profession of the mother; marital status and age-group of the children were held constant. Of all pre-school children included in the sample the W-H was measured to indicate wasting, or current malnutrition; H-A indicating stunting, the effects of long-term (chronic) malnutrition and mid-upper-arm circumference. The children belonging to the comparison group

comparison group were not suffering from malnutrition at the time and none of the mothers and children in this group had ever attended the FLTC³.

6. Interview Schedules and Observation Forms

The group of mothers with malnourished children admitted to the FLTC were interviewed with a questionnaire. All the interviews were conducted with the help of an assistant. The questionnaire included open-ended and structured questions. The duration of the interviews usually amounted to an hour and a half. Information was collected concerning economic resources, housing conditions, marital status of the mother, her formal education level and incidencies of pregnancies as reported during admission. Furthermore, a detailed history of the child's illness and the illness management of the parents, i.e. the steps they had taken to ameliorate the condition of the child, were taken down during the interview (Appendix 2).

During a four week stay at Kilifi FLTC, further data were collected through participant-observation. Observations were recorded in an observation diary. Subjects of observations were the mother-child interactions and daily activities of mothers and children. Recording was done by the researcher. The interviews of the second part of the study were also conducted with the help of a local assistant. In each household the mother was interviewed. This second questionnaire comprised questions on the subject of child feeding and weaning; parental care; indigenous beliefs and values regarding child health care, illness management and general housing conditions.

³It turned out that one initially selected case in Chilulu had been admitted at Kilifi-F.L.T.C. and therefore this case was replaced.

During this part of the research, the assistants also conducted observations at the homes of the selected households. For two consecutive days they stayed in the households and recorded observations with the help of pre-designed forms on parental care and attitudes, parent-child interaction, feeding and hygiene. No ready-made method of observation of these factors at household level could be found in the literature and an observation method was developed in the field. By having the observers work with forms with explicit observation-categories, it was attempted to increase observer reliability and limit intersubjectivity (Appendix 3). The observations conducted by the assistants were compared with an extra observation of the researcher. At three different households discrepancies occurred between the observations of the researcher and those of the research assistants; in these cases the observations were repeated to obtain conclusive data. In the next section the condition of children admitted at Kilifi FLTC and the socio-economic characteristics of their families will be analysed. In section 8 the home environment and its various aspects will be discussed.

7. The Socio-Economic Characteristics of Mothers Admitted to Kilifi Family Life Training Centre

In Coast Province there are two Family Life Training Centres (FLTC's), one in Kilifi District and one in Kwale District. Kilifi FLTC was opened in December '78. Mothers with malnourished children are mostly referred to Kilifi FLTC by social workers, nutritionists from the nearby hospital, family planning field educators and other health care and social service personnel. Some mothers, however, come on their own

initiative. They are allowed to bring a maximum of six children under five years of age and they stay at the centre for three weeks or longer. (Kogi, 1982)

The women and their children are housed in cottages. Each mother is assigned a house she shares with one other mother and her children. During their stay they are expected to cook and clean just as they would at home and to work in the vegetable gardens of the centre. Food is prepared on a communal fire. Mothers prepare food in turns. The children eat first, the mothers afterwards. Each week, the women are given several lectures. They receive instructions about many aspects of child care, including the importance of a balanced diet and a clean environment in and around the home. On admission to the FLTC a detailed history of the family's structure and the condition of the child is recorded. The children are weighed and if necessary, arrangements are made for the children who are ill or who need vaccination, to be seen by a clinical officer from the Kilifi Hospital.

Table 1: Age distribution of all children admitted at Kilifi FLTC

< 11 months	76 (20%)
12 - 23 months	100 (27%)
24 - 35 months	77 (21%)
36 - 59 months	56 (15%)
> 60 months	64 (17%)
Total	373 (100%)

Source: Admission-book FLTC Kilifi October 1984-October 1985

From October 1984 till October 1985, 265 mothers with malnourished children were admitted to the Kilifi FLTC. It is the policy of the FLTC-programme that when space is available a mother is allowed to bring healthy siblings along with her malnourished children especially when they require maternal attention. According to the clinic records the mothers brought 277 malnourished children and 96 healthy children with them

(information concerning these children is presented in Tables 1-5). Most of the malnourished children were over one year of age but below five (74%), with a small group of children under one (15%). Their siblings, however, were usually much younger or much older: 36% of them were still under one year and were generally being breastfed while another 36% were over five (Table 2).

Table 2: Age distribution of children by nutritional condition

	malnourished children	healthy siblings
< 11 months	41 (15%)	35 (36%)
12 - 59 months	206 (74%)	27 (28%)
> 60 months	30 (11%)	34 (36%)
Total	277 (100%)	96 (100%)

Source: Admission-book FLTC Kilifi October 1984-October 1985

The malnourished children were usually suffering from moderate to severe marasmus, kwashiorkor or a combination of these two. The personnel of Kilifi FLTC diagnosed 60% of the children as suffering from a moderate form of malnutrition (Table 3); 40% was considered severely malnourished. The majority of the children were suffering from kwashiorkor (47%). As described earlier on, kwashiorkor is found predominantly in older infants and young children whose requirements for protein and energy have not been met for some time. A smaller group of children (41%) were suffering from marasmus, which is characterized by gross wasting of muscle and subcutaneous tissues. The rest of the children suffered from a combination of both afflictions (12%). Overall, the children were apathic and irritable and they often vomited after feeding. Of the recent arrivals many had to be forced to eat because of lack of appetite. Mothers were advised to feed the children more times a day and to enrich the children's diet with fruits, eggs, mashed cashewnuts, boiled diluted cow's milk and fat.

Table 3: Nutritional condition of malnourished children
(As diagnosed by the FLTC-Personnel)

	marasmus	maras.-kwash.	kwashiorkor	Total
Moderate	56 (20%)	14 (5%)	95 (34%)	165 (60%)
Severe	58 (21%)	18 (7%)	36 (13%)	112 (40%)
Total	114 (41%)	32 (12%)	131 (47%)	277 (100%)

Source: Admission-book FLTC Kilifi October 1984-October 1985

Every week all children under five were weighed. The weight-for-age of the majority of the "healthy" children (54%) was above 80%, but nearly as many children (42%) fell between 60% and 80% W-A, while two cases from this group in fact had a W-A below 60%. Healthy appears to be a relative concept, and many of the "healthy" children appear to deserve attention as well. The W-A of the malnourished children on admission was usually below 60% (62% of the cases) and 36% had a weight for age between 60 and 80% (Table 4 and 5).

Table 4: Weight for age of all children by nutritional condition

	malnourished children	healthy siblings
< 59%	156 (62%)	2 (4%)
60-79%	89 (36%)	24 (42%)
>80%	6 (2%)	31 (54%)
Total	251 (100%)	57 (100%)

Source: Admission-book FLTC Kilifi October 1984-October 1985

The children were admitted for a period of three weeks but if after three weeks there was no improvement, they usually stayed on. Ten children died during their stay at the FLTC despite the care by the staff of the centre. The majority of the children were discharged after three to four weeks. According to the records close to 30% of the children still had an obviously unsatisfactory nutritional condition at discharge i.e. a W-

A of less than 60%, and 54% of the malnourished children had a W-A between 60 and 80% on discharge. This nevertheless indicates an improvement in the condition of more than 35% of the children, since the number of cases below W-A (60) had gone down by 33%, and the number of cases over W-A (80) had gone up by 5%. In addition many children showed smaller improvements that did not result in a shift between the (rough) categories. Furthermore, it must be pointed out that in a small number of cases loss of oedema may have caused initial weight loss.

Table 5: Weight for age of malnourished children at admission and at discharge

	at admission	at discharge
< 59%	156 (62%)	74 (29%)
60-79%	89 (25%)	135 (54%)
>80%	6 (3%)	17 (7%)
Unknown (*)		16 (6%)
Children who died		9 (4%)
Total	251 (100%)	251 (100%)

Source: Admission-book FLTC Kilifi October 1984-October 1985

(*) For these children the weight had only been recorded at admission because the mother left the centre before discharge.

As regards the analysis of the socio-economic characteristics of the women who attended Kilifi FLTC from October 1985 till October 1986 four sources were consulted: the FLTC - admission book 1984-1985; the NIRP-survey data collected at nine FLTC's in 1979 and 1980 (Niemeijer, 1981); the Coast Province data recorded during the Integrated Rural Surveys 1976-1979 (C.B.S., 1982) and the Kenya Fertility Survey 1977-1978 (C.B.S., 1980).

Table 6: Acres per holding

	Kilifi FLTC ¹ 1984-1985 N=265	Rural Pop. Coast. ² 1977-1978 N=260
Less than 3 acres	54%	55%
3-5acres	21%	12%
6-10 acres	6%	18%
More than 10 acres	17%	15%
Unknown	2%	-
Total	100%	100%

Sources:

1. Admission-book FLTC Kilifi October 1984-October1985
2. Data extracted from The Integrated Rural Surveys 1976-1979 (CBS, 1981)

The FLTC admission records showed that the economic resources at the disposal of the women who attended Kilifi FLTC were modest. It is known that the women generally receive little support from their husbands (Niemeijer, 1981, p.16). Most of the husbands (67%) are farmers without any form of off-farm employment. The average acreage at their disposal was about four acres (Table 6). A comparison with C.B.S. figures for Coast province as a whole did not indicate that the FLTC-cases had less land at their disposal than is common in the region. However, the quality of the land in large areas of Kilifi District is low because of insufficient rainfall and poor soils. Four acres is consequently often not sufficient to maintain a household if the family income solely depends on farm produce. Many women therefore were engaged in casual work on shambas of neighbours or friends, to earn some extra money to feed the family (around 75% according to Niemeijer:1981, p. 20). The casual labour heavily increases the workload of the women.

Table 7: Marital status of women

	Kilifi FLTC ¹ 1984-1985 N=265	Rural Pop. Coast. ² 1977-1978 N=260
Married	91%	90%
Single	2%	3%
Separated, divorced, or widowed	7%	7%
Total	100%	100%

Sources:

1. Admission-book FLTC Kilifi October 1984-October 1985

2. Data extracted from the Kenya Fertility Survey for all women of 20 to 39 years of age. (CBS, 1980)

Also, marital instability did not seem a major factor in the aetiology of malnutrition although the percentage of women who were widowed, divorced or separated was slightly higher in Kilifi FLTC compared to the percentage of the whole district. But at least ninety-one percent of the women who attended the centre were married and only two percent was single and seven percent was widowed or divorced/separated. Compared with the percentages for the whole of Coast Province, the number of women who were separated, divorced, or widowed appeared to be the same (Table 7).

In effect, polygamy, coupled to lack of support by the husband, appears to play a more important role. The incidence of polygamy was no longer recorded by FLTC personnel in 1984/85. However, in 1979/80 the incidence of polygamous marriages was reported to be as high as 55% (Niemeijer, 1981, p. 17). The regional estimates of polygamy amounted to 38% (CBS, 1980) which is considerably lower than the FLTC-percentage. Against this background of a high incidence of polygamy among the admitted women, the high number of women (between 80 and 90%) reporting to receive little or no support from their husband (Niemeijer, 1981, p. 9) points to the relevance of intra-household organisation as a factor in the aetiology of malnutrition. Possibly, this kind of family constellation may lead to reduced maternal attention for the young child.

The incidence of pregnancies recorded in the FLTC amounted to 17%. For 1979 and 1980 this figure can be estimated at 20% (Niemeijer, 1981). The national percentage reported was 12.5 % (CBS, 1980). Thus indicating that the number of pregnant women attending Kilifi FLTC was on the high side.

Table 8: Education of women

	Kilifi FLTC ¹ 1984-1985 N=265	Rural Pop. Coast. ² 1977-1978 N=260
No formal education	89%	89%
Standard 1 to 4	4%	6%
Standard 5 to 8	6%	4%
Beyond primary	1%	1%
Total	100%	100%

Sources:

1. admission-book FLTC Kilifi October 1984-October 1985

2. Data extracted from the Kenya Fertility Survey for all women of 20 to 39 years of age. (CBS, 1980)

Finally, with regard to the level of formal education, it was found that the majority of the mothers who attended Kilifi FLTC (89%), had no formal education. This percentage was slightly higher than the district percentage (84%). Also the number of women who had attended Standard 5 to 8 (6%) was somewhat less than the number recorded at district level (10%) (Table 8).

In summary, the FLTC-cases studied appear to experience a scarcity of resources at home but in this respect they do not differ from the general population of Kilifi District. With regard to marital status it was found that the incidence of separated, divorced or widowed women attending Kilifi FLTC was higher but not significantly. The same is true for the number of pregnancies. The formal educational level of the women who attended Kilifi FLTC differed little or not at all from the educational level of the general population. It appears that none of the factors scrutinized here provide a sufficient

explanation by themselves although some do play a role in the occurrence of malnutrition. The high incidence of polygamy and of women who receive little or no support from their husbands indicates the relevance of intra-household factors in the aetiology of malnutrition.

8. Environmental Factors Associated with Malnutrition

In the previous section attention focused on environmental factors influencing the occurrence of child malnutrition at meso-level through an analysis of the socio-economic characteristics of mothers with malnourished children attending Kilifi FLTC. The present section proceeds with a more detailed analysis of environmental factors at household level i.e. social-cultural and home-stimulation factors conducive to child malnutrition.

The social-cultural factors: indigenous beliefs and values and illness management; feeding and weaning practices; hygiene and parental care and support at the household level were taken as possible risk-factors (chapter 4). To study the effect of these factors a comparison was drawn between ten households with pre-school children who suffered from malnutrition (the index group) and ten households without cases of malnutrition (the control group). Both groups live in the same ecological area, (Kaloleni Location in Kilifi District), they belonged to the same ethnic group (Mijikenda), and shared the same overall socio-economic conditions i.e. they were matched on the "occupation of the father" (Table 9) and the "average acreage owned by the households" (which was approximately five acres; Table 10). All women were married and spouse to the head of the household and none of them had enjoyed formal education.

Table 9: Occupation of head of household

	frequencies index group	frequencies control group
Casual labourer	3	2
Farmer	6	5
Regularly employed or self employed	1	3

Table 10: Acres per holding

	frequencies index group	frequencies control group
Less than 3 acres	4	4
3 - 5 acres	4	2
6 -10 acres	1	3
More than 10 acres	1	1

Through case-studies during the first part of the study at Kilifi FLTC a number of unfavourable social conditions had been identified that could possibly have exacerbated the situation of malnutrition : "absence or lack of involvement of the father"; "heavy workload of the mother" or "lack of assistance from older children". These respective circumstances were assessed for both groups (Table 11).

Table 11: Incidence of unfavourable conditions

	frequencies index group	frequencies control group
a) Heavy workload of the mother	3	4
b) Lack of assistance from elder children	1	3
c) Absence or lack of involvement of the father	5	3
d) Polygamous unions	4	2
e) Not first wife	3	0

It appeared that, although these conditions were certainly relevant (especially (c) "lack of involvement or absence of the father") both groups encountered the same grade of unfavourable conditions.

Table 12 : Number of pre-school children under five years in household

Number of children	frequencies index group	frequencies control group
1	2	2
2	5	6
3	3	2

Only in one respect did the two groups differ somewhat. In the index group four women were married polygamously, compared to two in the control group. Of the four polygamous unions in the index group, only one out of four respondents had the status of first wife of the head of the household. In the control group the two women married in polygamous union were both first wife to the head of the household. The status of "first wife of the head of the household" generally implies a higher status and less duties to perform. The number of pre-school children per household was also similar and added up to around two per household (Table 12).

continue p.36.

Table 13: Averages and distribution of anthropometric measurements of children under five for index and control group

Critical values	index group	control group	test of difference
<i>weight for age</i>			
averages	74.6%	83.8%	(U=25, p< 0.5)
below 80%	6	2	
equal or above 80%	4	8	
<i>height for age</i>			
averages	88.5%	90.0%	(U=33, n.s.)
below 90%	7	3	
equal or above 90%	3	7	
<i>weight for height</i>			
averages	89.0%	92.8%	(U=27, p=0.5)
below 90%	6	2	
equal or above 90%	4	8	
<i>mid-upper arm circumference</i>			
averages	87.2%	89.0%	(U=33, n.s.)
below 90%	5	4	
equal or above 90%	5	6	

To assess the nutritional conditions of the children their weight-for-height (W-H), weight-for-age (W-A), height-for-age (H-A), and mid-upper-arm circumference (MAC) were measured using standard techniques (Table 13). On the average the children of the index group still had a less favourable nutritional status at the time of the study although they had been discharged from the FLTC some time ago. The group included more children falling below critical values of W-A (80), H-A (90), W-H (90) and M.A.C. (90). Statistical tests showed differences in weight conditions (W-A; W-H) between the two groups of children to be significant (Table 13: Mann-Whitney U; $p < 0.5$). However, none of the children included in the study showed signs of acute malnutrition.

As already mentioned, traditional beliefs with regard to health and disease remain strong among the Kilifi Mijikenda. Traditional beliefs considering the causes for sickness and pain are common and people remain confident of the traditional healer, the "mganga".

Some diseases are directly attributed to supernatural causes. Examples are tetanus, polio and malnutrition. Children suffering from what we call P.E.M. are considered to be "chirwa-ed" which means that the children are suffering because the parents violated a sexual taboo. These beliefs were shared by most respondents, including the women in the index group who had visited Kilifi FLTC. Informal interviews with the women suggested that the households in the control group were more prone to visit government dispensaries or M.C.H.-clinics and thus had incorporated some new ideas (such as the treatment of child diarrhoea with boiled water and salt) in their management of child sickness. However, the differences between the two groups were only marginal. The financial costs involved seem not to be a factor as traditional healers were said to charge as much as modern health workers.

Food preferences, food classifications and feeding and weaning patterns were studied as a separate risk-factor with the help of open-ended interviews. On the whole the two groups differed little and adhered closely to the general practices of the Mijikenda. During the first four to six weeks the women fed the infant "on demand" but gradually a definite feeding pattern developed which gave the mother time to carry out household and farm duties. Additional feeding usually started at the age of four to six months. At first these additional foods are liquids: cow's milk diluted with water or thin porridge of maize flour with milk or water. Later on mashed vegetables and sometimes fruits were added, and by one year of age the majority of infants were being fed the staples of the family diet: maize and cassava. Most women stopped breastfeeding their children some time between the first and second year of their life. In general, the child's diet was rather bulky containing little energy per unit weight due to a high fibre content and lack of fat. For this reason children are likely to have difficulty eating sufficient food to meet requirements with two or three meals a day.

A two-day period of observation by "trained observers" provided additional insight in mealtime arrangements; the duration of the interval between meals; weaning food; and,

behaviour during meals. During six meals (two consecutive days) it was observed whether the children were supervised and stimulated to eat or left to their own devices. Mealtimes were noted down and the general behaviour of the child was scored, i.e. whether they were quarelling, eating very fast etc. A composite score was derived from the scores of the various behaviour patterns distinguished. Adequate supervision and stimulation, orderly meal time arrangements and reasonable intervals between meals were scored positively (for full details see Appendix 4).

In most households the children were supervised and stimulated during mealtimes; in the index group in only two households the children were eating without supervision and in the control group in only one household. Most of the time their mothers or grandmothers watched over them. Most families ate three meals a day: a breakfast at seven or eight o'clock in the morning; a second meal between one and three o'clock and an evening meal that was taken between seven and nine o'clock. The duration of the interval between meals was recorded for all households and classified in three groups beginning with the shortest interval: i.e. less than five hours between meals followed by five to six hours between meals and more than six hours. No attempt was made to quantify the child's intake; the objective was only to determine when the infant had been fed. The mothers in the control group fed their children more regularly as the periods between meals were shorter. A comparison of weaning foods used by the mothers revealed that of the index group, only two households gave their children a so-called "balanced diet" (breast-milk, porridge, cow's milk and fruits). In the control group one household gave its children a balanced diet. Seven households in the index group gave their children only porridge and tea while three households in the control group used the same diet. Overall the control group scored slightly better on feeding than the index group but not significantly (Table 14).

Table 14: Average scores on home environment scales

	index group	control group	test of difference ¹
'Feeding'-scale	2.7	3.5	(U=27, n.s.)
'Hygiene'-scale	5.1	7.3	(U=23, p< 0.05)
'Parental Care & Stimulation'-scale	1.8	3.0	(U=8, p< 0.02)

1) Because of the large number of ties occurring among scores, an exact estimation procedure was used to calculate p. values.

Following Foster and Anderson, attention also focused on diet limitations administered at times of illness (cf. chapter 5). No special limitations were observed which could possibly endanger the condition of the children or cause malnutrition. During interviews it was learned that both groups often treated diarrhoea with dietary changes mainly of restrictive nature, as well as with herbs and appropriate magical ritual. The mothers usually gave a child with diarrhoea uji (thin porridge of maize flower with water) and occasionally the parents let the child starve for a day. In this respect no systematic differences were found between the two groups.

Hygiene behaviour was identified by several researchers as an important possible risk-factor. (Alleyne et al.,1977; McLaren & Burman, 1976; Morley, 1972; Ebrahim, 1982; Nabarro, 1981) As was pointed out in the theoretical outline, protection from environmental hazards including microbial and parasitic infestations depends largely on the parents care for hygiene (Chapter 4, p.1). Observations of hygiene were recorded during food preparation and consumption and notes were made on the cleanliness of children and compounds (after having agreed on a general definition regarding cleanliness with the research assistants) scores were calculated in a similar fashion as outlined above in connection with feeding, and a comparison of the hygiene scores of the two groups of households showed that the mothers from the control group had more concern for the cleanliness of their children (Appendix 5). Although the scores for hygiene in both groups were not high, the storage, handling, and preparation of solid

and liquid foods appeared to be less hygienic in the index group. During home visits it was further observed that washing of the hands before meals was not common: in both groups only the members of two households did this. Finally, sanitary conditions were often found to be inadequate among the households from the index group. Observation showed that only one out of ten households had a pitlatrine at their disposal. The Mann-Whitney U test showed the difference in hygiene score between the two groups to be significant (Table 14).

During the home-visits observations on infant social behaviour and parent-child interaction were also recorded. Previous findings of Cravioto and Delicardie stressed the importance of these factors in relation to child malnutrition (Chapter 5). During two consecutive days various types of stimulation given to the children were recorded (details of the observation and scale construction are presented in Appendix 6). Positive interaction scores reflected: (1) praising or admonishing or other stimulation during the day; (2) caressing or fondling of the children and reciprocal smiles or other responsive action during bathing of the children; (3) presence of caretaker and, (4) happy and active play of the child during the day. The observations revealed that parents and/or relatives from the control group provided more types of stimulation to their toddlers. They showed less deference giving praise or admonishing them; caressing and fondling them during washing and clothing or in general while looking after them during day-time. The children from the index group were found to sleep more, to be less active, and to stay closer to the mother. A comparison of the scores of the two groups showed a significant disparity in scores of stimulation offered to the children in favour of children from the control group (Mann-Whitney U; $p < 0.02$), which indicates that this has been one of the factors in the occurrence of malnutrition among these children (Table 14).

9. Conclusion

The aim of this study was to investigate the occurrence of childhood malnutrition in Kilifi District. The study started with an analysis of the socio-economic characteristics of women with malnourished children attending Kilifi FLTC. Although these women generally experienced a lack of resources, they did not differ on important socio-economic variables from the general population in Coast Province who are living at similar low-income levels. Lack of resources, marital instability or low education are not directly associated with the occurrence of malnutrition, although polygamy coupled with lack of support and involvement of the father seems to be of relevance.

Earlier research among women who attended FLTC's in Central and Western Kenya, found important differences between the aetiology of malnutrition in these different parts of the country (Hoorweg & Niemeyer, 1982; 1988). While in Central Province rural poverty and marital instability played a major role, in Western Kenya this relationship was not found. Here malnutrition was linked with factors such as inexperience of mothers, feeding habits and child-rearing practices. Moreover, the families in Western Kenya were more often extended in type with more sharing of responsibility for children. In Coast Province many of the families are also extended in nature, so that it is difficult to gain an accurate idea of individual resources. One might further speculate whether rural poverty as such fails to be a distinguishing factor, because land is not a scarce commodity, contrary to the situation prevailing in Central Province.

The second part of the study further concentrated on aspects of the child-environment at household or micro-level. Information was collected regarding Mijikenda food patterns and indigenous concepts of causation, cure and prevention of childhood malnutrition. Traditional beliefs with regard to health and disease remain strong among the Kilifi Mijikenda and people remain confident of the traditional healer, the "mganga". The

symptoms of malnutrition are usually not associated with inadequate feeding, infections or worm infestations but are seen as being caused by the transgression of sexual taboos by the parents. It is therefore not readily accepted that supplementary feeding forms an essential part of the treatment of malnutrition.

To investigate the possible influence of intra-household factors on the occurrence of malnutrition, attention next focused on feeding and weaning patterns. Hygiene, parental care and home-stimulation. Important variations in respect of these behavioural aspects were found, particularly as regards child-caretaker relationships. In households where no malnutrition had occurred children were provided with more types of stimulation.

The first part of the study was carried out among mothers and children when admitted to the centres, that is concurrent with the episode of malnutrition. The second part of the study was retrospective in nature, that is mothers were followed several months after they had been discharged and the various intra-household variables were investigated at that time. It would have been preferable, if these factors had been studied during the development of the malnutrition among the children, but this was not possible because of the much greater research effort needed. In the analysis it has been assumed instead that the behaviour patterns of the mothers had not changed fundamentally as a result of their recent experiences. At first sight this assumption appears debatable since the FLT programme has behaviour modification of the mother as a main objective in order to avoid malnutrition in the future. However, earlier evaluation studies indicate that the influence of the intervention is actually quite modest (Hoorweg & Niemeyer, 1982; 1988). The chances that profound behavioural changes had occurred among these women are small. But, even if such changes had occurred, this would only have affected the possibility of wrongly concluding that there were no differences between the two groups of women compared. It would not have a bearing on the interpretation of the actual finding, namely that the mothers who had attended the FLTC still differed

in their behaviour patterns from mothers without malnourished children. In fact, it makes such a finding all the more pregnant.

The results of the present study confirm findings in Mexico by Cravioto & Delicardie (1975) that malnutrition was more likely to occur when parents or relatives could only give hurried and preoccupied attention to their children and when they were not able to develop close sensitivity to the child's needs. However, there is a problem of interpretation regarding the direction of cause and effect. It is quite possible that unresponsiveness of a sick child may have generated a feeling of hopelessness on the side of the mothers and other relatives, leading to a subsequent (or increased) lack of attention on their part. The question is unanswered whether a malnourished child generates a lower level of stimulation on the caretaker's part, or whether lack of stimulation of the caretaker leads to an increased risk of malnutrition.

The few studies that have examined nutritional deficits and concurrent social and emotional behaviour have consistently found increased irritability; inability to tolerate frustration and low activity level on the part of malnourished children. The wellnourished infant appears more successful at engaging caretakers in interaction while the undernourished or malnourished child is responded to less often and with less sensitivity, a pattern which may result in a failure to develop normal patterns of social interaction, persisting even into school age (Barrett et al., 1982; Chavez & Martinez, 1979).

The present findings, however, not only indicate that a relationship between childhood malnutrition and home stimulation exists, but that it persists beyond the acute episode and subsequent rehabilitation. The lack of home-stimulation may possibly lead to relapses, but the fact that it persists after rehabilitation could well be an important factor in the developmental retardation that has been found at later ages among the victims of childhood malnutrition. This observation is in line with recent thinking regarding the

relation between malnutrition and cognitive development, which tends to emphasize the complex interrelationships between socio-economic conditions, home environment, malnutrition and child development.

Consequently emphasis during rehabilitation should not be only on nutritional requirements and general child care, but also on individual attention and stimulation given to the child, so that these children may eventually return to a safer and more favourable home environment.

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Appendix 1

Kilifi Family Life Training Centre Year : Admissions 1984/1985

	<i>mothers</i>	<i>sick children</i>	<i>healthy children</i>
<i>Ganze Division</i>			
Bamba location	9	10	3
Kauma location	7	7	1
Sokone location	9	8	1
Vitengeni location	12	14	14
Ganze location	7	7	4
Thingiria location	2	1	
Sub-Total	46	47	23
<i>Malindi Division</i>			
Ganza location	6	7	5
Magarini location	12	13	8
Marafa location	4	5	-
Gede location	8	12	4
Madunguni location	5	5	-
Fundisha location	5	5	-
Malindi location	4	4	-
Adu location	3	3	1
Chakama location	1	1	3
Dagamra location	1	1	-
Sub-Total	49	56	21
<i>Kaloleni Division</i>			
Kaloleni location	16	18	8
Kambe/Ribe	4	5	2
Chonyi South	7	7	3
Chonyi North	10	13	3
Kayafungo location	13	13	3
Mariakani location	7	10	2
Duruma location	13	15	3
Jibana location	5	8	2
Sub-Total	75	89	26
<i>Bahari Division</i>			
Tezo location	22	24	14
Takaungu location	19	21	13
Junju location	4	4	2
Roka location	13	13	4
Mtwapa location	8	9	-
Sub-Total	66	71	33
<i>Total</i>	236	263	103

Appendix 2

FLTC - Questionnaire (translated in English)

- 1) What is your name, please? and the names of your children?
(Je, unaitwa nani bibi? na watoto wangu wanaitwa nani?)
- 2) How old are you?
(Je, una miaka mingapi)
- 3) How many boys and how many girls do you have?
(Una watoto wakiume na wakike wangapi?)
- 4) When were your children born?
(watoto wangu wamezaliwa lini au wana miaka mingapi?)
- 5) Do you have a child which is still breastfeeding?
(Una mtoto ambao anaononya?)
- 6) Is there a man in your house⁴ If yes, how many wives does your husband have?
(Je, uko na bwana? Bwana yako ana bibi wangapi?)
- 7) Did you go to school? If yes, which class did you reach or did you follow adult education?
(Je, ulianda shuleni? Ulifika darasa la ngapi? Ulisoma darasa la watu wazima?)
- 8) Are there any off-farm activities?
(Je, unafanya kazi yoyote?)
- 9) Where do you live?
(Je, unaishi mtaa gani? kijiji gani?)
- 10) What sort of work do you do? and your husband?
(Je, unafanya kazi gani? bwana yako anafanye kazi gani?)
- 11) Where does your husband work?
(Je, bwana yako anafanya kazi wapi?)
- 12) Does he return every day or does he stay there?
(Je, anakuja nyumbani kila siku au anishi huko huko?)
- 13) When did he leave? When will he return home?
(Je, Alihamia, huko lini na anakuja kwa kila baada ya muda gani?)
- 14) How does he send money home?
(Je, hukuletea pesa kwa njia gani?)
- 15) Are you a member of a women's group?
(Je, ulijiunga na kikundi cha kina mama?)
- 16) If yes, what's the name of your women's group, please?
(Je, kikundi chenu kinaitwaje?)
- 17) Could you describe the style of your house? (Swahili or other)
(Nyumba yako ina mtindo mjengo wa kiswahili au wa kienyeji?)
- 18) The roof is made of what material?
(Paa la nyumba yako limezekwa na nini? makuti, mabati au nyasi?)

⁴Sometimes it was difficult to translate the question back into English. The Swahili form however was the proper way to ask this question.

- 19) How has the floor been made?
(Je, nyumba yako ina sakafu ndani?)
- 20) Is there a separate room for cooking?
(Kuna chumba ch kupikia?)
- 21) Who is responsible for the cooking at home?
(Nini anaye husika na upishi?)
- 22) Where do you get your drinkwater from?
(Unachota wapi maji ya kunywa?)
- 23) What is the distance to the watersource?
(Ni umbali gani kutoka nyumbani mpaka kule unakochota maji?)
- 24) Is there a pitlatrine?
(Je, kuna choo kwako nyumbani?)
- 25) Before you gave birth to this child, did any of your children die?
(Je kabla ya kuzaa mtoto huyo, ulipata mtoto mwengine aliyeharibika?)
- 26) Was the child ill?
(Je, alikuwa akiuguwa ugonjwa gani?)
- 27) What were the symptoms?
(Dalili ya ugonjwa ulikuwa ni nini?)

Appendix 3 : OBSERVATION SCHEDULES

CONFIDENTIAL

Household Nr.

OBSERVATION SCHEDULE 1A

Name

Date

Time

Name

Household head

Is he normally present? Yes/No

If not normally present, indicate why :

Other members

Indicate relation to the head of the household:

	Name of	Rel. to Head	Present yes/no	Reason of Abs.
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

Appendix 3, continued

CONFIDENTIAL**OBSERVATION SCHEDULE 1B**

Mealtimes

Breakfast

Lunch

Dinner

Mealtime arrangements; with whom do the children eat?

Name of the Child	Sex	Birth Date	Age	Eats with mother; other caretaker etc.
	boy/girl			

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

How is the food served?

	common dish	separate dish	Describe Weaning Food:
Staple food	yes/no	yes/no	
Meat	yes/no	yes/no	
Fish	yes/no	yes/no	
Fruit/Vegetables	yes/no	yes/no	

Appendix 3, continued

CONFIDENTIAL**OBSERVATION SCHEDULE 1C**

Hygiene during meal preparation

Cleanness of 1) cooking pot/sufuria
2) cooking place
3) bowls
4) other utensils

Are the green vegetables washed?	Yes/No
----------------------------------	--------

What is used to clean the utensils?	Water/Soap	Yes/No
	Water only	Yes/No
	Sand	Yes/No

Hygiene during consumption

Cleanness of hands of the children:

Describe behaviour of the children in general, during mealtime:

Time spent from.....to.....

Appendix 3, continued

CONFIDENTIAL

OBSERVATION SCHEDULE 2A

Name household head:

Date:

Time:

Observe during the whole day and describe:

A) Children are praised?

Name of the child

- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
 - 7.
 - 8.
-

Appendix 3, continued

CONFIDENTIAL

OBSERVATION SCHEDULE 2B

observe during the whole day and describe:

B) Children are admonished ?

Name of the child	Reason of admonish.	admonished by mother, father or other caretaker	Frequency
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

Appendix 3, continued

CONFIDENTIAL**OBSERVATION SCHEDULE 3A**

Name of the household head:

Present Yes/No

If not, state reason of absence:.....

Describe for all children, during the morning:

Name of the child	Totally washed?	If yes with water/soap?	Dressed by?	Caressed by	Reaction of the child?
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Appendix 3, continued

CONFIDENTIAL
OBSERVATION SCHEDULE 3B

Describe for all children , when the mother is at home (working)
who is looking after the children

	Name of the child	Caretaker (s)	Activities of the child	Behaviour of the caretaker
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Appendix 3, continued

CONFIDENTIAL**OBSERVATION SCHEDULE 3C**

Describe for all children, when the mother is working at the shamba, or is away
who is looking after the children?

	Name of the child	Caretaker	Activities Of the child	Behaviour of the caretaker
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Appendix 3, continued

CONFIDENTIAL**OBSERVATION SCHEDULE 3D**

Is the compound safe? Yes/No

If not , describe why:

Describe for all children during the evening:

Name of the child	Totally washed?	If yes with water/soap?	Dressed by?	Caressed by	Reaction of the child?
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Appendix 4

Comparison of Scores on Feeding Scale for Index and Control Group (Number of Households/Children in Respective Categories)

	Index group	Control group	(scale) (value)
<i>Mealtime arrangements</i>			
children are supervised and stimulated during mealtimes	8	9	(1)
<i>Hours between meals</i>			
less than 5 hours	2	3	(2)
5 to 6 hours	5	4	(1)
more than 6 hours	3	3	(0)
<i>Weaning food</i>			
porridge and milk and fruits	2	1	(2)
porridge and fruits	1	6	(1)
porridge and tea	7	3	(0)
<i>Behaviour during mealtimes</i>			
no crying or messing with sitting positions	5	8	(1)
<i>Average score</i>			
'food'-scale (U=27, p< 0.15)	2.7	3.5	

Between brackets: the scale value used in the calculation of the scale scores.

Appendix 5

Comparison of Scores on Hygiene Scale for Index and Control Group (Number of Households/Children in Respective Categories)

	Index group	Control group	(scale) (value)
<i>Hygiene during meal preparation</i>			
a) cleanness of cooking pot clean	4	7	(1)
b) cleanness of cooking place clean	6	8	(1)
c) cleanness of bowls clean	3	7	(1)
d) other utensils clean	5	8	(1)
<i>Washing of vegetables</i>			
washed	4	5	(1)
unknown		3	(1/2)
<i>Hygiene during consumption</i>			
hands washed before meals	3	3	(1)
unknown	1		
<i>Washing of children</i>			
twice a day	5	4	(2)
once a day	5	5	(1)
not all	0	1	(0)
<i>Children are washed with:</i>			
water and soap	5	6	(1)
<i>Cleanliness of compound</i>			
compound is:			
swept	3	5	(1)
pitlatrine present	1	9	(1)
pitlatrine unknown or collapsing	3	1	(1/2)
<i>Average score</i>			
'hygiene'-scale (U=23, p < 0.05)	5.1	7.3	

Between brackets: the scale value used in the calculation of the scale scores.

Appendix 6

Comparison of Scores on Parental Care and Stimulation Scale for Index and Control Group (Number of Households/Children in Respective Categories)

		Index group	Control group	(scale) (values)
1)	praising or admonishing or other stimulation during the day	1	3	(1)
2)	caressing or fondling during washing and dressing	7	9	(1)
3)	presence of caretaker during the day	5	9	(1)
4)	condition of the child good and it is playing happily	5	9	(1)
<i>Average score</i>	'stimulation'-scale (U=8, p< 0.02)	1.8	3.0	

Between brackets: the scale values used in the calculation of the scale scores.

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