

COST AND EFFECTIVENESS OF REHABILITATING  
PROTEIN-ENERGY MALNOURISHED PRE-SCHOOL  
CHILDREN IN SIAVA DISTRICT - WESTERN KENYA //

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BY

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A thesis  
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in

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1990

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DECLARATION

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



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NUNGO RHODA AZIKOYO

This thesis has been submitted for examination with our approval as University supervisors.

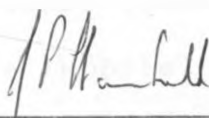
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### Intermediate objectives

- a) To provide continued recovery of children after discharge from a nutrition rehabilitation centre,
- b) To prevent malnutrition in younger siblings and other children through education of the mothers in child feeding practices and through other ways of promoting satisfactory growth of their children.

### Long term objectives

To improve the health status of the pre-school children in the community through diffusion of knowledge acquired by mothers who have attended the centres.

There are two assumptions made by rehabilitation programs; malnutrition in the pre-school child is due to inadequate and inappropriate use of available resources; and children with underlying complicating pathology may readily be screened out at admission so that only children suffering from primary malnutrition are admitted.

### The problem at stake

The Kenya government spends a sizable sum of funds on nutrition rehabilitation in Family Life Rehabilitation Centres (FLTCs) yet very little evaluation has been done to establish



the cost of running them, nor the extent of their effectiveness. Githagui tried to evaluate the effectiveness of Butula FLTC in Busia (Githagui, 1980). While doing a baseline survey of Lwak FLTC, Kaseje, et. al. remarked that the 'programs had fallen short of evaluation', since there were no baseline studies done before program implementation (Kaseje et. al., 1983, 84).

Given the reputedly high cost associated with nutritional rehabilitation as well as the relative scarcity of information of its effectiveness in our country, the author of this investigation set out to determine the cost of rehabilitating protein-energy-malnourished pre-school children as well as to establish whether there was an association between maternal knowledge acquired in the FLTC to improve nutritional status in their children and long-term maintenance. In this context, effectiveness of rehabilitation was being measured by long-term maintenance of the children's' nutritional status and the prevention of malnutrition in subsequent siblings.

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**ABSTRACT**

An investigation was carried out for the purpose of determining costs and effectiveness of a nutrition rehabilitation centre in Siaya District, Western Kenya. For this purpose, the Lwak Family Life Training Centre (FLTC), Siaya District, was chosen. As a first step, records on all children admitted to this centre in 1985 that were available were screened and relevant information was extracted. Subsequently, and as far as families could be traced, a visit was paid to each of the children's homes. The children as well as their younger siblings were examined for their current nutritional status, and their mothers were subjected to structured interview. The study was retrospective with respect to the criteria of the children's admission, their courses in the rehabilitation centre as well as the ultimate outcome of rehabilitation. It was concurrent with respect to mother's knowledge, attitude and practice, as well as the nutritional situation of younger siblings. The cost of running the Lwak FLTC was calculated from recurrent costs, capital investment costs (amortized) and opportunity costs to mothers, i.e. the amount of money, mothers could have earned had they not been "immobilized" at the rehabilitation centre. Effectiveness of the program was measured by (a) the proportion of children reaching an "acceptable" nutritional situation (b) their long-term maintenance of the nutritional status,

and (c) the extent of prevention of malnutrition in younger siblings. Costs of "rehabilitating" Protein-Energy-Malnourished (PEM) Pre-School children were determined using both the Lwak-, as well as the World Health Organization's (WHO) criteria for "successful" rehabilitation.

The results showed that 413 children had been admitted in that year, 20 of them re-admissions. The majority of children (83% had suffered from either kwashiorkor or marasmus. Altogether 35 deaths occurred among this group during the period of rehabilitation. The cost of running the FLTC in that year amounted to Kshs. 590,247.00. Cost per child admitted was Kshs. 1,429.17. Using the "Lwak criteria" of successful rehabilitation, the costs per child came to Kshs. 3,451.74; according to WHO criteria, to Kshs. 10,355.21. Of the 320 children qualifying for follow-up, a further 57 (18%) had died between discharge and the authors' follow-up. A total of only 129 could be traced, hence, were physically examined. From among these, 71% had maintained their nutritional status, measured in terms of weight-for-age at or above 80% of the NCHS standard. Siblings were found to have a significantly higher prevalence of stunting 41% than the Nyanza average at 29%. Despite obvious stunting, children had no clinical signs of malnutrition and, in-fact 83% were found to be well-nourished i.e. they were at

or above 80% of the standard weight-for-age while 52% were above 90% of the weight-for-height median.

Overall, the food consumption of children after discharge had improved suggesting that mothers had indeed changed their feeding practice.

# CHAPTER 1

## 1.0 INTRODUCTION

### 1.1.0 Statement of the Problem

Cost and effectiveness studies on rehabilitation of protein-energy malnourished pre-school children have not been given much publicity in the past. Cost studies are difficult to deal with since there are many items required apart from material goods and salaries that go into the development and implementation of an intervention, some of which are difficult to price. Quite often scholars have looked at areas of their particular interest only. Program costs include all infrastructural inputs, also referred to as capital investments, outputs, i.e. operating expenses in relation to their outcomes are measured as effectiveness. Outcomes are generally expected to meet the set objectives. There are very few studies that have been carried out on cost effectiveness of nutrition rehabilitation in Kenya. A number have been undertaken in other countries where both the economic situation and the cultural and development status may, however, be comparable to the situation in Kenya.

Protein-energy malnutrition (PEM) is the most prevalent form of malnutrition\* in all developing countries. PEM often affects the "under-five" child population and has been categorised into :

## I Kwashiorkor

Kwashiorkor is caused by deficient protein intake and is characterised by oedema (swelling) of the hands and feet, retarded growth, apathy (misery) and hair changes. Hair becomes sparse and is easily pulled out, curly hair grows straight. The skin may be pale and the child may have anemia and loss of appetite.

## II Marasmus

Marasmus is caused by inadequate intakes of both protein and energy and is characterised by severe growth retardation as manifested by low-weight-for-age (usually below 60% of the NCHS reference median. This reference is also used as standard for the assessment of child development by the World Health Organization

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\*(malnutrition is referred to in this paper as: the imbalance of health status due to inadequate intake and utilization of nutrients in the body).



(WHO). There is wasting of the muscles and subcutaneous fat and the child looks like a "wizened little-old-man".

### III Marasmic-Kwashiorkor,

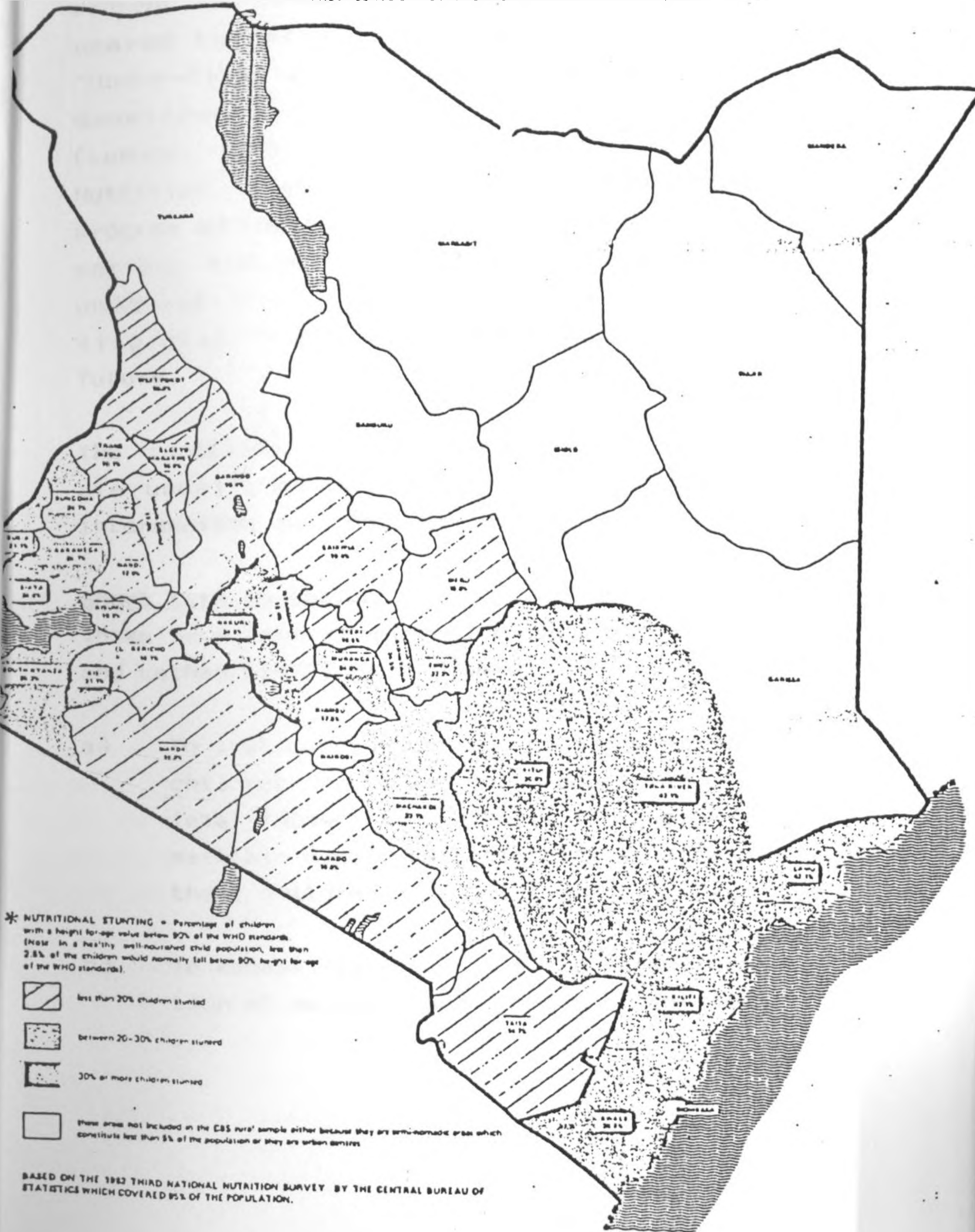
is a combination of the above (Jelliffe, 1966; Derby and Patwardhan, 1976; Cameron and Hofvander, 1983).

Malnutrition in a given child community is usually measured by the extent of nutritional stunting (i.e. the percentage of children with a height-for-age below 90% of the NCHS standard). According to WHO, "In a healthy, well-nourished child population, less than 2.5% of the children would normally fall below 90% height-for-age". In Kenya nutritional wasting or acute malnutrition only affects a small proportion of the child population (3%) while nutritional stunting or chronic malnutrition has a high prevalence (24%).





As shown in Map 1, Siaya district is the third district with respect to levels of malnutrition. As indicated, 38.6% of the children below five years of age fall below 90% of the height-for-age median, highlighting the nutritional problems among the child population (Agunda, 1984).

Map No. 1

CHILD NUTRITION (3-60 MONTHS) IN RURAL KENYA 1982  
PREVALENCE OF NUTRITIONAL STUNTING BY DISTRICT\*



\* NUTRITIONAL STUNTING = Percentage of children with a height-for-age value below 90% of the WHO standards (those in a healthy well-nourished child population, less than 3% of the children would normally fall below 90% height-for-age of the WHO standards).

-  less than 20% children stunted
-  between 20-30% children stunted
-  30% or more children stunted
-  these areas not included in the CBS rural sample either because they are semi-urban areas which constitute less than 5% of the population or they are urban centres

BASED ON THE 1982 THIRD NATIONAL NUTRITION SURVEY BY THE CENTRAL BUREAU OF STATISTICS WHICH COVERED 95% OF THE POPULATION.

Malnutrition can be very detrimental to a child's overall development and health. To prevent or combat it, intervention programs geared to better nutrition status of the "Under-fives", child population have been developed and tried all over the world (Lunven, 1983; Kennedy and Alderman, 1985). Nutrition rehabilitation is an intervention program addressing the child at acute risk of serious and possibly permanent damage from under-nutrition. By involving the mother it also aims to prevent malnutrition in the future.

The functions of nutritional rehabilitation are usually given in terms of short-term, intermediate and long term objectives.

#### Short term objectives

These have been summarised by Beaudry-Darisme and Latham (1973) as follows :

- a) To instruct the mothers of malnourished children in the use and preparation of local foodstuffs that will improve or maintain a good nutritional status in their children
- b) To rehabilitate, or initiate rehabilitation of malnourished pre-school children.

### Intermediate objectives

- a) To provide continued recovery of children after discharge from a nutrition rehabilitation centre,
- b) To prevent malnutrition in younger siblings and other children through education of the mothers in child feeding practices and through other ways of promoting satisfactory growth of their children.

### Long term objectives

To improve the health status of the pre-school children in the community through diffusion of knowledge acquired by mothers who have attended the centres.

There are two assumptions made by rehabilitation programs; malnutrition in the pre-school child is due to inadequate and inappropriate use of available resources; and children with underlying complicating pathology may readily be screened out at admission so that only children suffering from primary malnutrition are admitted.

### The problem at stake

The Kenya government spends a sizable sum of funds on nutrition rehabilitation in Family Life Rehabilitation Centres (FLTCs) yet very little evaluation has been done to establish

the cost of running them, nor the extent of their effectiveness. Githagui tried to evaluate the effectiveness of Butula FLTC in Busia (Githagui, 1980). While doing a baseline survey of Lwak FLTC, Kaseje, et. al. remarked that the 'programs had fallen short of evaluation', since there were no baseline studies done before program implementation (Kaseje et. al., 1983, 84).

Given the reputedly high cost associated with nutritional rehabilitation as well as the relative scarcity of information of its effectiveness in our country, the author of this investigation set out to determine the cost of rehabilitating protein-energy-malnourished pre-school children as well as to establish whether there was an association between maternal knowledge acquired in the FLTC to improve nutritional status in their children and long-term maintenance. In this context, effectiveness of rehabilitation was being measured by long-term maintenance of the children's' nutritional status and the prevention of malnutrition in subsequent siblings.

## CHAPTER 2

### 2.0 LITERATURE REVIEW

#### 2.1.0 Background of Nutrition Rehabilitation

According to documented evidence, 'Nutrition Rehabilitation' was started in 1950s by Bengoa. At that time there was a lot of emphasis on Kwashiorkor and its treatment. There was less concern about other forms of PEM and their prevention. Yet, when these other forms progressed into severe malnutrition, expensive hospitalization was similarly required which, in turn, was not readily available. As a consequence, malnutrition was associated with high case fatalities (Beaudry-Darisme and Latham, 1973). In his attempt to reduce child mortality due to malnutrition, Bengoa proposed the development of Nutrition Rehabilitation Units (NRUs) which could supplement hospital treatment.

The NRUs according to Bengoas perception had the following features :

- a) Be an ordinary village-house staffed by 1-2 'intelligent' village women with practical training in nutrition and child-feeding.

- b) Be economical to run and provide services at a fraction of the cost of hospitalization.
- c) Accommodate about 30 children who would require 3 or more good meals a day.
- d) for 8-10 hours per day for a period of 3-5 months.
- e) Mothers of children attending NRUs would provide one day of work per week to reduce cost of running the centre and also get active learning experience of improved child feeding practices using local foods, and also of other aspects of health and hygiene (Beaudry-Darisme and Latham, 1973). In 1958 a WHO Expert Committee on Medical Rehabilitation held the same view as Bengoa. "The main aim of medical rehabilitation is not only to restore the disabled person to his previous condition but to develop his physical and mental functions to the maximum" (Schneideman et. al., 1965-67).

During the sixties and seventies, many countries like Haiti, Guatemala, Uganda, Chile, The Philippines, Tanzania, Zambia, Kenya as well as others set up rehabilitation centres based on Bengoa's perception with modifications in structure and operation as dictated by local conditions. There are,

hence, several types of NRUs all over the continent under different names as follows :

1. Hospital rehabilitation (in-patient)

Treatment takes place within the hospital. As a rule, children are admitted who are both severely malnourished and have other complications such as measles, diarrhoea, pneumonia, etc. These children are treated on an emergency basis. Hospital treatment has been seen to be very expensive. Therapy is mainly curative where doctors/nurses take charge while the mother is a passive bystander observer (Jelliffe, 1966, 1975).

2. Out-patient rehabilitation

Usually takes place in the Maternal and Child Health Care program of the hospital or health centre where the mother takes the child once a month. The child's weight is taken and mothers are instructed on child-care by a nutritionist or nurse. This type of rehabilitation has been found to be relatively inexpensive since the mothers usually live within walking distance (Dagnelie, 1979).

3. Day-care Centres

Children are taken by their mothers daily to the centre for feeding and weighing.



Nutrition education is provided for the mother as she participates in the preparation of the food as well as during the feeding of the child. In any given area with a high prevalence of PEM, the NRU establishes itself within a given village, making use of a village house as its physical structure. It remains there until no more malnourished children are encountered within walking distance, and then moves to the next location with high PEM prevalence (Lunven, 1983; Cutting, 1983). This method of nutritional rehabilitation has been found to be significantly cheaper than if based within, or attached to a hospital.

#### 4. Domiciliary (home) rehabilitation

The nutritionist, social worker or health worker visits the homes of malnourished children, weighs them and instructs the mother in her home on healthy nutrition, domestic hygiene, food preparation, and, among others, on how to start a kitchen garden. This has been found to be both the most practical and effective method of rehabilitation since the nutritionist/nurse teaches in relation to what is visible and available in the child's own environment (Lunven, 1983; Blankart, Latham and Schulpen, 1977). Unfortunately, the author of this investigation could not obtain information on costs of this type of NRU specific enough to lend itself to comparison.

#### 5. On-site (mobile) Rehabilitation

Nutritional rehabilitation is also performed through mobile teams. If so, the actual care and follow-up is usually performed at fortnightly or longer intervals. Children are periodically weighed and mothers remain enrolled and are given nutrition education until the child improves. If the nutritional status of the child is severe, the team refers him/her for hospitalization. The mothers usually contribute food from their gardens and often get rations of milk for the child from the mobile NRU (Dagnelie, 1979). The method of rehabilitation has been found to be inexpensive.

#### 6. Residential Rehabilitation

Mother and child are institutionalised for a varying period of time. The child is weighed once a week or fortnightly, depending on the schedule at the NRU. The mother is instructed on food preparation and "proper" child-feeding using locally available foods. Mothers work in the NRU kitchen garden and also help with other chores at the NRU. This type of NRUs may be situated near a hospital and be part of it. In some countries, community members, such as women leaders also participate. Residential NRUs have been found to be less expensive than hospitalization and have been shown

to be quite successful in terms of catch-up growth after discharge (Koppert, 1972; Dagnelie, 1979; Lunven, 1983). Costs of this type of NRUs have not been uniform, but investigators generally found it to be less expensive than hospitalization.

Before 1974 in Kenya, NRUs were run by voluntary organizations such as the Red Cross Society, Catholic Relief Services or other missionary groups. The government took over the running of residential NRUs under the Ministry of Culture and Social Services in 1974. The NRUs then adopted the name Family Life Training Centres (FLTCs).

Investigations into cost-effectiveness of rehabilitation centres reveal that quite a number of studies have been carried out worldwide including also in some districts of Kenya. No studies have been carried out specially in Siaya district even though malnutrition there is rampant and nutrition rehabilitation is being practiced.

#### 2.1.1 Cost of Rehabilitation

While evaluating the effectiveness of mothercraft centres in Haiti, King et. al., (1978), observed that "numerically the greater benefit from the centres was on prevention". At a cost of US \$ 4034, a typical centre would successfully treat malnutrition and prevent

relapse in 105 children. In addition, it provided protection against severe malnutrition to their (306) younger siblings. Their cost break-down was as follows :

a) Direct expense

Salaries	\$	1071
Rent and maintenance	\$	228
Food and fuel	\$	1040
Miscellaneous	\$	267

b) Support expense

Office supplies	\$	38
Salaries and wages of administrative services	\$	1117
Transport	\$	273
Total		4034

Their study included eight mother-craft centres run by the "Hospital Albert Schweitzer". In the same paper the authors provide detailed costs for three mother-craft centres under : Salaries, Food, Supplies, Rental, Incidentals and Supervision. There was, however, no mention of the number of children rehabilitated, making cost-effectiveness calculations impossible.

As pointed out by Beghin (1973), the cost of a bed-day at a hospital was 10 times more expensive, with a range of 4.5 to 18 times,

than at a day-care centre. The Table in Appendix II from Beghin and Viteri (1982) summarizes average costs of rehabilitation from several countries.

Dagnelie (1979) carried out what he termed, "experimental mobile nutrition rehabilitation" in Embu, Kenya and concluded that costs were lower than at residential NRUs but would be more expensive than out-patient rehabilitation since the out-patient mother attended once a month as opposed to the one coming to the mobile NRU who had to attend fortnightly. In his breakdown of costs, he included the following line items : Staff salaries, transport, monthly lunch allowance for field workers and program cost (charcoal, gas sugar etc.).

In his experiment, mothers brought most of the food and the district hospital provided vegetables free of charge. His cost accounting was as follows :

- cost per child admitted	Kshs.	78
- cost per child who finished the NRU course	Kshs.	125
- cost per child with satis- factory (long-term) recuperation)	Kshs.	212
- cost of one visit of one child	Kshs.	15
- total costs for one attendance day of the NRU-Embu	Kshs.	165
Total costs per year (1974 base)	Kshs	13757

Dagnelie concluded that the cost of a mobile NRU was only 9% that of a hospital based one, 25% less than that of a residential NRU, and 17-75% of the costs of other different day-care NRUs.

The report from the Child Care and Adoption Society in Zambia indicates that residential rehabilitation costs 13 Ngwee per child with the following items considered (Koppert, 1972):

- Salaries of housemothers
- Electricity
- Soap and fuel
- Food
- Part-time staff
- Maintenance
- Extras (Transport)
- Capital write-off

Although this was only a report, it gives more explicit cost breakdowns along FAO guidelines on Cost evaluation (FAO 1980). The only essential item not mentioned in this list is water which is important in an urban setting.

#### 2.1.2 Nutrition Education of the Mother

Several authors report favourably on the knowledge acquired by mothers in the course of feeding their own children while in the rehabilitation unit. During home visits following

residential rehabilitation, Schneidemann et. al., (1972), observed that 65% of the mothers were cooking separately for their children, using protein-rich foods as taught. Dagnelie also was of the opinion that the knowledge gained by mothers was put indeed into practice back home. He deplored the fact that little if any of this knowledge diffused into the community. Githagui (1980) carried out a study in Busia (Kenya) with the objective of improving the effectiveness of a centre in Butula. He observed that mothers' knowledge on nutritional education improved but there was little change in home diets. This he speculated, was mainly due to limited purchasing power.

From their review of the literature Beaudry-Darisme and Latham were of the opinion, namely, that mothers' nutritional knowledge improved which could be measured by improved child nutritional status. On the same issue, Kennedy and Alderman (1985) concluded from their studies in Guatemala and Haiti that maternal nutrition knowledge had improved. This they measured on the basis of improved incomes which were used to purchase food in turn leading to improved child nutrition. The two concluded that "the most effective means to improve nutritional status were nutrition education and growth monitoring".

Namboze (1973), had done a follow-up study on six children discharged from a rehabilitation

centre. She similarly maintained the view of improved maternal knowledge but cautioned that follow-up in the home had to be carried out to give support since "there were other complicated social factors which could lead to a child's relapse".

In a follow-up study with two colleagues on discharged children from a hospital in the West Indies, Cooper (1980) concluded that catch-up growth in the hospital was very rapid but children relapsed at home due to other factors. The authors observed that, "there was need for more nutrition education and help in solving personal and social problems, and there was very little, small scale or large scale nutrition rehabilitation could achieve in the long run".

### 2.1.3 Prevention of Malnutrition in Younger Siblings

Ryland et. al., (1975) in their follow-up study in Haiti observed that children who had attended a rehabilitation centre and their siblings were much better-off than those who had not. This they attributed to maternal education gained in the course of rehabilitation put into practice.

Brown and Brown (1980), were disappointed from the results of their follow-up in Zaire. They looked at the progress of children at three



intervals following their discharge, at three months, between three months and one year and after a year. They found that there was only 1-3 cm gain in height after one year, which they found very disappointing. The authors were of the opinion that NRUs "were not worth their effort in the long-run if there was no marked change in nutritional status of children". They concluded the poor results to have been due to :

- inappropriate methods of teaching mothers,
- food mixes used at rehabilitation may not have been available at home due to limited purchasing power,
- mothers did not follow what was taught,
- demonstrators might have been poorly taught themselves. With only 1-3 cm increase in height per year, they suggested that the specific NRU's under observation be carefully looked into as to modes and methods of operation. They, however provided no alternative suggestions as to the management of severely malnourished children.

Beaudry-Darisme and Latham (1973) in their study found that weight-for-age of siblings of rehabilitated children tended to be higher when compared to a control group from the general population. Berggren (1972) monitored

all of 1,700 Haiti children from 0-6 years living in a given area on a monthly basis for two years. He observed that siblings of children discharged were better nourished, and death rates in the 1-4 year population specific to PEM had definitely decreased.

#### 2.1.4 Unresolved Research Issues

##### a) Cost evaluation

In the 60's and 70's no general guidelines were set on how to evaluate cost. Authors arbitrarily decided on what cost items to include or leave out. In the 80's the Food and Agriculture Organization (FAO) set up guidelines where costs included all program inputs in relationship to the number of those who benefited, but not all researchers have adopted, or, perhaps been able to adopt these. Most authors of programs cited in this report concluded that it was cheaper to have NRU's outside the hospital without giving much thought either to precisely how much cheaper it would be, or to the actual costs at which NRUs operate or actually amount to.

##### b) Comparison of cost

From among the authors quoted, Dagnelie, Beurdry-Darisme, Latham, Beghin and Koppert, all compared program to program without taking into consideration the different ecological situations or means of operation. Only Beghin

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(1971) clearly pointed out the fact that "hospital cases usually are complicated by infection or water and electrolyte disturbances, and, therefore, the two population are not wholly comparable". The child with severe PEM is an emergency case in any hospital and since it has a high risk of dying, it is obvious that more costs are incurred to save its life than for the non-critical child admitted to a NRU because of borderline malnutrition.

c) **Limitations in Evaluation of Effectiveness**

Only Beaudry-Darisme and Latham gave clear criteria they used in evaluating effectiveness as follows :

"if the mother had learned and changed her behaviour, it would be reflected in an improved nutritional status of her child at the time of follow-up. As a further criterion for effectiveness, nutritional status of the next younger sibling of the child would be assessed at the time of follow-up and morbidity and mortality history of each family taken".

d) **Contradiction by authors**

From my review of the literature it seems that many investigators are of divided opinion on the benefits from, and uses of, nutritional rehabilitation. Some are highly critical yet

at the same time propose those very measures that are being implemented in NRUs. Thus Haedden and Lawrence stated that "NRC are of limited use" yet, at the same time pointed out the need for more nutrition education to the mother. They further failed to provide evidence to support some of their more radical conclusions such as "no need for high-energy feeding".

e) **Sample size**

There was no consistency in the number of children enrolled (and studied) in any given nutritional rehabilitation scheme. The numbers ranged from 6 children in a study by Namboze, 59 in one by Beghin in different centres, to 197 families studied by Beaudry-Darisme and Latham. This leaves a lot of room for speculation by other scholars as to the "ideal" number of children that can be rehabilitated in any given centre, where ideal refers to the number that can comfortably be handled by staff, that promotes and does not prevent interactions between mothers and ensures that all children may be treated for what they are, at high risk of deterioration. Similarly, when examining the effectiveness of NRUs, there seems to be little information on what sort of "Controls" to use for comparisons purposes (Beaudry-Darisme).

f) The situation in Kenya

From their studies on The Effect of Nutrition Rehabilitation centres Hoorweg and Niemeijer (1982) provided new insights into the functioning of NRUs in Kenya, which as it seems, differ from those in many other countries. The authors observed that youngest children did not gain weight while at the centre. The teaching at the centre had a minor effect on the knowledge and attitudes of the mothers. At home the diet of the children had a typical characteristic of less milk drunk, less solid food eaten with more porridge and vegetables consumed. They recommended a choice between providing family education in rehabilitating the malnourished child or providing assistance to families.

The author of this investigation, therefore, undertook to evaluate the FLTC with afore-said authors' observations in mind.

## CHAPTER 3

### 3.0 RESEARCH OBJECTIVES AND EXPECTED BENEFITS FROM THE INVESTIGATION

#### 3.10 Objectives

The objectives of this study were :

1. To determine the nutritional status of children admitted at Lwak FLTC.
2. To determine the cost of running Lwak FLTC over one year.
3. To determine the effectiveness of the rehabilitation program.
4. To determine the effect of maternal exposure to Lwak FLTC on the nutritional status of younger siblings.
5. To determine whether mothers' practiced what they had learnt while at FLTC.

The costs in this study included all program inputs in relationship to :-

- i) the total number of children who attended the rehabilitation program,

- ii) the number of children who completed the stipulated duration of twenty one days,
- iii) the number of children who were successfully rehabilitated according to Lwak FLTC standards i.e completed 21 days and gained 300 grams of body weight before discharge,
- iv) the number of children who were successfully rehabilitated according to the author's criteria using WHO standard i.e the child has to gain it's expected weight-for age  $\geq 80\%$  of the standard and have no clinical signs of malnutrition.
- v) the cost of food.

Effectiveness in this study was determined by:

improved and maintained nutritional status of the index child i.e. the child had to be at its expected weight-for-age at  $\geq 80\%$  of the standard and depict no clinical signs of malnutrition 12 months following discharge.

The impact of maternal exposure to Lwak FLTC was measured by the nutritional status of the younger siblings, i.e. be at the expected weight-for-age at ( $\geq 80\%$  of the standard) and depict no clinical signs of malnutrition.

Mother's nutritional knowledge and practices



acquired while at the FLTC was measured by :

- what she had learned and was practicing
- the frequency and type of food she gave to her children to improve their nutritional status
- whether she had a kitchen and kitchen garden
- the type of food storage
- the presence of a latrine and bathroom
- the method of garbage disposal

### 3.1.1 Hypothesis

Residential rehabilitation of protein-energy malnourished pre-school children is cheap and effective.

### 3.1.2 Expected benefits

The investigation results are expected to be of benefit to the following :

- a) The Ministry of Culture and Social Services could use the information to compare other FLTCs in the Republic. The information could be of particular benefit in planning new FLTCs to ensure

both improved effectiveness as well as reduction of cost.

- b) The Lwak FLTCs could use the findings to strengthen and improve services especially in areas where they have not met their set objectives partly because they have not yet carried out an evaluative study on their own.
  
- c) The community of Siaya district could ultimately benefit since any recommendations issuing from this investigation could be applied for the improvement of the centre operations. This in turn may ultimately result in their children getting better care, i.e. better health.

## CHAPTER 4

### 4.0 RESEARCH DESIGN

#### 4.1.0 Types of Investigation

The study was retrospective and of an evaluative nature. The subject focused on the costs and effectiveness of rehabilitating protein-energy malnourished pre-school children in Lwak FLTC in Siaya district. The investigation was retrospective in that costs were calculated from a review of records at the FLTC for 1985. Review of centre records together with a follow-up on children who had been admitted at Lwak FLTC and their younger siblings served to determine the effectiveness of rehabilitation program. Observation of the home environment and recall were used to determine practicability of knowledge and practices acquired at the Lwak FLTC. The main respondent were the mothers who had had one or more of their children admitted at the FLTC during the same calendar year (1985).

#### 4.1.1 Tools of measurement

1. Two pre-set questionnaires were used; one for the FLTC at Lwak and the other for household with rehabilitated children.

2. Anthropometric measurements included weight, using an Aanonsen portable baby scale (Model 102-10; 25Kg at 100 gm gradations), plastic pants and 2 hooks.
3. Length of children 1-24 months was determined by use of a somatometer (model 209, 1 meter) with length divided into 5mm gradations. Older children (i.e. 25-60 months length was determined by use of a tape measure and a locally made "measuring board" to be placed vertically onto an even foot plate.

#### 4.1.2 Standardization of instruments

1. The questionnaires were pre-tested by piloting, and modifications made before actual data was collected.
2. The Aanonsen portable baby scale was standardized by checking on accuracy to the nearest 0.1 Kg by use of 2 kilogram standard weight. The investigator had been trained on the use of both scale and somatometer during her didactic year.

The scale was adjusted before each measurement by bringing the scale needle back to the exact zero mark using the side screw that was provided for that purpose.

To make sure the scale was in the required

working order, the investigator had it checked at the office of Weights and Measures every three months.

3. To determine the age of the child to the nearest month, his/her clinic card was used. All mothers had these cards.
4. The national identity cards served the purpose of determining the age of the mother.

#### 4.1.3 Population selection/sampling

The sampling frame had been determined by the number of children who had been admitted for rehabilitation at Lwak FLTC from January to December 1985 (413). The year was decided upon because there appeared to be adequate records on preliminary review carried out in the pilot phase of the investigation. Purposive rather than random sampling was done since the children had to be followed-up using available records from the centre.

#### 4.1.4 Specific research activities

1. Two questionnaires were tested in the course of the pilot survey performed September and November of 1986. Based on the results they were modified for actual data gathering which ran from December 1986 to August 1987. The first questionnaire was used at the FLTC.

It served to ascertain organizational details as well as cost associated with running the centre for the year 1985.

Subsequently, information was collected on all children who were admitted in 1985. This included their names and ages, their weight at admission and at discharge, as well as status of nutrition at discharge according to the centre's criteria of successful rehabilitation. We further recorded information on the mother, such as her name, village, sub-location, division, districts, name of chief, husband's name and occupation, as well as education.

In addition, we recorded how long they stayed at the centre, whether they left prematurely because of hospitalization or on their own, how many of them completed the required course of stay, their fate in the centre, and lastly, on the number of those relapsing that were subsequently readmitted.

2. Given the information the cost of running the FLTC was calculated. In the determination of cost, three major items were considered. Recurrent expenditures, capital investments which were (amortized) and "missed opportunity costs" associated with the mothers' stay at the FLTC. Costs to family were based on districts guidelines for Siaya in 1985 by Wanjau.

3. For the purpose of the follow-up, only records pertaining to children from one division of Siaya district were extracted. When the survey was planned, it was assumed that only children from one division, the one the centre is situated in, would attend, hence need to be follow-up. However, after pilot-testing, the investigator noted that children had come from all over Siaya district. Children were traced in their homes using information on mothers obtained from the centre records. For all children who could be found mothers were interviewed using the questionnaire. Mothers' names had to be verified and so was the information regarding other variables collected from the centre records.

The child's age was determined by use of a clinic card and recorded to the nearest month. Anthropometric measurements included weight, and height. Weight was taken to the nearest 0.1 Kg using an Aanonsen baby scale. All children were weighed naked. For this purpose the scale was suspended using a hook attached to rope on a beam or a tree branch. The child in a plastic pant was then suspended from the scale using another hook.

The length of children 1-24 months of age was taken by making the child lie on a stiff surface (board), placing the "somatometer" horizontal with one bar on the head. The

mother was then asked to press down the chest and head while the village guide pressed down the knees. The other bar was next moved by the investigator till it touched the flat part of the feet. A reading was taken to the nearest half centimetre by the investigator. For older children, a tape measure and a locally made board were used to take their heights. The children were asked to stand on a flat surface with bare feet, heels together, back straight and eyes looking straight forward. A horizontal head bar was pressed firmly against the head and the measurements read from the tape to the nearest half of a centimetre. In addition to measuring the "index child", anthropometric measurements were also taken on the next in line younger siblings.

3. Mothers of children thus traced were interviewed using a present questionnaire. Information collected from mothers included the child's morbidity experience prior to rehabilitation, the number of times she had attended nutrition education sessions while the child was staying at the FLTC, what she practiced at home as a result of what she had learned, i.e. the number of times per day she fed her children and the number of times she gave protein and energy-rich foods to them in an average week.

The home environment was checked for the



presence and use of the following : kitchen gardens, food storage, water storage, water source, dishrack, pit latrine, bathroom and garbage disposal.

#### 4.1.5 Method of data processing, cleaning and analysis

The questionnaires from households were checked every evening for completeness and correctness. Those found incomplete were put aside for a second or third visit. The remainder were stored for final data processing.

Analysis was done on an IBM-AT compatible "Multitech" micro-computer using the SPSS-PC plus\* software program.

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\*Statistical program for Social Scientists.

#### 4.1.6 Definition of terms

##### Anthropometry

Measurements of child's' body to determine how well nourished it is i.e. take weight and height or length.

##### Cost

The relationship between the total cost of the program which involved Recurrent expenditure, Capital investment, opportunity cost of mother's stay at FLTC and the number of children who benefited i.e.

- i) the children who were ever admitted (413)
- ii) the children who completed 21 days (218)
- iii) the children who met Lwak FLTC criteria of successful rehabilitation (171)
- iv) and the children who met WHO standards of successful rehabilitation.

##### Effectiveness

Measure of long term maintenance of index children's' nutritional status and prevention of malnutrition in subsequent younger siblings.

### Drop-outs

Children who do not complete the set duration for rehabilitation.

### Follow-up

Checking at a later date to determine the effects of the program on the recipients.

### Malnourished

To be in poor health due to inadequate intake of essential food nutrients i.e. signs of marasmus and kwashiorkor are present.

### Nutrients

Those parts of food which supply the body with all it needs for full growth and maintenance.

### Nutrition Rehabilitation

An intervention program aimed at prevention of malnutrition of children at risk by teaching the mothers how to prepare food and feed these children.

### Protein-Energy-Malnutrition

Poor condition of nutrition in young children caused by lack of protein and energy in the diet. Early sign is slowing down of growth rate.

Weaning

To introduce a child gradually to new food other than breast-milk.

Weight-for-age

The weight of a child at a given age and is an indicator of the child's' nutritional status.

Weight-for-height

Weight in relation to height as an indicator of nutritional status.

## CHAPTER 5

### DESCRIPTION OF THE STUDY SETTING

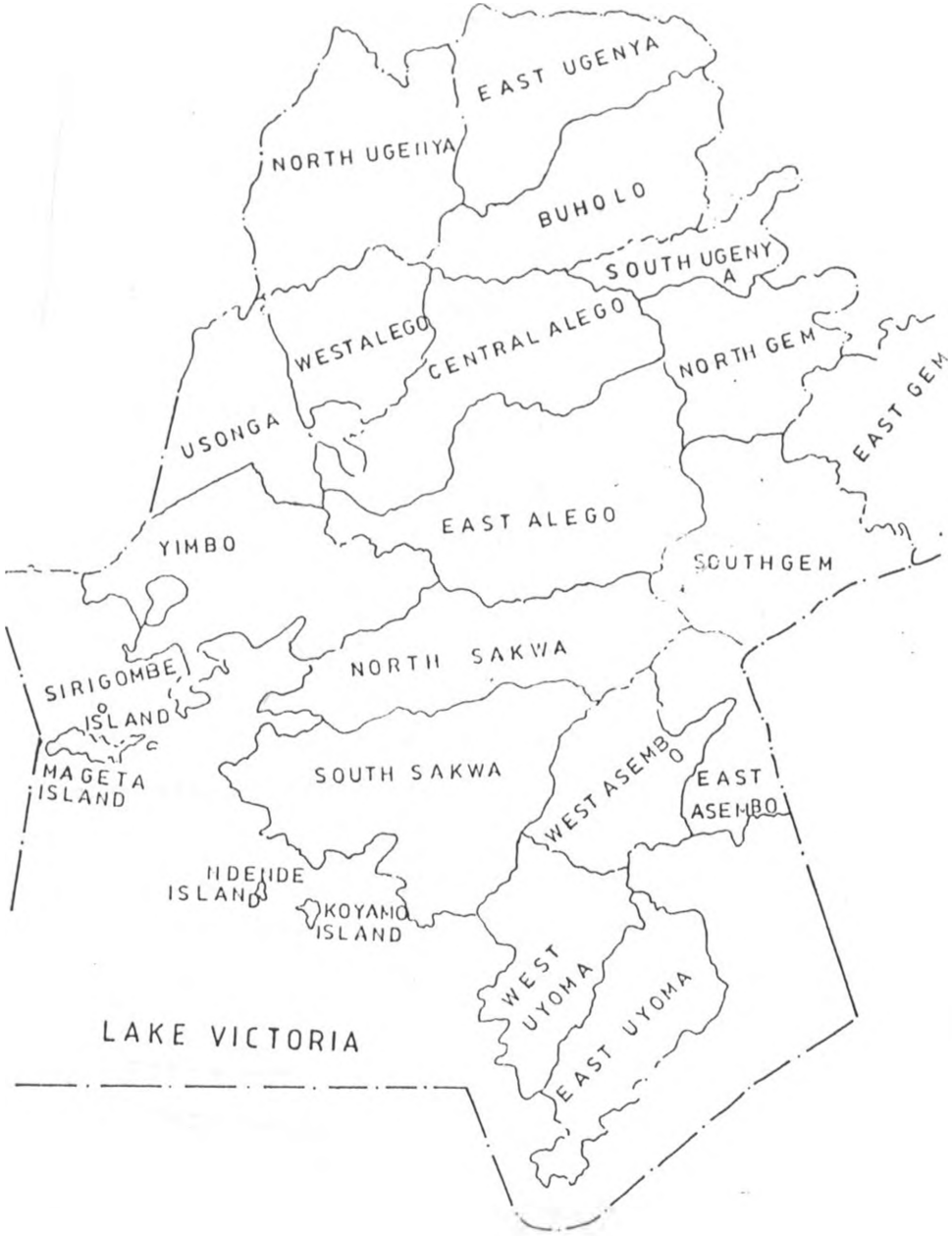
#### 5.1.0 The Study area

The study was carried out in Siaya District which is one of the four districts that comprise Nyanza Province in Western Kenya. The area covered by the district lies between latitudes  $0^{\circ} 13^{\circ}$  South and  $0^{\circ} 18^{\circ}$  North and from  $33^{\circ} 58^{\circ}$  East to  $34^{\circ} 33^{\circ}$  West. The district is bordered by three other districts; Busia to the North, Kakamega to the North-East, Kisumu to the South-East and Lake Victoria to the South. The area covered by the district is  $3,528 \text{ Km}^2$  of which  $1,005 \text{ Km}^2$  is under water (Jaetzold & Schmidt 1982).

#### 5.1.1 Population

The district is divided into 5 divisions which, in turn, are subdivided into 29 locations, and further divided into 146 sub-locations, the smallest administrative units (see map 3). The divisions are Ukwala to the North, Yala to the East, Rarieda to the South East, Bondo to the South West, and Boro which is centrally placed. According to the population projections for Kenya 1980 - 2000 (Central Bureau of Statistics 1983), the population for 1985 was estimated to be 651,000 based on the assumption of constant

MAP NO 2 : SIAYA DISTRICT WITH ITS LOCATIONS.



fertility and mortality over the decade and using the growth rate of 3.1%.

Most of the people of Siaya district belong to the Luo tribe and are predominantly engaged in subsistence farming and fishing, for those who live around the lakeshore.

#### 5.1.2 Climate

The average annual rainfall is 800 mm around the lakeshores and increases to 2000 mm near the Kakamega border. Reliability of rainfall for both long and short rains is 60%, with long rains occurring early March - July and short rains occurring August - December. The temperature averages 22.5<sup>0</sup>C in North-East, though there is a wide variation daily. Relative humidity is normally high and evaporation averages between 1800 mm and 2000 mm per annum (Jaetzold and Schmidt 1982).

The altitude varies from 1140 m on Lake Victoria in the South to 1300 m in the Northern and Eastern parts. There are scattered highlands rising to about 1280 m around Lake Victoria.

Map 3

AGRO-ECOLOGICAL ZONES

SIAYA.





### 5.1.3 Agro-Ecological Zones

There are five distinct agro-zones as shown in Map 3.

- i) UM1 Upper midland zones which are very small. They occupy a small area around Kakamega - Siaya border and are suitable for tea and coffee.
- ii) LM1 Lower midland sugar cane zone. This zone has an average rainfall of 1500 - 1900 mm and has an altitude of 1300 - 1500 m. This zone is occupied by half of Ukwala and Yala divisions and has a high potential for hybrid maize, sorghum, groundnuts, fruits, bananas, pasture, cassava and vegetables.
- iii) LM2 marginal sugar cane zone with an annual average rainfall of 1400 - 1900 mm and altitude 1200 - 1350. This zone has a long cropping season followed by short and intermediate rains, it has good yield potential for sorghum, sweet potatoes, onions, cassava, fruits, yams (near rivers), maize and groundnuts : most of this zone lies in Ukwala and Yala and portion of Boro divisions.
- iv) LM3 Lower midland cotton zone with an average rainfall of 1000 - 1100 mm and altitude of 1140 - 1250 m. This zone

is occupied by a big section of Boro, Bondo and Rarieda divisions. It has a medium to long cropping season followed by a short or very short one. This zone is good for Katumani maize, sorghum, millets, beans, simsim, sweet potatoes, cotton and near swamps irrigation can be done for rice, bananas and vegetables. This has a poor potential for hybrid maize. Other parts of the area grow cassava throughout the year.

v) LM4 at an altitude of 1135 - 1200 mm is referred in as the marginal cotton zone. It has an annual average rainfall of 800 - 100 mm and is occupied by Bondo and Rarieda with a small portion of Boro division. This zone has a medium to short cropping season. It has a good potential for sorghum, millet, green grams, cowpeas, simsim and sisal the whole year.

vi) LM5 the Lower midland livestock-millet zone. This zone occupies a small portion of Bondo, inclusive Mageta Island. It has a high potential for sorghum, millets and vegetables with cassava. Because of the rather unpredictable rains, growing maize is risky. Drought resistant crops are hence mainly grown (Jaetzold and Schmidt 1982).

According to the most recent district guidelines for Siaya : Wanjau (1986) estimates 54% of the land being occupied by grazing and fallow land, while 46% of the total land is under cultivation and structures. The land under food crops and cash crops (cotton, sugar cane) is only 21.9% of the total land area. Bearing this situation of land utilization in mind, there is bound to be scarcity of food within some sections of the district which may affect the nutritional status of the population. According to the statistical figures for the calendar year 1985, most of the clients at the FLTC were from the low midland and marginal cotton zones, a greater portion of Bondo and Rarieda divisions. This zone has a medium to short cropping season. It has a good potential for sorghum, millet, green grams, cowpeas, simsim and sisal the whole year.

#### 5.1.4 Research facilities

To facilitate the investigation, records were readily available at the FLTC which were used to extract information for the first section of the study, i.e. on cost. Specifically records were reviewed to obtain information on the individual child, his or her family, regarding his or her stay at the centre.

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These details have been enumerated earlier. Transport was made available from the Ministries of Agriculture, Culture and Social Services when their work schedules were not heavy. Occasionally public transport needed to be used. During the first weeks of the investigation, the FLTC staff accompanied the investigator, subsequently and because of commitments at the centre FLTC staff no longer came along and for the rest of the study the investigator had to use village guides in the various sub-locations.

The equipment used was borrowed from the Unit of Applied Human Nutrition, Kabete Campus, University of Nairobi. Secondary information, on malnourished children, where needed was made available by the district hospital in Siaya.

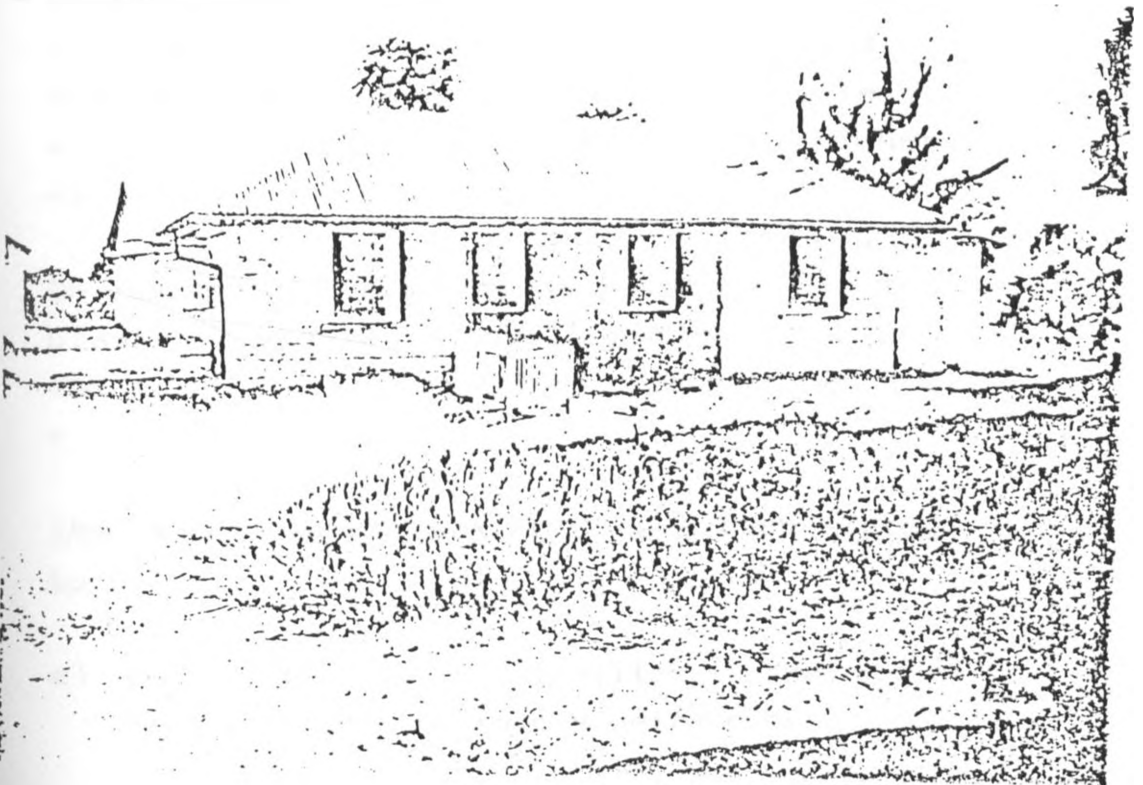
## 5.2 Lwak FLTC

### 5.2.1 Background to FLTC

Before 1974, Lwak FLTC, like 11 FLTC elsewhere were run by voluntary organizations such as the Red Cross and Catholic Relief Services. In 1974, the Kenya government took over the running of the Nutrition Centres, then renamed FLTCs under the Ministry of Culture and Social Services (in the Division of Family Life Training Program). Lwak FLTC has distinct features that are common to the other 11



P.1 HOME-STEAD IN IMMEDIATE ENVIRONMENT TO FLTC



P.2 COTTAGE AT FLTC

FLTCs. Unlike Bengoa's perception of simple structures adjusted to the local economic situation, Lwak FLTC sharply contrast with its immediate environment (see plates No. 1 & 2). Lwak FLTC has an urban outlook in a very rural setting. There is an administration block which also has a lecture hall, a dining hall with an adjacent kitchen with raised stoves, and a store with creches for babies. The centre has a large underground water tank and medium size raised tank. The water used at the FLTC is pumped some 14 kilometres from Lake Victoria. There are 15 cottages with built-in wooden beds for mothers and movable baby cots. There are two "ablution blocks", i.e. toilets. However, due to water scarcity in 1985, pit latrines were dug which now seen to be the ones actually used. Staff at the FLTC are housed within the same compound in modern buildings (see plates 3-6). There is also a five acre plot used as a kitchen garden.

On admission, the mother is supplied with two blankets, sheets, a towel, diapers, a basin and a bucket, hurricane lamp, mosquito net and a "potty" for the baby.

The Objectives of Lwak FLTC have been stated to be :

- a) to assist individual families in their effort to improve family welfare by



training the mothers in key areas of family care,

- b) to prevent malnutrition and poor health among children by giving their mothers instructions on preventive health measures,
- c) to treat malnourished children by providing a high protein calorie diet, Kaseje, et. al. (1984).

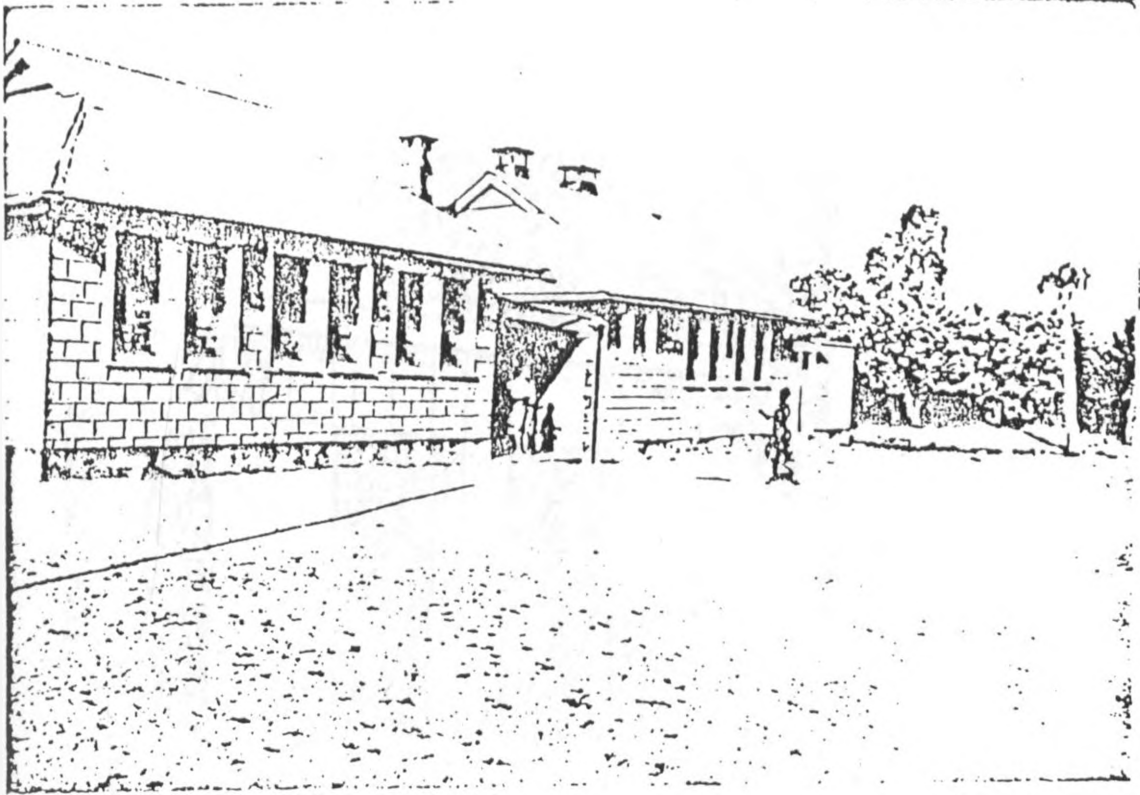
The FLTC is next to a Mission Hospital and 40 kilometres from Siaya District Headquarters and District Hospital.

#### 5.2.2 Activities

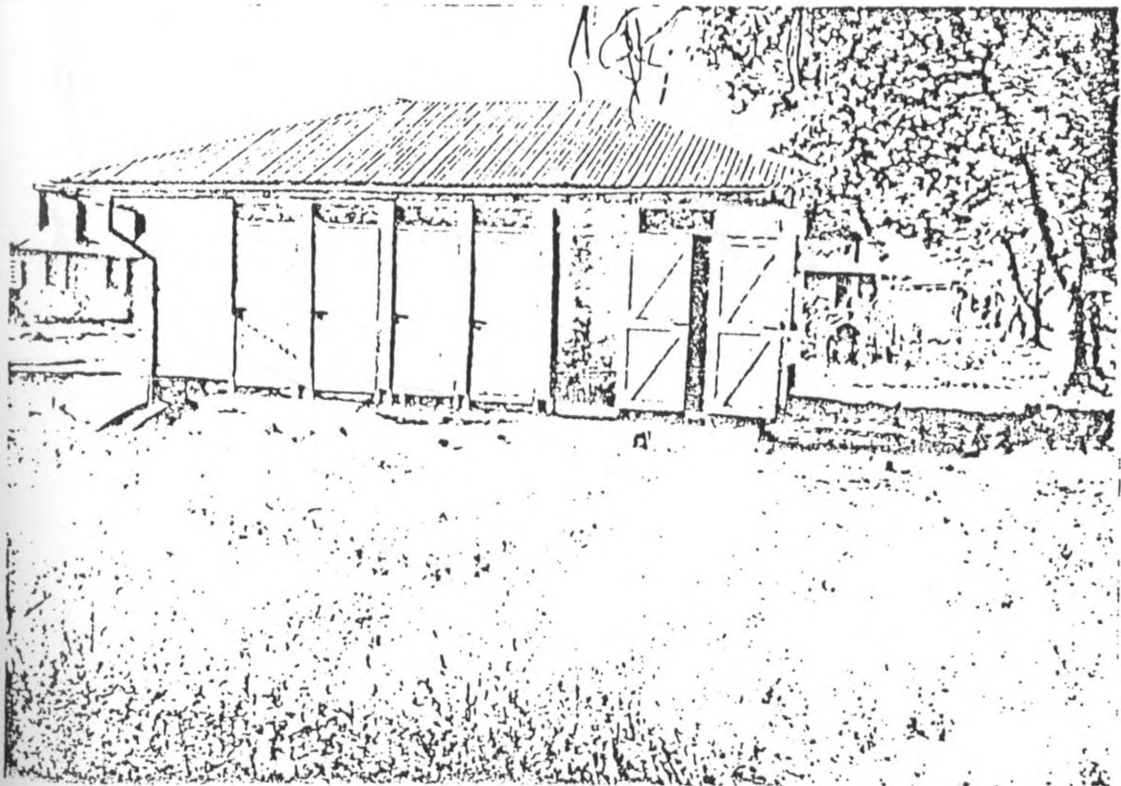
On arrival to the centre, the child is weighed and medically examined by the staff. Sick children are referred to the hospital. Depending on the seriousness of their problem, these may continue to stay at the centre and visit the hospital as out patients or be directly hospitalized. If a child is very ill, or has some complications that the staff at the centre cannot deal with, he/she is referred to the District Hospital. In 1985 most children referred were anemic and were referred for blood transfusions. Mothers of those admitted to the NRU are allocated a room where they are supposed to stay for a minimum of three weeks.

The mother's daily routine starts at six o'clock with cooking breakfast and feeding her child or children, as the case may be. Each mother is responsible for cleaning her cottage and keeping the surrounding clean. The mother also works in the FLTC kitchen garden where, apart from becoming familiar with a variety of nutritious vegetables and legumes, she is taught new methods of crop production. She also learns about practical ways of food preservation that she may apply in her own home.

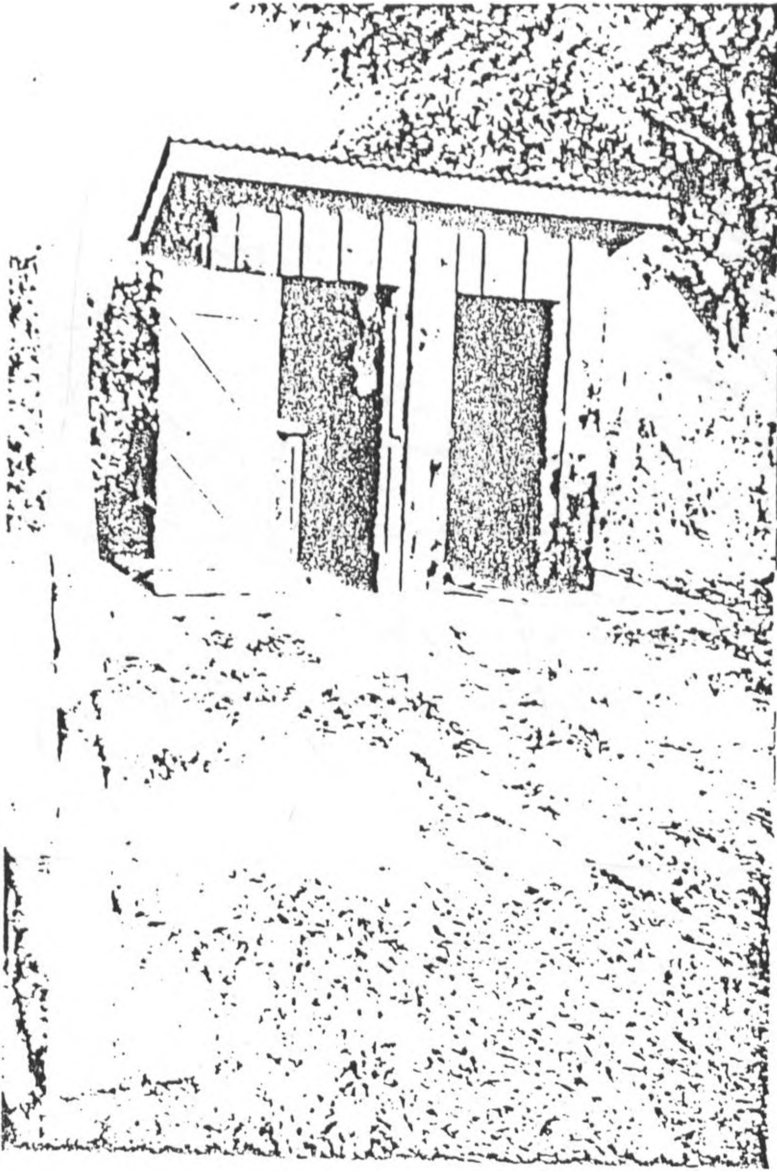
Mothers also get various instructions on Animal Husbandry, Home and Money Management, Family Care and Child Development including talks on the importance of immunizations and good nutrition. They are being encouraged to join women groups and co-operative societies once back home. This is done to assist them to advance economically. Mothers are counseled and individual basis after their histories have been taken.



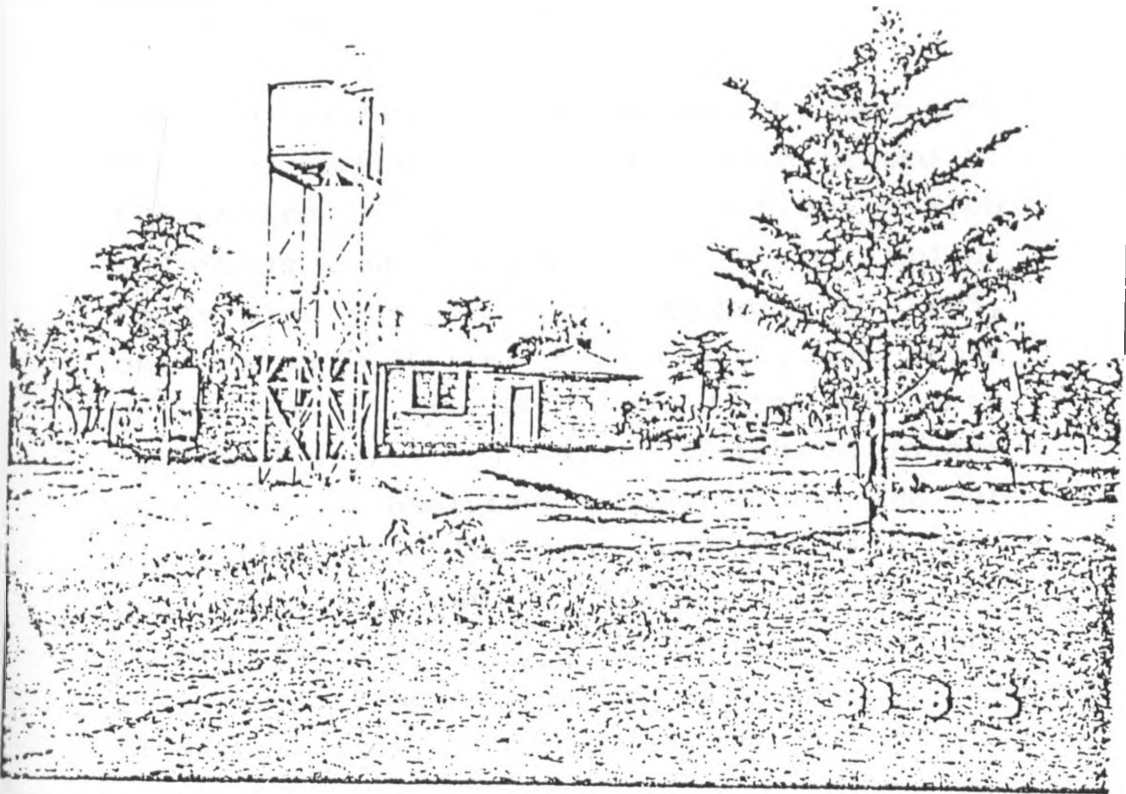
P.3 KITCHEN AND DINING-HALL AT FLTC



P.4 ABLUTION BLOCK



PL. 5 PIT LATRINE AT FLTC



PT. 6 WATER-TANK WITH STAFF HOUSE IN THE BACKGROUND

### 5.2.3 Follow-up and Referral

The follow-up program is intended to make sure that the mother uses the knowledge gained at the centre to improve the nutrition, health and economic well-being of her family. Children's progress is also assessed. In 1985, only children at risk at discharge, i.e. those below 60% of standard weight-for-age were followed up. In 1985, a Danish Volunteer Nurse and one assistant supervisor carried out all follow-ups. The funds used for this purpose came from DANIDA (Danish International Development Agency). If in the course of the follow-up any other children are found at risk of malnutrition, they are taken to the FLTC.

### 5.2.4 Mobile Clinics

After some initial baseline studies in 1983-84, mobile clinics were started in Uyoma location in Rarieda division. Mobile clinics are involved in immunizations of "Under-fives" and are carried out twice a month by the volunteer nurse, one assistant supervisor and Lwak catholic mission staff (trained nurse and community health worker).

### 5.2.5 Training of Community Health Workers (CHWS)

The training of the CHWs was started in May 1985 in the two sub-locations where mobile

clinics were also carried out. The objective of training the CHWs was to have local people within their own communities who would assist in disseminating information on how to improve family health. The trainees are elected by their own communities. Instructions are given by FLTC staff and invited extension workers from the Ministries of both Health and Agriculture, as well as from other agencies involved with child and women group activities.

#### 5.2.6 Staff at FLTC

In 1985, there were 13 Government-of-Kenya-employed staff and 1 Danish Volunteer nurse. The specific breakdown of the staff was as follows :

Supervisor	1
Assistant Supervisor	3
Clerical Officer	1
Store man	1
Housemother	1
Driver	1
Copy Typist	1
Junior Staff	4
Danish Volunteer Nurse	1

The supervisor was a trained mid-wife, while one assistant supervisor and housemother were trained social workers with good backgrounds in nutrition and child care. Two assistant

supervisors and one junior staff are trained in rural institutional management which also includes nutrition and home economics. One junior staff has been trained on the job to do agricultural duties while the other two are watchmen. Visiting staff include a public health technician, technical agricultural staff, a family planning field educator and an adult education teacher. There was hardly any supervision from the headquarters' offices, though monitoring was done by correspondence.

#### 5.2.7 Finance

The recurrent expenditure was mainly financed by the Government of Kenya. Other donors like UNICEF and DANIDA aided the FLTC. The buildings were funded by DANIDA.

#### 5.2.8 Equipment

The centre was adequately equipped with utensils for use in the kitchen, cottages and for weighing children.

#### 5.2.9 Transport

During 1985 there were two vehicles which served the FLTC. One vehicle (Peugeot pick-up) was donated by DANIDA and was used for the everyday work. A Daihatsu vehicle was used by the Danish volunteer nurse for follow-up of children and for mobile clinics.



The FLTC staff are guided by published manual divided into six sections in the running of the centre (see Appendix V).

## CHAPTER 6

### 6.1.0 Chronology of Investigation

#### A - Phase II - Preparatory Arrangements

A formal request together with all questionnaires were prepared, presented to, and received permission from the Office of the President to carry out research in Siaya. Research funds were sought for, and granted by International Development Research Centre.

#### B - Phase II - Pilot Phase

A trip was made to Western Kenya and clearance received from the Offices of Provincial Director of Culture and Social Services, the District Commissioner Siaya and the District Officers in Bondo, Rarieda, Boro, Yala and Ukwala. Meetings were held with supervisor of FLTC and chiefs in Rarieda and Bondo. The questionnaire was tested on 20 mothers who had been at the FLTC in 1984 with their children and resided in locations surrounding the FLTC. The survey tools were reviewed and modified for actual implementation of the main data collection phase.

#### C - Phase III - Investigative Phase

Actual data collection started with a review of records at the centre. At that time the supervisor was interviewed, subsequently data

collection proceeded into the divisions to obtain the required household information.

#### D - Phase IV - Data Processing Phase

The data was analysed and interpreted.

#### E - Buffer Period

This period was used for eventualities which had not been envisaged before the research was started.

#### F - Phase VI - Completion Phase

Results of the investigation were written after interpretation and the paper submitted to the Faculty of Agriculture and the research sponsors, IDRC.

#### 6.1.2 Problems Encountered

There were quite a number of set backs encountered from the beginning of the investigation. At the FLTC problems encountered were :

1. Incomplete information which may have been due to the mother or staff. This resulted in difficulty in assigning mothers' correct residences. Thus for some 22 cases sub-locations were not indicated.

2. Incomplete information on villages. There seemed to have been inconsistency in probing mothers as to whether the village referred to the name of their husband as head of household or to the father-in-law.

3. Incomplete recording of departure of mother and child, and weight of the child at departure.

#### Problems encountered in the field

1. The rains caused some delay since some areas like Uyoma in Rarieda were impassable and the investigator had to walk long distances (10-15 kilometres) while locating the homes. This caused a lot of inconvenience since only 1-2 homes could be visited on days when it was raining heavily.

2. The area of operation was too large even with vehicle transport as 2-3 visits to most of the homes took more time than had previously been envisaged. The FLTC vehicle was involved in a road accident on 17th February 1987 and this also slowed data collection. The investigator had to walk and use private vehicles while making arrangements for use of vehicles from the Ministry of Agriculture. While walking and using private or public vehicles, the amount of time required to move from home to home varied since for some areas vehicles were available

only in the mornings and late afternoons. This was mainly experienced in Uyoma, Kaudha and Sakwa locations.

3. Some information was not complete where a mother was not at home and the child had died and no one was ready to give information on behalf of the mother, the investigator did not re-visit the home.

4. The investigator was confronted with other side issues like teaching the mothers to interpret the growth chart, family planning, kitchen garden and taking extra anthropometric measurements on children who were not in the sample. The investigator had to comply to these demands so as to encourage good rapport with the community as word traveled from sub-location to sub-location about the nature of the investigation.

5. Directions given at the centre on distance of home from health centre usually were under-estimates.

6. For some cases there was only partial information available during data collection because of the following reasons :

a) The mother had gone to her husband's place of work taking the children along.

- b) The mother may have left the home and got married elsewhere and taken the child with her.
- c) The mother may have left her (marital) home for her paternal home due to marriage problems.
- d) The child may have died and the mother was not in, and no one else was willing to give information in the mother's absence.

7. During data analysis the investigator encountered problems while using the computer. There was constant power failure and twice data was lost and had to be re-entered. This necessitated more time than had been estimated.

## CHAPTER 7

### 7.0 RESULTS

#### 7.1.0 Interview of FLTC Personnel

The supervisor at the FLTC responded to the interview schedule during the investigation.

By 1985 the centre had been operational for ten years. Malnourished children were referred to the FLTC by the Mission hospital, health centres within the district, extension workers from the Ministries of Agriculture, Culture and Social Services, healthy ex-clients mothers. Some mothers went on their own initiative.

For admission to the FLTC, a child had to be below 80% of the expected standard weight-for-age and depict symptoms of Kwashiorkor, and loss of appetite or be marasmic.

Mothers were taught to restore the nutritional status of their children by participating in food preparation and feeding of children. Apart from wheat and dry skimmed milk, all other food is locally procured. This includes 'dagaa' small fish, Nile perch, cow's blood, beef, beans, maize, green-grams, local or traditional vegetables, fruits such as pawpaws, lemons and oranges. Mothers are taught how to make various mixtures from the

food which they feed their children. Children with diarrhoea are given the Oral Rehydration Treatment (ORT) and their mothers are provided with instructions on how to prepare and administer the solution to their children.

Children are considered rehabilitated by FLTC criteria when they have regained their appetite, gained at least 300 g, depict no more symptoms of kwashiorkor and the mother satisfies the staff that she has learnt to improve the child's nutritional status. The child has to finish at least 21 days, minimally considered necessary for successful rehabilitation.

The FLTC personnel gave the following reasons, when asked why mothers leave before their children have fully recovered :

1. During the peak seasons of planting and harvesting, mothers opt to go home.
2. Some mothers leave because of the death of a child they shared the cottage with. When a child dies while at the FLTC it causes fear in other mothers and, depending on the condition of their children they decide to leave since they fear their children too might die.



3. Husbands go to the FLTC with various reasons for taking out mother and child, e.g. the mother has to take care of the other children whom he does not want to be brought to the FLTC, to take care of cattle, or to take care of mother-in-law. Some husbands insist the child has to be taken for better treatment elsewhere.

4. The children are referred to Kisumu or Siaya District hospitals for blood transfusions or other treatments for complications they may have.

5. Some mothers protest to the treatment accorded them. Some think the work load is too much compared to that in their homes and so decide to leave.

6. When the weight of a child does not improve and the child gets infections like cough, or measles, the mother leaves.

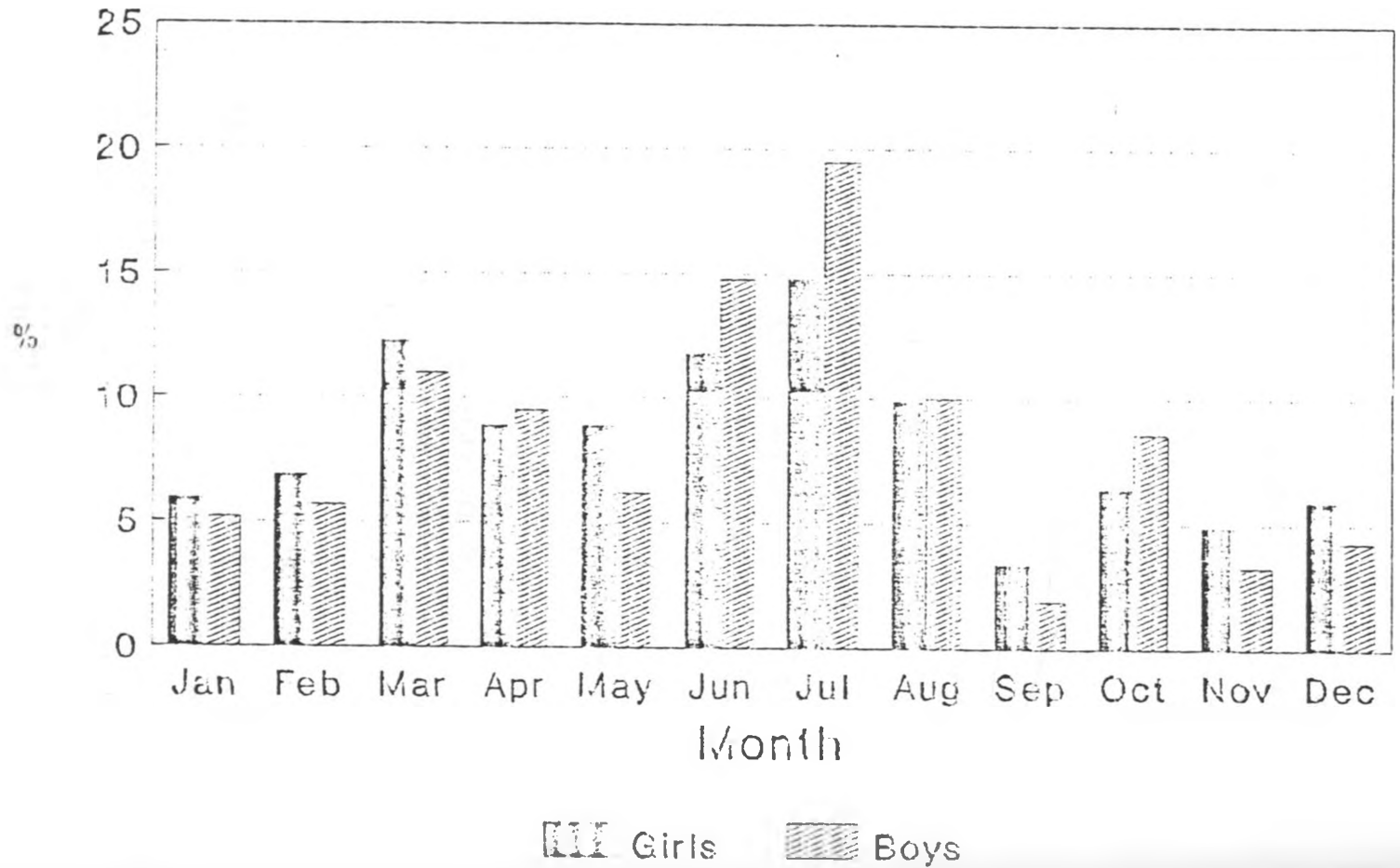
7. The mother may be sick and require medical treatment which she cannot get at the rehabilitation centre or in the nearby mission hospital.

#### 7.1.1 Records on children admitted in FLTC

During the year under study (1985), a total of 413 children and their 292 mothers were admitted at Lwak FLTC. There were 393

children as 1st admittees and 278 mothers. Twenty children with 14 mothers were re-admissions. The highest number of admissions were in July (70), June (55) and March (48) respectively. There were more boys (210) than girls (203) during the year (Figure 1).

Figure 1. Distribution of admitted children by month of admission and sex



### 7.1.2 Admissions by Divisions

Most of the children (351), who were admitted at Lwak FLTC in 1985 came from divisions within Siaya District. 62 children came from Kisumu District. Most of the cases came from Rarieda Division (48.9%), Bondo (23.2%) and Winam the lowest (0.2%) (Table 1).

Table 1 : Distribution of admitted children by Divisions

Division	N	%
Bondo	93 (3)	23.2
Boro	11	2.7
Rarieda	187 (15)	48.9
Yala	40	9.7
Ukwala	2	0.5
Maseno	57 (2)	14.3
Nyakach	2	0.5
Winam	1	0.2
Total	413	100.0

*Numbers in ( ) represent children who were readmitted*

### 7.1.3 Admissions by age in months

Children admitted were usually categorised by age (in months) and by sex. The highest number of children (235) were between 7-24 months which is the weaning period (Table 2).

Table 2 : Distribution of admitted children by age and sex

Age in Months	ALL		GIRLS		BOYS	
	N	%	N	%	N	%
1-6	36 (1)	9.0	17	8.4	19 (1)	9.5
7-12	67 (4)	17.2	40 (1)	20.2	27 (3)	14.3
13-18	80 (5)	20.6	34 (4)	18.7	46 (1)	22.4
19-24	88 (3)	22.0	40 (1)	20.2	48 (2)	23.8
25-30	34	8.0	17	8.4	17	8.1
31-36	17 (3)	4.8	6 (2)	3.9	11 (1)	5.7
37-48	25 (1)	6.3	12 (1)	6.4	13	6.2
49-60	20 (1)	5.1	11	5.4	9 (1)	4.8
61+	24 (2)	6.3	16	7.9	8 (2)	4.8
Not re- corded	2	0.5	1	0.5	1	0.4
Total	413	100.0	203	100.0	210	100.0

Numbers in ( ) represent the number of children who were readmittees

#### 7.1.4 Nutritional state of admitted children

The nutritional state of given child was usually classified at admission to assist in the type of diet the child should be given to enhance rehabilitation. Overall almost half of the cases had kwashiorkor (48.2%) as seen in Table 3.

Table 3 : Distribution of admitted children according to nutritional state and by sex

Nutritional state	ALL		GIRLS		BOYS	
	N	%	N	%	N	%
Health	46 (2)	11.6	19	9.4	27 (2)	13.8
Kwashiorkor	93 (6)	48.2	86 (3)	43.8	107 (3)	52.4
Marasmus	80 (8)	21.3	42 (4)	22.7	38 (4)	20.0
Marasmic						
Kwashiorkor	55 (2)	13.8	33 (1)	16.7	22 (1)	11.0
State not recorded	19 (2)	5.1	14 (1)	7.4	5 (1)	2.9
Total	413	100.0	203	100.0	210	100.0

Numbers in ( ) represent readmitted children

### 7.1.5 Weight of children at admission

Children were weighed at admission and categorised according to their weight-for-age. Most of the children (69.5%) fell below the Median weight-for-age Harvard standard expected weight-for-age (i.e >80% of the standard). From among all admitted boys 72% from among the girls 67% had a weight for age of less than 80% on admission.

Table 4 : Distribution of admitted children by weight for-age and sex

Standard weight/age	ALL		GIRLS		BOYS	
	N	%	N	%	N	%
< 60	92 (3)	23.0	43 (1)	21.7	49 (2)	24.3
60-79.9	183 (9)	46.5	88 (4)	45.3	95 (5)	47.6
80-110	76 (3)	19.1	35 (1)	17.7	41 (2)	20.5
110+	9	2.2	7	3.8	2	0.9
Not recorded	38	9.2	24	11.8	14	6.7
<b>Total</b>	<b>413</b>	<b>100.0</b>	<b>203</b>	<b>100.0</b>	<b>210</b>	<b>100.0</b>

*Numbers in ( ) represent readmitted children*

7.1.6 Fate of admitees at FLTC

More than half of the children, 52.8% completed 21 days while 28.8% were referred to hospital before 21 days.

Table 5 : Fate of Admitees

Duration of stay and state of discharge	N	%
a) Total admitted	413	100
b) Completed 21+ days	208 (10)	52.6
c) Left on their own before 21 days	43 (10)	12.8
d) Ref. Hosp. before 21 days	119	28.8
e) Ref. Hosp. before 21 days and died	5	1.2
f) Ref. Hosp. after 21 days*	4	1.0
g) Died before 21 days in FLTC	20	4.8
h) Died after 21 days in FLTC*	10	2.4
Not recorded	3	0.7

*Figures in brackets represent children who were readmittees.*

*\* Have been counted twice, e in d and f in h.*



### 7.1.7 Required duration for rehabilitation

A duration of 21 days + at the FLTC was considered adequate for children to recover from their state of malnutrition (Table 6).

Table 6 : Distribution of children by duration of stay at FLTC by months

Month	Duration <21 days		Duration >21 days		Total child days	
	N	%	N	%	N	%
January	4	2.1	19	8.7	550	6.8
February	4	2.1	22	10.1	624	7.7
March	14	7.1	31 (3)	15.6	995(72)	13.2
April	20	10.3	15 (3)	8.3	648(117)	9.5
May	20 (1)	10.8	10	4.6	447 (2)	5.6
June	31 (5)	18.4	20	9.2	849(70)	11.4
July	45 (1)	23.6	22 (2)	11.0	1152(63)	15.0
August	17 (3)	10.3	20 (1)	9.6	641(46)	8.5
September	5	2.5	6	2.7	206	2.5
October	16	8.2	15	6.9	583	7.2
November	8	4.1	9	4.1	452	5.6
December	(1)	0.5	20	9.2	541(28)	7.0
Total	195	100.0	218	100.0	8086	100.0

*Figures in brackets indicate the number of children who were readmittees*

**7.1.8 FLTC criteria for successful rehabilitation**

The FLTC criteria for improved health was set at a weight gain of 300 gm+ after 21 days and no signs of kwashiorkor. There were a total of 171 children who had attained 300 gm+ by the time of discharge from the FLTC (Table 7).

**Table 7 : Distribution of children who had gained  $\geq 300$  gm on discharge, by month and their final nutritional status**

Month	<60%		60-79.9%		>80%	
	N	%	N	%	N	%
January	3	12.0	6	6.7	6	10.5
February	3	12.0	7	7.9	6	10.5
March	6	24.0	11 (2)	14.6	15 (2)	28.1
April	3	12.8	4 (1)	5.6	2 (2)	7.0
May	2	8.0	8	9.0	1	1.8
June	2	8.0	10	11.2	3	5.3
July	2	8.0	11 (1)	13.5	3	5.3
August	3	12.0	7	7.9	5 (1))	10.3
September	-	-	5	5.6	1	1.8
October	1	4.0	3	3.4	4	7.0
November	-	-	4	4.5	2	3.5
December	-	-	8(1)	10.1	5	8.7
<b>Total</b>	<b>25</b>	<b>100.0</b>	<b>89</b>	<b>100.0</b>	<b>57</b>	<b>100.0</b>

*The figures in brackets represent children who were readmittees.*

7.1.9 Annual costs at the Lwak FLTC for 1985

Annual costs for rehabilitating malnourished children were calculated from Recurrent costs (Kshs. 352,107.00), Capital Investment costs (Kshs. 154,920.00) and Family (opportunity cost of mother's stay at FLTC Kshs. 83,220.00) (Table 8).

Table 8 : Distribution of recurrent expenditure at the FLTC for 1985

Item	Amount in Kshs	%
Staff salaries	165660	47.0
Transport operating expenses	23500	6.7
Travel & Accommodation	6320	1.8
Postage	2000	0.6
Telephone	2350	0.7
Water	1000	0.3
Conservancy	800	0.3
Trainees' food	29669	8.4
Uniform & clothing	1980	0.6
Purchase of stationery	2350	0.7
Advertising & Publicity	830	0.2
Office general expenses	4670	1.3
Purchase of stores	3080	0.9
Maintenance of Plant & Equipment	1080	0.3
UNICEF (food stipend)	89595	25.4
DANIDA (food stipend)	1652	0.5
DANIDA (follow-up-fuel only)	7380	2.1
DANIDA (vehicle maintenance)	5000	1.4
Total	352,107	100.0

Table 9 : Capital Investment Costs

Item value	Original cost in years	Amortization costs	Annual
FLTC (permanent building)	1,500,000.00	20	75,000.00
Water pump	219,600.00	5	43,920.00
Vehicle pick-up	360,000.00	10	36,000.00
Total	2,079,600.00		154,920.00

Table 10 : Opportunity cost of mothers while in FLTC during the year (1985)

Cost per man-day		Kshs.	15.00
Total mother-days*	5548		
Average No. of mother-days	19		
Average cost of mothers' stay		Kshs.	285.00
Annual cost of mothers' stay		Kshs.	83,220.00

7.1.10 Summary of annual costs

Review of the Lwak Family Life Training Centre records for 1985 revealed that 413 children were admitted at a cost of Kshs. 590,247.00. The calculated cost per child ever admitted was therefore Kshs. 1,429.17. For the children who completed 21 days, the cost per child was Kshs. 2,707.56. The cost per child for those children meeting the FLTC criteria for successful rehabilitation was Kshs. 3,451.74 while for those meeting the WHO criteria was Kshs. 10,355.21 and cost per malnourished child ever admitted was Kshs. 1,608.30 (Table 11).

Table 11 : The Cost of rehabilitation using various criteria for assessment

Costs	Kshs.	cts.
a) Cost per child admitted (413 children)	1429	17
b) Cost per child admitted per day (8086 total child days)	72	92
c) Cost per child who completed 21 days (218 children)	2707	56
d) Cost per child completing 21 days per day (4487 child days)	131	45
e) Cost per successful FLTC child (171 children)	3451	74
f) Cost per FLTC successful child per day (4684 child days)	126	00
g) Cost per Author's criteria per child (57)	10355	21
h) Cost per Author's criteria per child per day (1557 child days)	379	11
i) Cost of food per child admitted (Kshs. 120,916)	292	75
j) Cost of food per child admitted per day (8086 child days)	14	94
k) Cost of food per child completing 21 days (218 children)	554	66
l) Cost of food per child completing 21 days per day (4487 child days)	26	95
m) Cost per malnourished child only (367 children)	1608	30

The total cost was Kshs. 590,247.00. Food costs were 34.3% of the total recurrent expenditure, and 20.5% of the total FLTC expenditure.

\*Author's criteria were based on WHO recommendations for successful rehabilitation i.e. the child has to gain the expected weight for its age and have no clinical signs of malnutrition.

7.1.11 Follow-up by FLTC staff

In 1985 there were 176 children seen on follow-up. 84 were seen for first follow-up, 44 for second follow-up focused on children who were still at risk at discharge. These follow-ups were for children admitted 1983-84. During the follow-up, children had not yet attained the expected weight-for-age, i.e. at or above 80% and be health (Table 12).

Table 12 : Distribution of Nutritional Status of children at follow-up by FLTC staff

% Weight-for-age	1st FP*	2nd FP	3rd FP	All FP's	%
<60	10	5	5	20	11.4
60-80	42	19	23	84	47.7
>80	31	20	18	69	39.2
Not recorded	1	-	2	3	1.7
Total	84	44	48	176	100.0

\* FP - follow-up

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60-80	42	19	23	84	47.7
>80	31	20	18	69	39.2
Not recorded	1	-	2	3	1.7
Total	84	44	48	176	100.0

\* FP - follow-up



#### 7.1.12 FLTC Funding

71% of recurrent costs of the FLTC was financed by the Kenya Government, 25.4% was financed by UNICEF and 3.5% by DANIDA. DANIDA was also entirely responsible for capital investment costs.

#### 7.1.13 Results at Author's Follow-up

From the original 413 children 320 particularly remained for follow up. This population was arrived at by dropping children originating from Kisumu District and those who had died while in FLTC. 6 children of 35 who had died had come from Kisumu District. Of 320 who qualified for follow-up, only 40.3% were physically found and examined. Children who were lost due to inadequate information from FLTC records formed 21.9% while 17.8% had died between discharge and authors follow-up, see Table 14.

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*Table 14 : Fate of children at follow-up*

Fate of children	N	%*
Survivors weighed and heights measured	129	40.3
Reported survivors who had gone to father's place of work	22	6.9
Reported survivors who had migrated elsewhere	3	0.9
Reported survivors whose mothers had married elsewhere	28	8.8
Survivors >60 months seen and had no clinical signs of malnutrition	11	3.4
Children who had died between discharge and follow-up	57	17.8
Children who could not be traced due to inadequate information	70	21.9
Total	320	100.0

\*The percentage is calculated with the denominator of 320, total children who qualified for follow-up.

#### 7.1.4 Nutritional status of traced children

The nutritional status of children who were traced was determined anthropometrically using weight and height as indicators. Of the 129 children 71.3% had a weight-for-age at or above 80% of the standard, while 28.7% were still below the standard. Using height-for-age 65.9% were still below the standard. Only 34.1% had attained their expected height-for-age. Weight-for-height 93.0% of the children had actually attained their expected weight-for-height while only 7% still fell below that threshold, as shown in Table 15. This shows that the nutritional status of the children had improved.

Table 15 : Distribution of children at follow-up by nutritional status and sex

NUTRITIONAL STATUS	GIRLS		BOYS		ALL	
	N	%	N	%	N	%
A) Weight-for-age						
<60	0	1	1	100	1	0.8
60-79	11	30.6	25	69.4	36	27.9
>80	50	54.37	42	45.7	92	71.3
Total	61	47.3	68	52.7	129	100.0

	GIRLS		BOYS		ALL	
	N	%	N	%	N	%
B) Height-for-age						
<90	38	44.7	47	55.3	85	65.9
≥90	23	52.3	21	47.7	44	34.1
Total	61	47.3	68	52.7	129	100.0

	GIRLS		BOYS		ALL	
	N	%	N	%	N	%
C) Weight-for-height						
<90	3	33.3	6	66.7	9	7.0
≥90	58	48.3	62	51.7	120	93.0
Total	61	100.0	68	100.0	129	100.0

7.1.15 Nutritional status compared with the course of events at the FLTC

The nutritional situation of the children at follow-up was also examined with respect to completion of their stay at the FLTC, as shown in Table 16. It was noted 62% (n=80) of the children had completed 21 days at the FLTC. Of these 30% were still below their expected weight-for-age. 25.6% of the children (n=33) had been referred to hospital before 21 days and of these 78.8% had attained the expected weight-for-age. Of the children who had left on their own (n=16), six were still below the expected weight-for-age.

Table 16 : Weight-for-age at follow-up by course of events at FLTC

Weight-for-age	Completed 21 days		Left on their own		Ref. to hospital before 21 days		ALL	
	N	%	N	%	N	%	N	%
<80%	24	18.6	6	4.7	7	5.4	37	28.7
>80%	56	43.4	10	7.8	26	20.2	92	71.3
Total	80	62.0	16	12.4	33	25.6	129	100.0

7.1.16 Nutritional status by age

Children were classified by age in relation to their weight-for-age at follow-up. Most of the children were above 36 months. Of these, 30.4% (n=69) were still below the expected weight-for-age. These children did not depict any clinical signs of malnutrition and were between 60% - 79% except one who was below 60% and had severe marasmus Table 17.

Table 17 : Weight-for-age at follow-up by age

Weight- for-age	13-24 months		25-36 months		37-60 months		ALL	
	N	%	N	%	N	%	N	%
<80%	1	0.8	15	11.6	21	16.3	37	28.7
>80%	8	6.2	36	27.9	48	37.2	92	71.3
Total	9	7.0	51	39.5	69	53.5	129	100.

7.1.17 Nutritional status and class of PEM

Nutritional status of children was related to the class of PEM they had belonged to at admission. It was observed that 28.7% (n=37) were still below the expected weight-for-age. Most of these children (n=10) had had kwashiorkor while three of them had been healthy. The majority of the children 71.3% (n=92) had attained the expected weight-for-age. Most of these children had kwashiorkor (n=44) while others (n=28) had marasmus and 20 had had marasmus-kwashiorkor. Apparently 15 had been healthy Table 18 below.

Table 18 : Weight-for-age at follow-up by class of protein energy-malnutrition, as originally diagnosed

Weight-for-age at follow-up		Original Diagnosis at FLTC									
		Healthy		Kwashiorkor		Marasmus		Maras-kwash			
N	Cx %	N	%	N	%	N	%	N	%	N	%
<80%	37	28.7	3	8.1	19	51.4	8	21.6	7	18.9	
≥80%	92	71.3	15	16.3	44	47.8	20	21.7	13	14.2	
Total	129	100.0	18	14.0	63	48.8	28	21.7	20	15.5	



7.1.18 Nutritional status compared at admission and follow-up

The children's nutritional status at the time of admission was also compared with that at their discharge as well as that at the author's follow-up. At admission 70.5% of the children were below the expected weight-for-age while at follow-up this figure had decreased to 28.7%. From the follow-up it also became evident that children had progressed very well after discharge. However, from among those below 80% only one child was still severely malnourished. The rest of the children (n=36) were between 60%-79% of the standard and had no clinical signs of malnutrition Table 19.

Table 19 : Comparison of children's nutritional status at admission and follow-up

Weight-for-age	Admission		Discharge		Follow-up	
	N	%	N	%	N	%
<60	30	23.2	17	13.2	1	0.8
60 < 80	61	47.3	72	55.8	36	27.9
>80	38	29.5	40	31.0	92	71.3
Total	129	100.0	129	100.0	129	100.0

#### 7.1.19 Mortality of children

The mortality experience among children after discharge was considerably high since it is assumed that children leaving the FLTC will remain well. Of the 57 children who died 24 had completed the minimal 21 days considered adequate for rehabilitation. Of the 24 deaths 18 occurred within the first six months following discharge.

#### 7.1.20 Nutritional status of siblings

Siblings who had been born after the rehabilitation period, similarly had their nutritional status assessed at follow-up to determine whether mothers had been able to prevent malnutrition in subsequent children. The mean age of the siblings was 10.3 months, range was 1 to 22 months. Most of the siblings were well-nourished (82.9%) i.e. they were above 80% of the NCHS median and showed no clinical signs of malnutrition. The Central Bureau of Statistics in Kenya has used stunting as a measure of nutritional status in a number of studies since there are more nutritionally stunted than wasted children (Third Rural Child Nutrition Survey, 1982).

Statistical analysis using a correlation matrix showed weight-for-age of the index children to be highly significantly correlated with maternal education and energy intakes.

Thus the correlation co-efficients for Education, Protein Intakes and Energy versus Nutritional Status were 0.2652 (P <.01), 0.3386 (P < .001) and 0.3331 (P < .001), respectively. Multiple linear regression with weight-for-age as dependent, and maternal education and either Protein or Energy intakes as independent variables gave statistically highly significant models as shown in Table 20.

Table 20 : Multiple Linear Regression Models with weight-for-age as dependent and dietary intakes and maternal education as independent variables

Independent	Variables	
	B	P
Model 1 index children (constant)	.837	
Education*	.115	0.01
Protein intakes**	.249	0.001
Energy left out at	.117	0.001
Model 2 siblings (constant)	1.292	
Education*	.217	0.01
Protein left out at	.078	0.01

\* in terms of formal education

\* in terms of foods with good protein value

\*\*\* in terms of foods with good energy value

### 7.1.21 Maternal knowledge and practices following stay at FLTC

Mothers were traced in their homes using records from the FLTC. according to records, there had been 292 mothers. Forty one mothers were from Kisumu district which was not in the study area, hence these mothers were excluded. Thirty five children had died before discharge (29 of the children belonged to 24 mothers from Siaya). These were similarly excluded from the mothers potentially remaining for follow-up. A total of 227 mothers (292-41-24) hence remained. From these, more than half remainders, 11% (n=132) were actually contacted. Among the remainders, 11% (n=25) were either temporarily absent at the time of follow-up while 5% (n=12) had permanently moved, and 25% could not be traced. Reasons for attrition are summarized in Table 21.

Table 21 : Reasons for sample attrition (Mothers lost to follow-up)

Reasons for attrition	N	%
Mother traced but unavailable at time of follow-up (gone to market, or to husband's place of work)	25	26.3
Mother traced but had married elsewhere or migrated after stay at FLTC	12	12.6
Mother traced but both she and child had died	1	1.1
Mother not traced due to inadequate information on current whereabouts	57	60.0
Total number of mothers lost to follow-up	95	100.0

**7.1.22 Education sessions attended at FLTC**

While at the FLTC, mothers had to attend education sessions where they were taught various aspects of childcare. 43.9% of the mothers had attended 1-2 sessions, 56.1% had attended more than three sessions. Mothers were asked to enumerate what they had learnt, what they had found important and what they had put into practice. 11.4% of the mothers did not consider anything they had learnt important, hence were not practicing anything taught (Table 22).

**Table 22 : Distribution of mothers at follow-up by Number of education sessions (EDUCSA) attended and subjects learnt and practiced (SUBLP)**

EDUCSA	N	%	SUBLP	N	%
None	8	6.1	None	15	11.4
1-2	58	43.9	1-2	45	34.1
3-4	58	43.9	2-3	45	34.1
5-7	8	6.1	4+	27	20.4
	132*	100.1		132	100.1

*\*The number of index children was 129 while there were 132 mothers due to the fact that 3 mothers had siblings only as a result of death of their index children.*

### 7.1.23 Food consumption at follow-up

While at the FLTC, mothers were taught to give the child at least 3 meals a day with snacks in between, giving a total of six feeds. 72 (55.4%) of the mothers indicated that they gave at least 5 feeds to their children. The mothers were also taught how to mix various foods classified into three main groups, i.e. protein, starch and vegetables/fruits. At follow-up the mothers enumerated the foods they offered to their children and the number of times a week they gave them. Foods were ranked according to quality of mixtures into poor, fair and good. These were 46.2% of mothers gave fair animal protein foods and the same percentage also gave good animal and protein food. More than half of the mothers (55.4%) gave good protein and starchy foods to their children (Table 23).

Table 23 : Distribution of mothers by frequency of feeds given to child (FDD), Weekly protein intake (WKPIN) and Weekly energy intake (WKENIN)

FDD n=130	N	%	WKPIN n=130	N	%	WKENIN n=130	N	%
3*	11	8.5	Poor plant protein	10	7.6	Poor porridge mainly	2	1.5
4*	47	36.5	Fair animal protein	63	46.2	Fair starch	56	43.1
5*	62	47.7	Good animal & plant protein	63	46.2	Poor protein & starchy foods	72	55.4
6*	10	7.7						

\* represent the number of feeds given to the child daily

n=130 because 2 mothers did not respond to this question.

Their children had died and they had no other siblings.



7.1.24 Kitchen and kitchen garden

The mothers were also taught how to keep their kitchens clean. Of the mothers found, 60.6% had clean kitchen in the main house while 34.1% had detached kitchens and a small proportion of 5.3% used the open space outside the main house. Mothers had also been taught the importance of a kitchen garden to enable mothers to grow vegetables which could be used at any time. The recommendation was to have a kitchen garden adjacent to the kitchen. Only 25% of the mothers had kitchen gardens as recommended while most of the mothers 55.3% had them in the main garden. A small proportion of 3% had no kitchen garden while the majority of the mothers 97% had vegetables in their gardens Table 24.

Table 24 : Distribution of mothers by ownership of kitchen and kitchen garden

Kitchen	N	%	Kitchen-garden	N	%
In main house	80	60.6	Next to kitchen	33	25.0
In open space	7	5.3	In main garden	73	53.3
Detached	45	34.1	At lake side	22	16.7
			Absent	4	3.0
Total	132	100.0		132	100.0

7.1.25 Water and Food storage

Clean water and food storage is emphasised at the FLTC to promote better health of the child. Of the mothers found 50% kept their food suspended on hangers and in clean containers while 85.6% kept their water in clean covered containers which were either clay pots or plastic/tin buckets Table 25.

Table 25 : Distribution of mothers by water and food storage

Water storage	N	%	Food storage	N	%
In clean covered containers	113	85.6	In clean covered containers	54	40.9
In clean open containers	10	7.6	In clean open containers	1	0.8
In dirty covered containers	6	4.5	Suspended on clean hangers	66	50.0
In dirty open containers	3	2.3	Suspended on dirty hangers	10	7.5
			In dirty containers	1	0.8
Total	132	100.0		132	100.0

7.1.26 Water source

The type of water source available to a family very much determines the quality of water. Most mothers who attended FLTC used clean piped water while their children are undergoing rehabilitation yet they have no control over the quality of their water source at home. The majority of mothers 70.5% drew their water from lake, river or pond and, theoretically would have to boil it before use. The proportion without piped water was found to be 96.2% (Table 26) which compares well to 98.1% observed in the survey carried out by the Central Bureau of Statistics in 1982 (Third Rural Child Survey, 1982) (Table 26).

Table 26 : Distribution of mothers by type of water source

Water source	N	%
Lake/river	43	32.6
Pond	50	37.9
Spring	34	25.8
Tap	5	3.8
Total	132	100.0

7.1.27 Latrine and Bathroom facilities

Careless disposal of human refuse can be very detrimental to health if not done in accordance to the expected norms. There are no sewage facilities and according to the survey carried out in 1982, Siaya ranked 12th in sewage facilities in the Republic Ref. CBS (1982). Most of the families in Siaya tend to share toilet facilities. 49.2% of those interviewed shared toilets which were in good condition. 34.8% of mothers had no bathroom facilities and preferred to use the open space near the water source Table 27.

Table 27 : Distribution of mothers by latrine and bathroom facilities

Availability of facility	Pit latrine		Bathroom	
	N	%	N	%
Own in good condition	29	22.0	21	15.9
Own in bad condition	3	2.3	2	1.5
Shared in good condition	65	49.2	45	34.1
Shared in bad condition	25	18.9	18	13.6
Absent	10	7.6	46	34.8
Total	132	100.0	132	100.0

7.1.28 Garbage disposal

At the FLTC, mothers are instructed to keep their compounds clean to avoid creating breeding places for mosquitoes. Mothers are taught to dig composite pits to use as garbage disposal facilities for all organic matter and use it later as manure in the garden. There were only 14.4% of the mothers who had dug composite pits while the majority 78% threw rubbish in the garden Table 28.

Table 28 : Distribution of mothers by method of garbage disposal

Facility	N	%
Litter in compound	9	6.8
Has composite pit	19	14.4
Burns daily	1	0.8
Throws in garden	103	78.0
Total	132	100.0

7.1.29 Socio-economic status of mothers

Socio-economic characteristics of Siaya women were found to differ when compared to those of Kikuyu women in Hoorweq's study in Muranga (Hoorweq 1982), see Table 29. A large proportion of women in Siaya had formal education as compared to Central Province as seen in Table 29.

Table 29 : Socio-economic characteristics of Siaya FLTC clients compared to Central Province FLTC clients

Socio-economic characteristic	Central Province	Siaya District
Women aged 29 or younger	48%	78.4%
Women without formal education	59%	19.5%
Women who are not married (single/separated/divorced widowed)	27%	10.4%
Women from young families	26%	80.5%
Average number of children in household	4.5%	5.1%

## CHAPTER 8

### 8.1.0 Discussion

The responsibilities of Lwak FLTC are greater than those originally intended for a nutrition rehabilitation centre. The children brought to Lwak FLTC are not only malnourished but are also sick. Information gathered by the investigator at follow-up showed that 87.6% of the children had been acutely ill prior to admission. Lwak FLTC, therefore is unlike rehabilitation units in other countries where most do not admit acutely ill children. The Mwana-mugimu in Uganda admitted children who needed food only and provided no curative services. In Haiti, severely malnourished children were admitted to Mother-craft-centres only if located far from a hospital and these children were given food only (Beaudry-Darisme and Latham, 1973). In the manual used to guide Lwak staff it is indicated that they should give curative and preventive services to families with malnourished children. In the same manual some of the objectives are still in line with the original model of Bengoa. However, the FLTC in Lwak is very different in structure when compared to the homes from which the clients come.

The costs of running the Lwak FLTC were found to be 9.5 times more than Daqnelies' "mobile

rehabilitation" in Embu carried out in 1974\*. Dagnelies' study was only 11% of Lwak FLTC costs (Kshs. 62,441.00 and Kshs. 590,247.00).

In Dagnelies' study, staff salaries accounted for 60% of the costs while at Lwak FLTC they amounted to 28.1%. Food was brought in Dagnelies' study while at Lwak FLTC it was 20.2% of the total costs. Transport costs in Dagnelies' study was 34% and 12.2% for Lwak FLTC. The main items in the Embu study were salaries and transport while the Lwak FLTC also included family costs. Even if family costs are excluded, the costs are still 8.1 times more.

The structure at Lwak FLTC accounted for 12.7% of the total cost yet it may not be easy to replicate or be maintained by the community. These structures are in sharp contrast with the immediate environment as may be seen in (p1-P6). At the time of the study renovations at the FLTC were being done at almost the original cost (discussion with the supervisor). The amortization on buildings would be higher the years after the study.

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\*Dagnelies' study of 1974 were adjusted to allow comparison with those in 1985 using an average inflation rate of 14.8% (Central Bureau of Statistics for 1974-1986).



The total cost of admitting 413 children was Kshs. 509,247.00 and the cost per child ever admitted was Kshs. 1,429.17. This was 4.1 times more than Dagnelies' costs (see Table 13 for details). Cost per child who completed the required 21 days for stay at the FLTC was 4.8 times more than Dagnelies. When the same cost for those completing 21 days are compared with those for Lwak FLTC criteria for successful rehabilitation, they come to 6.1 times more than Dagnelies. The costs of WHO criteria come to 18.2 more times than Dagnelies' costs of 21 days, these costs are considerably very high.

The cost of food alone was 20.2% of the total costs and the cost of food per child ever admitted was Kshs. 295.75 and this came to Kshs. 14.9 per day. This cost of food per child was equivalent to the daily agricultural labour wage of Kshs. 15.00 prevailing in Siaya at that time. The cost of food per Lwak FLTC was Kshs. 707.11 and that per child according to WHO criteria was Kshs. 2,121.33.

Originally it was assumed that children leaving the centre with Lwak FLTC or WHO criteria of successful rehabilitation would remain wellnourished after discharge. This was not the case since 17.8% (n=57) of the children who qualified for follow-up died between discharge and follow-up. Of these children, 24 had actually been rehabilitated while the rest

were drop-outs or had been referred to the hospital. When compared to Daqnelies' data mortality was high among the FLTC children (6% and 17.8%) respectively.

The clinical condition of Lwak FLTC children was found to have been maintained at follow-up. There were 71.3% of FLTC children with weight-for-age at or above 80% of the standard weight-for-age while there were 59% of Dagne-  
lies' children. There were 27.9% of FLTC children with weight-for-age below 80% of this standard yet they had no clinical signs of malnutrition. There was only one child with severe marasmus while 41% of Dagne-  
lies' children had relapsed. The good recovery of FLTC children could perhaps also be attributed to the long period between discharge and follow-up (12 to 24 months as compared with 2 to 16 months) in Dagne-  
lies' study.

At follow-up 55% of Dagne-  
lies' children had low weight-for-height compared to only 7% of Lwak FLTC children. Weight-for-age had not been considered in Dagne-  
lies' study since a third of the children's age was not accurately known while all the Lwak FLTC children had clinic cards where their ages were indicated. According to Beghin and Viteri (1973), after chronic malnutrition often no complete recovery to normal anthropometric measures takes place. They suggested weight-for-height as a better criterion for recovery than weight-for-

age. The proportion of children with catch-up growth was 13.8% for Lwak FLTC children and 7% for Dagnelies' children.

Food consumption showed that in both studies mothers used more of the starchy foods with good proportions of both protein and fruits/-vegetables after discharge. In both studies also older children consumed more of the protein foods while younger children had more of the energy foods.

Statistical analysis showed that there was a significant association between the children's nutritional status and Protein plus Energy food intakes. The younger siblings ate more of the energy foods while the index children, whose average age was 38.2 months ate more of the protein foods. The younger children may require more of energy foods for catch-up growth while the older ones need protein for maintaining body tissues. It was observed that weight-for-age of index children correlated with maternal education at  $P < 0.01$  and protein at  $P < 0.001$  while siblings correlated with energy intakes at  $P < 0.01$ .

#### 8.1.1 Conclusion

From the foregoing discussion, it is clear that residential rehabilitation of protein-energy malnourished pre-school children at Lwak FLTC is effective though costly. This

high cost may not make it possible for communities to replicate these kinds of institutions. Maintenance costs are noted to be high. At the time of the study, the Lwak FLTC was already under renovations at almost the same costs of putting it up. The costs on the other hand may be high since they take into account opportunity of mother's stay. A look at other studies quoted where family costs were excluded still indicated Lwak costs to be high. The costs per child admitted are 3.4 times more than what one would earn per month in Siaya. The cost of food per child rehabilitated according to Lwak FLTC or WHO criteria would be 1.7 times and 5.1 times respectively more than the monthly wage. This would be very expensive if the mothers were to pay the expenses and probably they would not be able to attend considering the fact that the average monthly wage in this area was only Kshs. 420.00 which would not even be adequate for food alone.

The rehabilitation program was found to be effective since most of the children (71.3%) had maintained their nutritional status after discharge while 27.9% were below the expected weight-for-age but had no clinical signs of malnutrition. There was no significant association between what the mother had learnt at the FLTC and the nutritional status of the siblings, yet 82.9% of these siblings were wellnourished. It was assumed that mothers

would have positive changes in their knowledge, attitude and behaviour and this would actually have prevented any malnutrition in the siblings but this was not so. There may have been other factors i.e. economic which would have hindered the mother from getting adequate food for children. The height-for-age of the children may not have been a very good indicator since there was no previous data to compare with or to actually determine whether these children would have improved. Also studies by Brown and Brown (1980) showed that after one year children had only attained 1-3 centimetre in height.

When compared to Dagnelies' study, Lwak FLTC children were better off. In Dagnelies only 59% of the children at follow-up were in a satisfactory clinical condition as opposed to 71.3% of FLTC children. Also 15% of Dagnelies children had relapsed while only 0.8% of FLTC children had relapsed. Food consumption by children after discharge was similar in both studies. Older children appeared to consume more of the protein foods while younger children had more of the energy foods. It may appear that younger children actually need more of the energy food for catch-up growth while the older children need more protein to repair the worn-out tissues and maintain them.

### 8.1.2 Recommendation for Planners

Planners in the Ministry of Culture and Social Services could, in the future, plan with the community in mind when setting up new FLTCs. The structures may be modified but should be within the community's reach. Then, if donors withdraw, maintenance of the structures will be within the community's capability and the place will not collapse because of lack of funds.

The cost of running the FLTC is enormous and everything should be done to minimize costs and to reduce the number of cases of malnutrition. The prevention measures which might be implemented by the District Development Committee are :

- a) To liase with Lake Basin Development Authority (LBDA), Ministry of Agriculture, and
- b) to explore ways and means for food production at sub-location level. This could be done by LBDA giving credit in-kind to women groups in those sub-locations which have a high prevalence of malnutrition. The women should be able to pay back half of what is given at harvest time. This is feasible since groundnut seed was given to groups in

Oyuqis and it succeeded (personal) experience of the investigator in 1983-1984.

The Ministry of Agriculture and Livestock personnel should explain the necessary crop and animal husbandry techniques to the women groups. Non Governmental Organizations (NGOs) intending to carry out work on child health should liase with the District Development committee so that the funds and efforts are channeled to those sub-locations with children at risk. The District Development committee should also study in depth the objectives of proposed projects before sanctioning their implementation and should refer to studies that have been done which showed the magnitude of the problem.

The Ministry of Culture and Social Services should appoint personnel to the FLTC who have the appropriate training and experience. An individual trained in nutrition should be posted to the FLTC as well as an agricultural technician who could make good use of the 5 acre farm which lies idle most of the year. Irrigation could be introduced to produce vegetables for the FLTC if proper planning and management of the water is done. LBDA should assist in the identification of suitable sites of well/boreholes. A second underground tank could be built to store water for irrigation. This is feasible because the Lwak High School

next door which uses the same pump has been able to maintain several tanks for a population much larger than that at the FLTC.

The highest number of children admitted to Lwak FLTC (60%) were those at risk 7-24 months which is the critical weaning period. The community should be made aware of the onset of weaning and its implications to child health. This could be done through public barazas, MCH clinics and home visits done by Home Economics Extension. The use of locally available food mixtures could be taught by all extension workers who deal with women groups and youth programs.

An alternative to institutionalized rehabilitation would be domicilliary rehabilitation. This would be much cheaper since it would be carried out in the home by community village health workers supervised by trained personnel extension workers. The mother would plant her own food and the costs would further be reduced since the community village health workers would not be salaried. This may be feasible after campaigns on awareness of malnutrition and its prevention has been carried out and the community is ready to participate.



Recommendation for Lwak FLTC

1. To ease follow-up, the discharge forms should be completed with full information and some adjustment as follows :
  - a) The names of the husband's father should be recorded first and in full e.g. Ka John Asewe Pakara. The husband's names should have a separate space and also be recorded in full e.g. Peter Ouma Pakara. If the husband has moved to his own compound it should be indicated on the card.
  - b) The "heading distance/centre should be replaced by nearest shopping centre/ church/school". Distance of FLTC and rural health centre may not make sense to a mother who walks to these places and also the nearest health centre or clinic may be on one extreme side of the location while there is a school or church near the home that will make follow-up easy.
  - c) The staff who fills in forms should be able to probe from the mother what clan she comes from and the sub-location. This will also assist in tracing homes by going straight to the sub-location.
  - d) There should be name of village elder. 'Jadounq' qweng' instead of name of chief.

2. The staff at the FLTC should use implements that are relevant to the mother's situation. Pounding food should be done by pestle and mortar and not meat mincer since most mothers never get access to such in their life time.

3. The mothers should be taught the importance of the growth card and the implications of the curves in relation to malnutrition and growth.

4. The staff should do follow-up on all categories of children instead of only those <60% W/A at discharge. This is because children with Kwashiorkor at >80% W/A may be at risk of death and if the mother left before officially discharged she should still be followed up for more advice and to check on progress of the child.

5. When writing up the monthly report the staff should make sure statistics given comply with the number of children, and headquarters staff should also check on their figures to avoid differences. The annual report from headquarters had some figures which did not fall in line with annual report from FLTC.

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Appendix I.

Comparative Cost of Nutritional Rehabilitation Centers and of Hospital Treatment in Selected Countries Expressed in U.S. Dollars

Authors	Location	Cost of rehabilitation center		Cost of Hospital treatment		Ratio of costs column 5 to column 3
		Per child per day	For the period of recuperation	Per bed per day	For the period of recuperation	
- 1 -	- 2 -	- 3 -	- 4 -	- 5 -	- 6 -	- 7 -
Beghin (1970)	6 countries (Latin America)	0.89 <sup>1</sup>	97	4.05 <sup>2</sup> 15.98 <sup>3</sup>	-	4.5x1 18x1
De Leon & Retana (1969)	Guatemala	0.38-0.45	46-54	-	-	-
Salazar (1969)	Costa Rica	1.00 <sup>1</sup>	120 <sup>5</sup>	-	-	-
Vargas (1971)	Costa Rica			10 <sup>6</sup>	-	10x1
Batista et al. (1971)	Northeast Brazil	0.91 <sup>7</sup>	109 <sup>8</sup>	-	-	8x1 <sup>9</sup>
Schneideman et al. (1971)	Uganda (urban)	1.86 <sup>10</sup>	78 <sup>11</sup>	-	120 <sup>12</sup>	15x1
Stanfield (1971)	Uganda (rural)	0.72 <sup>13</sup>	-	-	-	-

<sup>1</sup> Median Range = 0.30 - 4.89; 1.27; number of centers: 11

<sup>2</sup> General Hospital.

<sup>3</sup> Social security hospital.

<sup>4</sup> Colones 6.37

<sup>5</sup> Colones 797.

<sup>6</sup> Approximately Colones 80. Data from the Children's Hospital San José, Costa Rica, personal communication of W. Vargas.

<sup>7</sup> NCr 2.00 (September 1970).

<sup>8</sup> NCr 240 (September 1970).

<sup>9</sup> See references Bastista et al, (1970) Beghin et al. (1972a).

<sup>10</sup> S13. Includes medicines.

<sup>11</sup> S225.

<sup>12</sup> S840.

<sup>13</sup> S35.5 per child per week

Appendix II

Table I : Summary records on malnourished children rehabilitated at Lwak FLTC in 1985

	1985 Total	Jan	Feb	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
Total No. of children admitted in FLTC (a)	413	23	26	48	38	31	56	70	41	11	31	17	21
No. who were 1st admitted (b)	393	23	26	45	35	30	51	67	37	11	31	17	20
No. of drop outs (c)	113	3	3	5	10	6	25	29	16	2	6	5	3
No. of deaths (d)	35	1	1	3	2	5	2	7	2	1	5	2	-
No. who were readmissions (e)	20	-	-	3	3	1	5	3	4	-	-	-	1
No. of drop-outs (no deaths occurred) (f)	2	-	-	-	-	-	1	1	-	-	-	-	-
Total children who completed b+e-(c+d+f) (g)	263	19	22	40	26	20	28	33	23	8	20	10	18
No. who gained 300g+ on discharge (h)	171	15	16	35	12	11	15	17	16	6	8	6	14
Percent who gained 300g+ on discharge (i)	41.1	8.0	9.4	20.5	7.0	6.4	8.0	9.9	9.4	3.5	4.6	3.5	8.2
No. who attained >80% weight/age on discharge (j)	57	6	6	16	4	1	3	3	6	1	4	2	5
Percent who attained (k)	13.8	10.5	10.5	20.0	7.0	1.8	5.3	5.3	10.5	1.8	7.0	3.5	8.8
Child days in FLTC (l)	8086	550	624	1067	765	449	919	1215	687	206	583	452	569
Mother days in FLTC (m)	5548	362	474	688	513	416	670	858	384	115	391	285	392

Appendix III

Distribution of admitted children by month of admission and sex

MONTH	ALL		GIRLS		BOYS	
	N	%	N	%	N	%
January	23	5.6	12	5.9	11	5.2
February	26	6.3	14	6.9	12	5.7
March	45(3)	11.6	23(2)	12.3	22(1)	11.0
April	35(3)	9.2	17(1)	8.9	18(2)	9.5
May	30(1)	7.5	17(1)	8.9	13	6.2
June	15(5)	13.6	22(2)	11.8	29(3)	14.8
July	67(3)	16.9	28(2)	14.8	39(1)	19.5
August	37(4)	9.9	20	9.9	17(4)	10.0
September	11	2.7	7	3.4	4	1.9
October	31	7.5	13	6.4	18	8.6
November	17	4.1	10	4.9	7	3.3
December	20(1)	5.1	11(1)	5.9	9	4.3
Total	413	100.0	203	100.0	210	100.0

The number in ( ) represent children who were readmitted during the rehabilitation period



APPENDIX IV

FLTC QUESTIONNAIRE

INFORMATION IS CONFIDENTIAL

Respondents name -----

Age in years ( ) ( )

Sex 1 = Male 2 = Female

Education record the number of years ( ) ( )

Position held at centre -----

1. For how long has this centre been operational under the Ministry of Culture and Social Services.  
(Indicate in years) ( ) ( )

2. Who refers malnourished children to the centre?  
-----  
-----

3. What conditions does a child have to meet to be considered malnourished and warrant admission?  
-----  
-----

4. How do you teach mothers to restore the nutritional status of their malnourished children?  
-----  
-----  
-----

5. a) What criteria do you use to discharge children and consider them successfully rehabilitated?  
-----  
-----  
-----

b) Why do mothers leave before discharge?  
-----  
-----

6. How many follow-ups did you carry out in 1985?

- 1<sup>st</sup> follow-up ( ) ( )
- 2<sup>nd</sup> follow-up ( ) ( )
- 3<sup>rd</sup> follow-up ( ) ( )

7. How many mothers on follow-up had implemented what they had learned on the following?

- Improved crop husbandry ( ) ( )
- Improved animal husbandry ( ) ( )
- Joined women group/cooperative ( ) ( )
- Accepted family planning ( ) ( )
- Improved environmental hygiene ( ) ( )

8. What were your sources of finance for running the centre in 1985?

-----  
 -----  
 -----

9. How many staff run the centre, of what cadre and Job group?

Number	Cadre	J/Group
-----	-----	-----
-----	-----	-----
-----	-----	-----

10. What were your financial allocations last year (1985) as per item?

- a) - Staff salaries ( ) ( ) ( ) ( ) ( ) ( )
- b) - Trans-oper-Exps ( ) ( ) ( ) ( ) ( ) ( )
- c) - Trav. and accom. ( ) ( ) ( ) ( ) ( ) ( )
- d) - Postage ( ) ( ) ( ) ( ) ( ) ( )
- e) - Telephone ( ) ( ) ( ) ( ) ( ) ( )
- f) - Electricity ( ) ( ) ( ) ( ) ( ) ( )
- g) - Water ( ) ( ) ( ) ( ) ( ) ( )
- h) - Conservancy ( ) ( ) ( ) ( ) ( ) ( )
- i) - Trainees food ( ) ( ) ( ) ( ) ( ) ( )
- j) - Uni and clothing ( ) ( ) ( ) ( ) ( ) ( )

- k) - Purchase of stat ( ) ( ) ( ) ( ) ( ) ( )
- l) - Advert and Publ ( ) ( ) ( ) ( ) ( ) ( )
- m) - Off-Exp-General ( ) ( ) ( ) ( ) ( ) ( )
- n) - Purchase of stores ( ) ( ) ( ) ( ) ( ) ( )
- o) - Maint of Pit & Equip ( ) ( ) ( ) ( ) ( ) ( )
- p) - UNICEF (Food Stipend) ( ) ( ) ( ) ( ) ( ) ( )
- q) - DANIDA (Follow-up) ( ) ( ) ( ) ( ) ( ) ( )
- r) - Other \_\_\_\_\_ ( ) ( ) ( ) ( ) ( ) ( )
- s) - Other \_\_\_\_\_ ( ) ( ) ( ) ( ) ( ) ( )

11. What were your expenditures on

- a) - Staff salaries ( ) ( ) ( ) ( ) ( ) ( )
- b) - Trans-oper-Exps ( ) ( ) ( ) ( ) ( ) ( )
- c) - Trav & Accom ( ) ( ) ( ) ( ) ( ) ( )
- d) - Postage ( ) ( ) ( ) ( ) ( ) ( )
- e) - Telephone ( ) ( ) ( ) ( ) ( ) ( )
- f) - Electricity ( ) ( ) ( ) ( ) ( ) ( )
- g) - Water ( ) ( ) ( ) ( ) ( ) ( )
- h) - Conservancy ( ) ( ) ( ) ( ) ( ) ( )
- i) - Trainee's food ( ) ( ) ( ) ( ) ( ) ( )
- j) - Uni and clothing ( ) ( ) ( ) ( ) ( ) ( )
- k) - Purchase of stat ( ) ( ) ( ) ( ) ( ) ( )
- l) - Off-exps-General ( ) ( ) ( ) ( ) ( ) ( )
- m) - Purchase of stores ( ) ( ) ( ) ( ) ( ) ( )
- n) - Maint of Plt & Equip ( ) ( ) ( ) ( ) ( ) ( )
- o) - UNICEF (food stipend) ( ) ( ) ( ) ( ) ( ) ( )

- p) - UNICEF (Food Stipend) ( ) ( ) ( ) ( ) ( ) ( )
- q) - DANIDA (Follow-up) ( ) ( ) ( ) ( ) ( ) ( )
- r) - Other ..... ( ) ( ) ( ) ( ) ( ) ( )
- s) - Other ..... ( ) ( ) ( ) ( ) ( ) ( )

INFORMATION IS CONFIDENTIAL

FORM 2

HOUSEHOLD QUESTIONNAIRE

FOR OFFICIAL  
USE

Mother's Number ( ) ( ) ( )

Sublocation -----

Village -----

Name of mother -----

Age in years ( ) ( )

Education 00 = illiterate

01-14 record number of years  
( ) ( )

Marital status

1 = Single      2 = Divorced

3 = Separated   4 = Widow

5 = Polygamy    6 = Monogamy

Occupation of mother -----

Occupation of father -----

Family size: number of siblings fed in  
the household ( ) ( )

ANTHROPOMETRIC/ILLNESS RECORD

Child's name -----

Age in months ( ) ( )

Sex 1 = Male    2 = Female

Height in cm ( ) ( ) ( )

Weight in Kgs ( ) ( ) ( )

FORM 2 (continued)

FOR OFFICIAL  
USE

Siblings less than 5 years, next in  
line and younger

Age in months ( ) ( )

Sex ( )

Height in cms ( ) ( ) ( )

Weight in Kgs ( ) ( )

When the child became malnourished,  
what was he/she suffering from?

-----  
-----  
-----

Mother's K.A.P on child feeding

Did you attend education sessions while  
child was in Rehabilitation?

1 = Yes 2 = No ( )

If 'yes', which of the subjects taught  
did you find useful and have put into  
practice?

-----  
-----  
-----

How many times per day do you feed  
your child?

1-5 indicate the number of times  
6 = on demand 8 = other

What foods do you feed your child on,  
how many times a week?

Type of food                      Times fed

- 1.
- 2.
- 3.
- 4.

FORM 2 (continued)

FOR OFFICIAL  
USE

- 5.
- 6.
- 7.
- 8.
- 9
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

Observe home environment for the presence and use of the following :

- 1. = Present and in use
- 2. = Absent
- 3. = Present not in use

- A: Kitchen
- In main house ( )
  - In open space ( )
  - Detached ( )

- B: Kitchen Garden
- Adjacent to kitchen
  - In main garden
  - At lake-side ( )

- C: Food storage
- In clean containers and covered ( )
  - In clean containers not covered ( )
  - In dirty containers and covered ( )
  - In dirty containers not covered ( )
  - In clean open space

FORM 2 (continued)

FOR OFFICIAL  
USE

- 5.
- 6.
- 7.
- 8.
- 9
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

Observe home environment for the presence and use of the following :

- 1. = Present and in use
- 2. = Absent
- 3. = Present not in use

A: Kitchen

- In main house ( )
- In open space ( )
- Detached ( )

B: Kitchen Garden

- Adjacent to kitchen
- In main garden
- At lake-side ( )

C: Food storage

- In clean containers and covered ( )
- In clean containers not covered ( )
- In dirty containers and covered ( )
- In dirty containers not covered ( )
- In clean open space



FORM 2 (continued)

FOR OFFICIAL  
USE

- Shared in good condition ( )

- Shared in bad condition ( )

I: Garbage disposal

- Litter in compound ( )

- Burns daily ( )

- Throws in garden ( )

FORM 2 (continued)

FOR OFFICIAL  
USE

- Shared in good condition ( )

- Shared in bad condition ( )

I: Garbage disposal

- Litter in compound ( )

- Burns daily ( )

- Throws in garden ( )







APPENDIX V

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