Nutrition Rehabilitation: Its Practical Application

by: Joan Koppert

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NUTRITION REHABILITATION—Its Practical Application
By *Joan Koppert, S.R.N., S.C.M.* With a Foreword by *Dr David Morley* and contributions by *Dr Sue Cole-King* and *Dr William Cutting.*

In most developing countries around 1 per cent of all children under the age of 5 years will be suffering from a severe degree of malnutrition at any one time, and in many countries the figure is far higher. In addition, there is a very much larger group of undernourished children. The most fundamental and realistic approach to this urgent problem is not in the hospital wards, but in the *Nutrition Rehabilitation Centres.* Joan Koppert has spent many years in setting up such Centres and training the staff to operate them. As this book will show, the results of follow-up studies have been most rewarding both in the recovery of the children and the training of the mothers, the latter to ensure that malnutrition does not recur within their families. All aspects of the Centres are dealt with—siting, building, cost, training programmes and methods, dietary considerations and record keeping—in the light of local conditions.

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This book is the result of an extensive project, funded by the UK Ministry of Overseas Development, to assess the relative value of mobile health services (with special reference to land vehicles and aircraft) in increasing the effective coverage of primary health services for the rural population of developing countries. Botswana was selected for the field work which was carried out by Dr Walker, a community physician, and the project was under the general direction of Oscar Gish, the health economist. Specific recommendations are made regarding the potential use of aircraft and other forms of transport. Many governments of such countries are realizing the potential in rural industrial and agricultural development both to improve social standards and with export in mind. This book goes a long way in solving the problems of effectively instituting the necessary mobility of all sectors of the health services from both the medical and economic points of view, and it should be read by all concerned with social and community medicine, tropical medicine, health planning and administration, and should be read in conjunction with *Guidelines for Health Planners.*
(This work is in production and is expected to be published early in 1977)

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HIS NAME IS 'TODAY'

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Contents

Foreword

If the need for nutrition rehabilitation centres is to be fully accepted, then the characteristics of developing countries must be clearly stated. Although the majority of people reading this book may come from developing countries – most of whom will have lived much of their lives in the cities – they may not fully appreciate the problems that their countries face. First of all, there is a rural/urban imbalance. Whereas in the industrialized countries of the west usually over 80 per cent of the population live in towns and cities, in the developing countries three-quarters of the population live in rural areas, and even in the cities around one-third of the population may be in urban slums.

The major exports of most developing countries are agricultural and are produced in the rural areas. It is one of the great injustices of our world that so many governments unwittingly allow the majority of spending to take place in the towns, both of the resources produced within the country and also the resources available from overseas, due largely to the export of agricultural products.

The population of developing countries is young, and over 45 per cent may be children. The proportion of wage-earners is small, and the number of dependants each wage earner has to support is therefore much larger than in industrialized nations. The health services are modelled on those suited to a European-type population with only half as many children and a disease pattern in which the acute infections and malnutrition play a minor role.

The resources of developing countries are very limited. Before inflation started in the early 'seventies it was estimated by economists that developing countries were spending around $1.00 a head

a year on their health care, compared with $100.00 invested in health by the industrialized countries. Forecasts at that time suggested that the ratio would not materially change and at the end of the century the spending would be around $250.00 a head a year for the industrialized countries and only around $3.00 for the developing countries. Since those estimates were made, the actual figures have altered considerably, due to inflation. However, the circumstances for the developing countries are, if anything, worse.

It is against this background that developing countries have taken the tragic option of investing in vast teaching hospitals. These multi-million dollar hospitals cost a quarter of their capital in running expenditure each year, and as a result the possibility of developing a health service relevant to the real needs of the people has been set back for many years.

Various estimates have suggested that in most developing countries around 1 per cent of all children under the age of five years will be suffering from a severe degree of malnutrition at any one time, and in many countries the figure is far higher. In addition, there is a very much larger group of undernourished children, and in some countries a high proportion of all the children can be considered as nutritional dwarfs. In these circumstances, the approach to the problem by many doctors in admitting a tiny minority of the malnourished children to highly expensive hospital wards is almost irrelevant, particularly since studies of the literature have shown that a high proportion of such children die either in hospital or in the year subsequent to discharge.

A more fundamental and realistic approach to the problem by promoting adequate growth – monitored by a weight chart held by every child – has been developed with the advent of the Under-Fives' Clinics. However, even in the few countries where such services are widely available, some children will develop a more severe malnutrition, and it is for these that nutrition rehabilitation centres are desperately needed. Unfortunately, to date the development of these centres has been largely outside the sphere of university interest. The publication of this first manual on the development of these centres may play an important part in their wider acceptance and their inclusion in the training of medical students and all other levels of health worker. The production of this book is particularly appropriate at the present time, following the general guiding principles issued by the 28th World Health Assembly of the World Health Organisation in 1975.

Although these principles may be familiar to the majority of those reading this book, they will be repeated here, as every one is relevant to the concept of nutrition rehabilitation.

(1) Primary health care should be shaped around the life patterns of the community it should serve and should meet the needs of the community.

(2) Primary health care should be an integral part of the national health system and other echolons of services should be designed in *support* of the needs of the peripheral level, especially as this pertains to technical supply, supervisory and referral support.

(3) Primary health care activities should be fully integrated with the activities of the other sectors involved in community development (agriculture, education, public works, housing and communications).

(4) The local population should be actively involved in the formulation and implementation of health care activities so that health care can be brought into line with local needs and priorities. Decisions upon what are the community needs requiring solution should be based upon a continuing dialogue between the people and the services.

(5) Health care offered should place a maximum reliance on available community resources, especially those which have hitherto remained untapped, and should remain within the stringent cost limitations that are present in each country.

(6) Primary health care should use an integrated approach of preventive, promotive, curative and rehabilitative services for the individual, the family and the community. The balance between these services should vary according to community needs and may well change over time.

(7) The majority of health interventions should be undertaken at the most peripheral practicable level of the health services by workers most suitably trained for performing these activities.

Perhaps, however, the strongest case for nutrition rehabilitation can be made by the Nobel Prize-winning poet from Chile, Gabriela Mistral, and an artist, Gillian Oliver.

We are guilty of many errors and faults,
but our worst crime is abandoning the children,
neglecting the fountain of life.
Many of the things we need can wait.
The child cannot.
Right now is the time his bones are being formed,
his blood is being made and his senses are being developed.
To him we cannot answer, 'Tomorrow'.
His name is 'Today'. *David Morley*

HIS NAME IS 'TODAY'

Preface

The purpose of this book has two aims. First, as a guide to those who are planning or operating a nutrition rehabilitation centre; secondly, to present the problems and causes of malnutrition involving many millions of mothers the world over and their daily struggle to feed their families, due to inadequate income, high food prices, low food production and ignorance as how to get the best out of their slender resources. The last-named factor is the concern of health and community workers – they should constantly teach and advise.

Low food production is the concern of those who plan development aid from outside. More help is needed for the subsistence farmer and the home gardens by way of improved irrigation, fertilizers, seeds and pesticides. Low incomes and high food prices are factors for those responsible for such policies within the countries concerned. An increase in basic wages combined with a restriction on food prices can help to alleviate the suffering and misery of many. My personal experience doing fieldwork in many parts of the world undoubtedly influenced my interest on the subject of nutrition rehabilitation and home and family improvement.

Born and brought up in rural conditions during the 'tens and twenties of this century – at some time without electricity and piped water – I too have known hardships, a fact which eventually led me to appreciate and understand the plight of the underprivileged of today.

Having started my professional career as a nurse and midwife in London and The Netherlands, my work took me, in 1950, to East Africa where in ante-natal and child welfare clinics with follow-up care in the homes of the local people I was soon confronted with the

serious problems of the mothers, perhaps the most urgent being that of providing sufficient food for the family invariably from an exceedingly low income.

During the 'fifties malnutrition as well as kwashiorkor and marasmus were common despite the fact that enough food was being produced. The drift to the towns had hardly begun and the population explosion not yet felt. Many changes have since taken place: the migration to the towns has greatly increased to such an extent that the rural population in many areas has been depleted, especially of men, leaving the food production to the women. In towns throughout similar parts of the world there is often mass unemployment without financial assistance, thus causing hardship. Lastly, the ever-increasing population creates a greater need for more food. Consequently, in spite of all the health teaching, malnutrition and undernutrition have increased rather than decreased. Health workers have been forced to look in other directions for a remedy for malnutrition.

Since the middle 'fifties nutrition rehabilitation has been practised in many different parts of the world; first in South America where Dr. Bengoa gathered together a number of mothers and their malnourished children to settle them for a period of time away from the hospital atmosphere, not only to recuperate the children by better feeding methods but also to teach the mothers how to manage for themselves and to make the best of their own resources. Since 1955 the concept of nutrition rehabilitation has been widely practised in many countries throughout the world, with varying approaches from hospital day centres and resident nutrition rehabilitation centres to domiciliary nutrition teaching in the homes. The results have varied; some very encouraging, others disappointing.

In 1972 I was invited to organize a nutrition rehabilitation centre on the outskirts of Lusaka, the fast-growing capital city of Zambia. At that time there were many problems of a rural population moving into the city, many unemployed and often living under difficult circumstances. The problems were complex, rural in a sense because of the background of the population who were finding it difficult to adapt themselves to city conditions.

By living at the centre for four months it was possible to assess these difficulties at close range and seek out solutions in collaboration with the local staff – a housemother, a cook and a university trained social worker. We had many encouraging results.

During 1974 on the invitation of several missions and other organizations I toured five African countries, spending as much time as possible at each of the 23 centres visited, which enabled me to study the background and some results of nutrition rehabilitation.

The impressions and facts gathered during this tour varied. Some centres were exemplary, others had recognized their failures but not always their problems. Little evaluation had been done, either on long-term or on short-term, in many places due to shortage of staff, great distances and lack of funds to provide transport facilities.

Upon my return I was requested to record my experiences gathered during this tour. It is from these and my earlier work over many years that this book has emerged. My aim has been to express myself in the right tone to all those people of different races and customs interested in nutrition rehabilitation the world over. I set out to ensure that this book would take the form of an instruction manual with detailed information on the setting up of a centre and its day-to-day running, a place where mothers would learn how to prepare balanced meals for their young, especially weaning children, on returning to their homes. Home economy, household budgeting, home gardening, food values, fathers' co-operation and ways and means of improving the family income have been included. Practical advice is given on the siting and construction of a centre along with the financial implications. Methods of administration and follow-up care are described.

Other works have been listed for further reading to enlarge on points which have necessarily had to be limited due to restricted space in this book. Advice has been gratefully accepted from notable workers in the field to ensure that the information given is applicable in all parts of the world, including Asia and South America, wherever the aftermath of malnutrition is prevalent.

I should like to thank publishers who have kindly given me permission to reproduce previously published illustrations.

This book would not have been possible without the constant encouragement and advice of Dr. David Morley of the Institute of Tropical Child Health, London. Practical help has been given with the writing, the typing, the photographs and drawings by the Royal Tropical Institute of Amsterdam. I am very grateful to Dr. Jane Kusin of the Department of Medical Nutrition for her specialist advice on Chapters 4, 5 and 6; to Ir. F. Geurts with the writing of Chapter 7 on tropical gardening; to Miss Wil van Steenbergen for her advice on the menus and food values; and to Anna Marie Ruygrok for the drawings. All are members of the Royal Tropical Institute.

Dr. Sue Cole-King of the Institute of Developmental Studies, Brighton, Sussex, helped considerably with Chapters 8 and 9. Finally, the generous financial help of the Interchurch Aid Department of the Netherlands Reformed Church has made the publication possible at low cost.

It is my sincere wish that this book will be read by all students of medical, agricultural and community development work and by field workers involved in or planning nutrition rehabilitation centres, often situated in isolated places and operating under difficult circumstances. It is hoped that it will benefit all the mothers of this world for whom the feeding of their families is a daily struggle, to all of whom this book is dedicated.

Joan P. Koppert

1

Home Resources Against Malnutrition

INTRODUCTION

Malnutrition is a major health problem that particularly affects children in the poorer countries and communities of the world. The most prevalent form is protein–energy malnutrition which probably affects more children in the world than any other disease. It is accepted that the causes of malnutrition are complex and interrelated. Poverty, ignorance and superstition underlie the more immediate precipitating factors like inability to grow or buy enough appropriate food. The neglect of medical conditions may predispose to malnutrition; social customs can limit the use of foods which are available; maldistribution of food within the family and the community also contribute to the problem.

MALNUTRITION AS A HEALTH PROBLEM: THE LIMITS OF SICKNESS SALVAGE

Protein-energy malnutrition becomes apparent as a medical problem when the child presents with clinical features. These children who usually suffer from extreme degrees of the condition are only the unfortunate end-products of a long process which has developed over many weeks or months. The classical medical answer to malnutrition has been to admit the children to a hospital and supply them with the necessary energy and nutrients that had been deficient and also treat any associated infections with antibiotics. This solution can only

be applied to a small number of the most severely ill children. Despite the most intensive efforts in even the most sophisticated units, the salvage rate rarely exceeds 60 per cent and treatment seldom takes less than one month. The striking pattern of recovery of the few tended to obscure the more important questions about either the predisposing natural history or the subsequent progress and mortality of these children. Despite this reality it was long assumed by the medical profession that children with advanced forms of protein-calorie malnutrition or with complications must be considered as emergencies and immediately hospitalized.

Examination of the result of apparently successful hospital treatment makes depressing and salutary reading. In Iran in one study no less than 37 per cent of the children had died within six months of leaving hospital. In the Philippines, 77 out of 100 malnourished children were followed up within a year of discharge, and of these 26 had died, 25 had severe and 23 moderate malnutrition. Another study in western India in 1972 followed up 37 children discharged after treatment from a teaching hospital; 48 per cent of the cases died within 6 months and 62 per cent within a year. As a consequence of such studies, workers infer that 'it seems to us that under the present circumstance, the admission to hospital of malnourished patients is to a large extent a waste of time and money'. In his review of this subject Cook concludes that 'in most parts of the world for many malnourished children discharged from hospital, the path of their progress leads but to the grave'.

NUTRITION REHABILITATION: AN ALTERNATIVE AND COMPLEMENTARY CARE SYSTEM

The logical steps to an alternative pattern of service require earlier intervention and more effective follow-up. Inevitably, concern is centred on the quality of care and feeding which had resulted in the malnutrition for these children. The fundamental questions are: (1) could the mother have done anything to prevent this within the constraints of the socio-economic situation; (2) how could she be involved in the immediate cure and rehabilitation of the child; and (3) what can she do to prevent the recurrence of malnutrition in this child and her other children?

Nutrition rehabilitation is a term used to describe a range of services aimed at answering these fundamental questions by combining therapy and education. It is a practical nutrition training in which mothers learn by participation in preparing appropriate diets from

locally available foods, and feeding their malnourished children back to health. Mothers learn from each other in a natural educational process which includes working together. Their ability to cope and their confidence to teach grows and is confirmed by the recovery of their children. The process must continue for a follow-up period long enough to establish that the mother is successful in her own home situation, and ideally over a period in which she can bear another child, rear it and wean successfully without further malnutrition in the family.

There are many patterns of nutrition rehabilitation that have been developed to suit different circumstances and countries; these include residential and day-care centres and domiciliary nutrition rehabilitation. None of these is mutually exclusive, but they can be combined with benefit. Each situation requires careful analysis of the malnutrition problem to identify the ways in which local resources can best be used to make up the deficit of child care which contributed to the condition. The aim of this book is to draw together some of the basic principles and methodology of nutrition rehabilitation, with illustrations from the author's experience. It is hoped that it will be a guide for those responsible for developing nutrition rehabilitation within their immediate setting. In each community local variations will be necessary, but it is the concept that underlies these details that is most important.

NUTRITION REHABILITATION: FROM THE MEDICAL SERVICES' VIEWPOINT

As a complement to existing medical services the aim of nutrition rehabilitation is to detect children at risk in an early stage of malnutrition, and those who have definite clinical malnutrition but are still at a stage that it can be reversed with adequate diet and minimal medical treatment.

It is unrealistic to consider nutrition rehabilitation as a complete solution to the malnutrition problem. Inevitably, only a relatively small proportion of malnourished children can be handled by nutrition rehabilitation centres, and the appropriateness of the service depends on suitable selection and referral of children. External constraints such as accessibility affect this, like other services. However, it has been shown that cost-for-cost nutrition rehabilitation units can provide an effective alternative pattern of care which includes early intervention and follow-up for many more malnourished children than can be treated by conventional hospital admission. As

such there is a case for considering this as a valuable complementary service.

In many places the nutrition rehabilitation programme provides a much needed and realistic nutrition training for doctors, nurses and auxiliary personnel. This counters the unfortunate but common tendency for nutrition education to be theoretical, unpractical and unrelated to the local scene.

NUTRITION REHABILITATION AND COMMUNITY

Ultimately it is individuals and the communities that they come from that need to face the problem of malnutrition and how it can be prevented. The need is largely beyond the resources and responsibility of a medical service. Many nutrition rehabilitation centres have been well aware of this and have been concerned with extension into the community and mobilization of public awareness and responsibility. They have also acted as bases for integrating different services, such as agriculture and community development. There is a serious risk that people will see nutrition rehabilitation as a centre with various activities, and not be aware of the less obvious but more important process which grows within the community.

Nutrition rehabilitation is a good practical illustration of the well known proverb: 'Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for life'.

GIVE A MAN A FISH
AND YOU FEED HIM FOR A DAY.....

Tomorrow.....
..... he may be a beggar

.....TEACH A MAN TO FISH
AND YOU FEED HIM FOR LIFE

Tomorrow .... if well taught ...
... he will be teaching others

2

The Problem of Malnutrition

There is growing concern by national and international authorities about the extent and increase of malnutrition in developing countries. To recognize the problem and to plan improvements it is necessary in the first place to look at the underlying causes of inadequate feeding. The most vulnerable groups are pregnant and lactating women, and young children under the age of 5 years. Numerous articles have been written in past years on the complex factors involved in the malnutrition syndrome, but there is no need to review these in this book; only short mention is made of the more important papers.

Poverty

It is obvious that poverty is the major constraint; hence there is obviously a need for socio-economic improvement. The lower wage earners, particularly in urban areas, are very susceptible to the high cost of living.

Food shortage

Seasonal food shortage may be due to various causes including inadequate production, drought, excessive rains, waste due to inadequate or bad storage when large amounts of produce can be ruined by insects or by rotting and, lastly, by selling too much produce for economic or other reasons. Complete failure of crops may lead to the risk of famine.

Disease

There are numerous diseases which affect the nutritional status of a child; on the other hand, a malnourished child has less resistance against infectious diseases than a well-nourished one. Acute infectious diseases such as measles, whooping-cough and chickenpox often result in a drop in weight. This can be illustrated by a follow-up of the child using a weight/growth chart; weight will be seen to drop suddenly. In many cases a child who was mildly or moderately malnourished before, develops kwashiorkor. The cause of such a deviation is that disease increases the requirements in nutrients tremendously, but food intake, both in amount and quality, is often reduced. The child has less appetite, and the mother may not know that a child needs more nutritious food when he is sick. There may be food avoidances in these conditions among others of food from animal sources.

In many countries there still exists the old belief that when sick one's food intake should be reduced. This was also known in western cultures when thin soups and arrowroot drinks were given to sick people – adults as well as children. Mothers often have to be persuaded to 'push' food and fluids with a sick child when she insists that the child 'does not want it' and she herself takes a fatalistic view. Only by helping her with the feeding until the child begins to swallow will the mother become convinced that it is possible and necessary to feed her sick child.

Chronic infections such as tuberculosis, hookworm infestations and urinary tract infections can also be the cause of faltering growth.

Ignorance and cultural habits

There is often a misuse of available foods through ignorance and cultural habits, which may cause malnutrition even when sufficient food is available. This situation can be seen all over the world, even in developed countries where children are given too much fat and carbohydrate-containing foods causing obesity, which is also a form of malnutrition.

Artificial commercial feeding may be considered as progressive, and is sometimes practised to increase the status of the mother amongst her friends. If the young women have not been properly instructed either at school or at home by their mothers, they may start family life with inadequate knowledge of food requirements and preparation to feed their families for which they are responsible, even

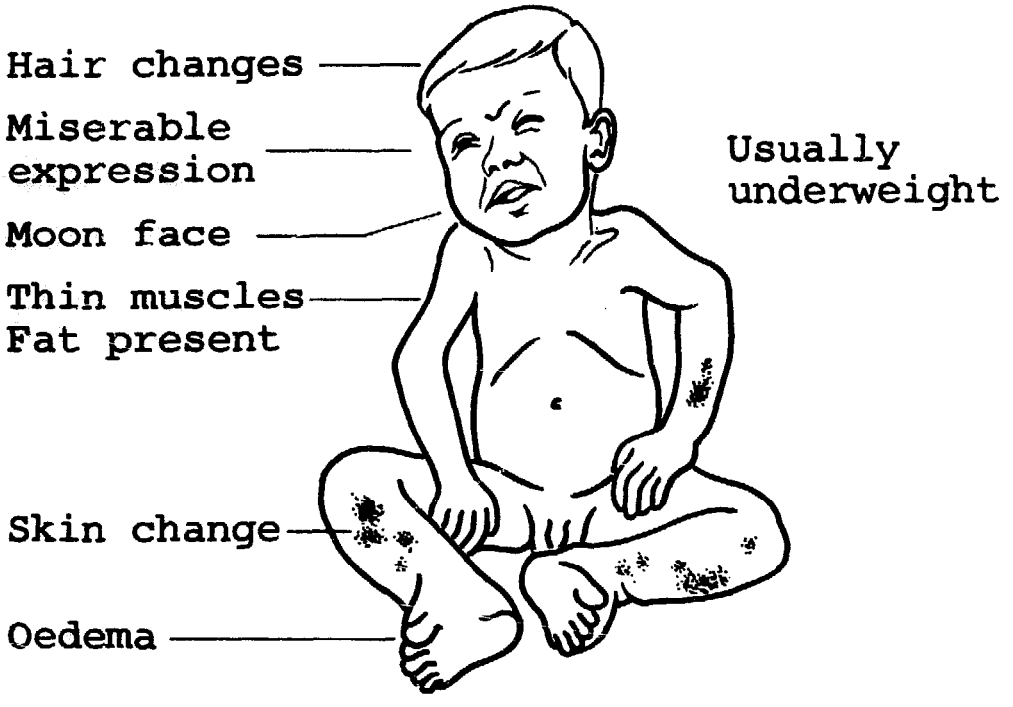

Figure 2.1 Physical signs in kwashiorkor

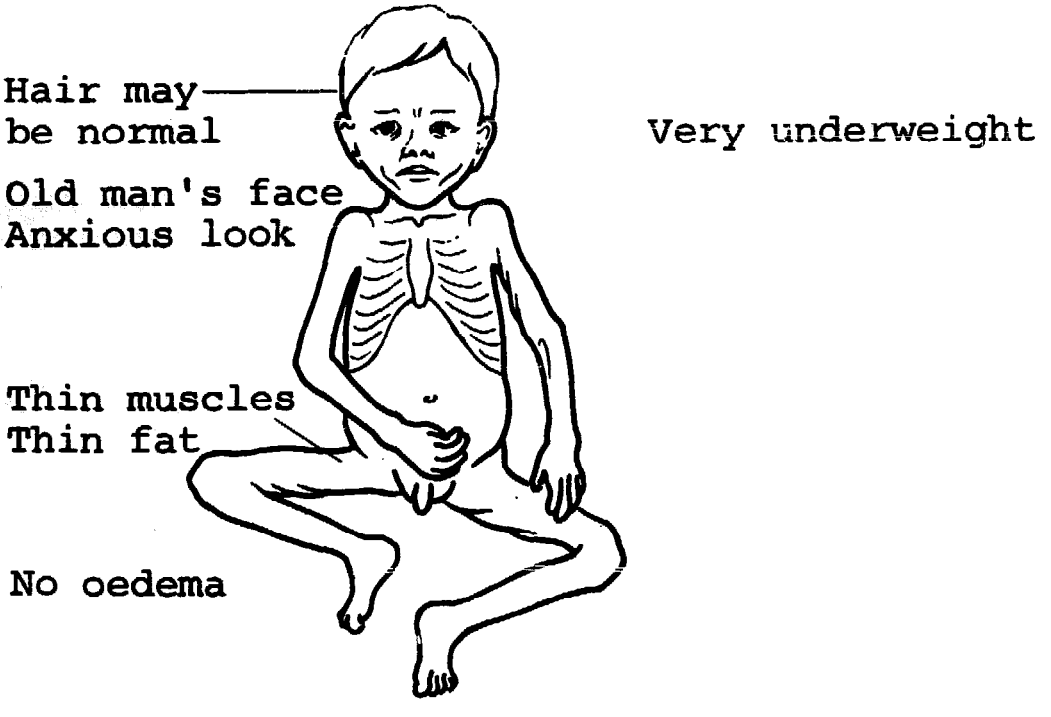

Figure 2.2 Physical signs in nutritional marasmus

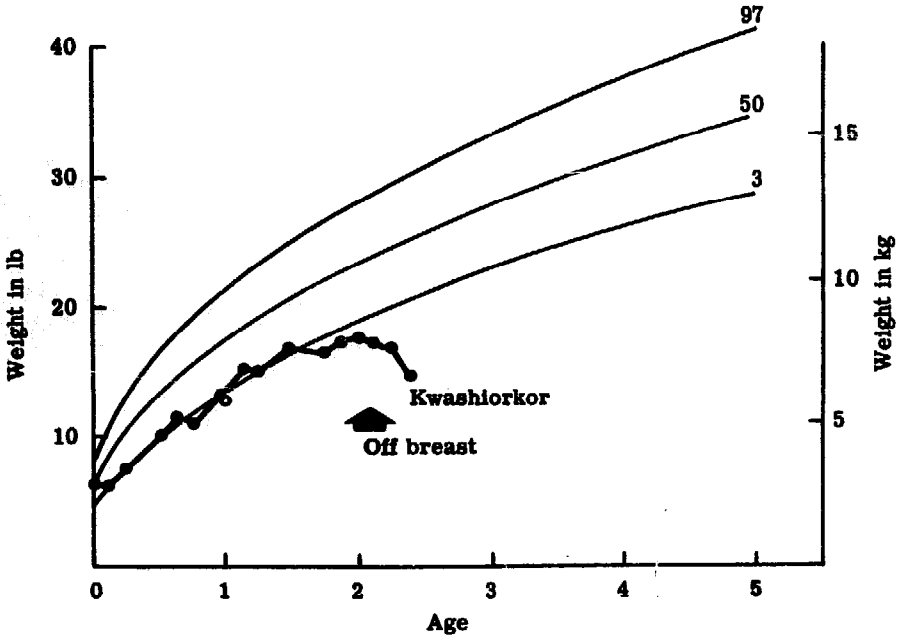

Figure 2.1 Common weight record in children prior to the onset of kwashiorkor

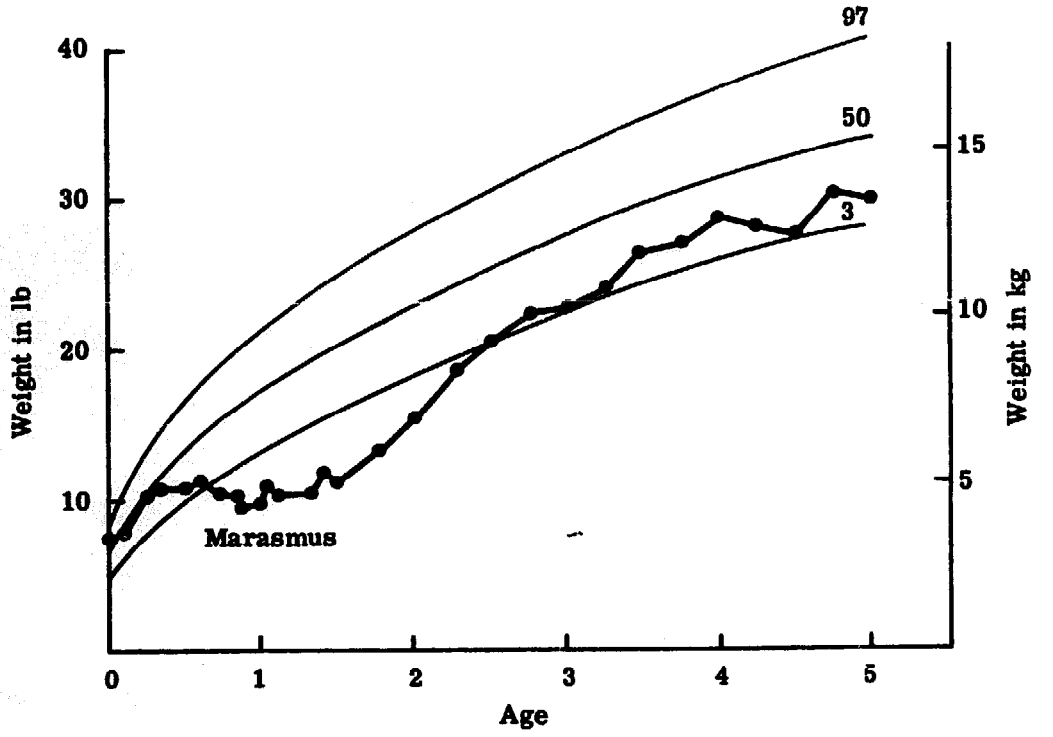

Figure 2.2 A common weight record in marasmus, showing failure to gain weight for fifteen months

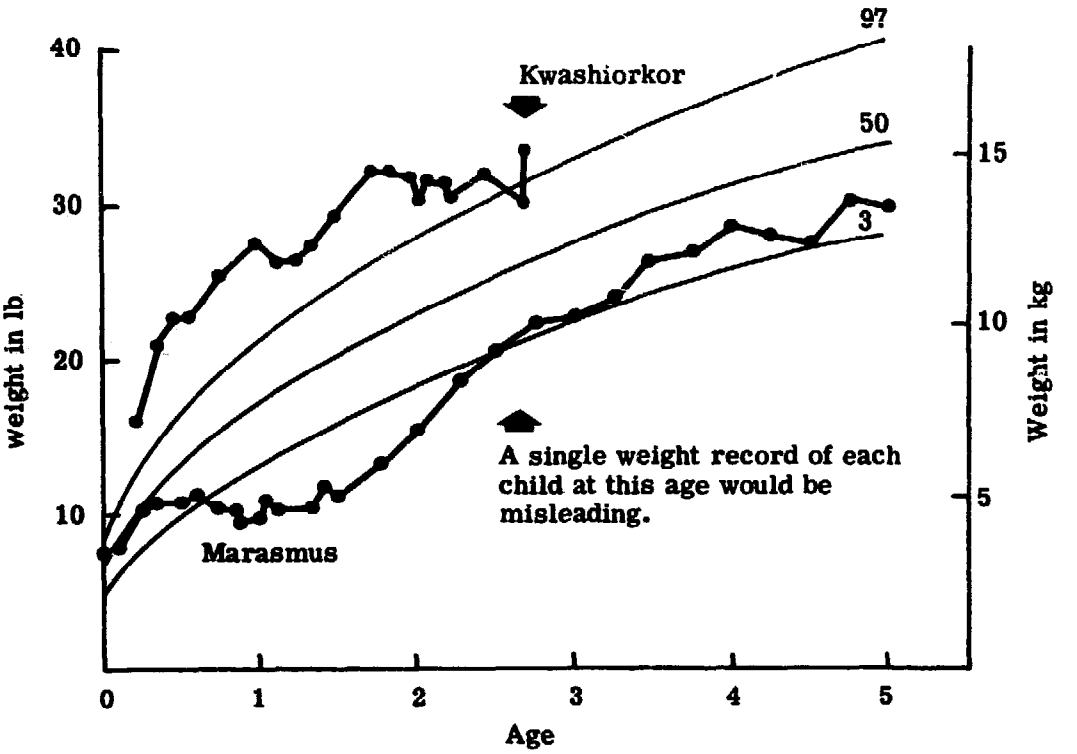

Figure 2.3 Comparison of weight curves of two children with kwashiorkor and marasmus shown in the previous Figures. Only with a weight curve can we understand childrens' nutrition. A single weight may be misleading.

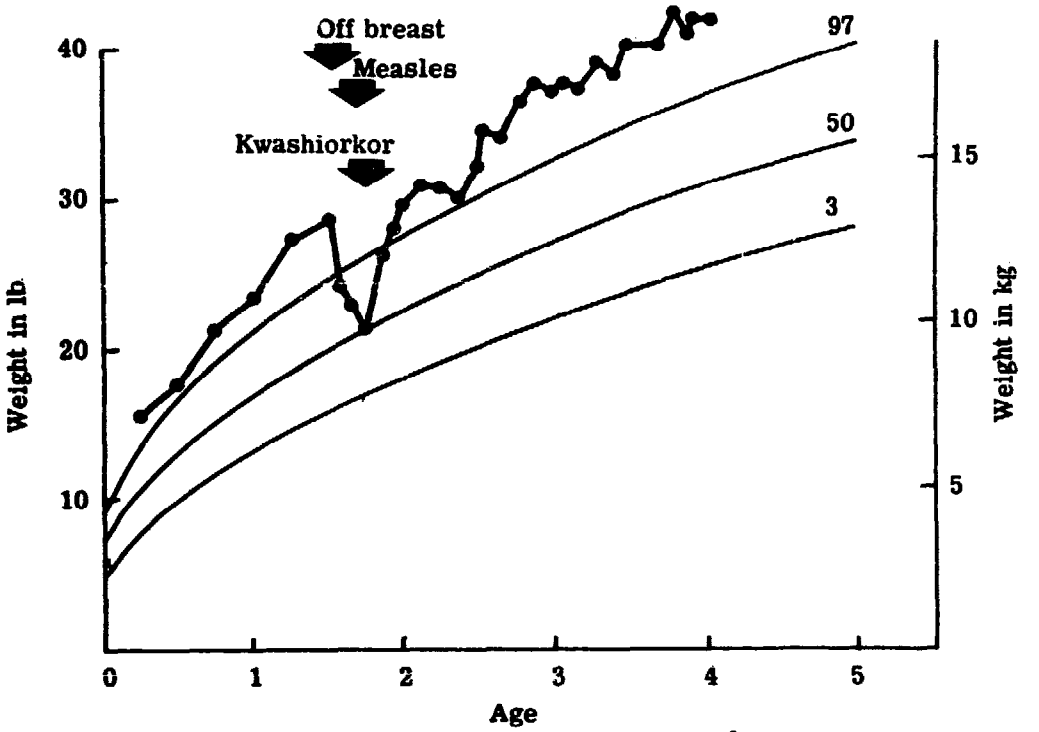

Figure 2.4 Development of kwashiorkor following cessation of breast feeding and measles. A severe illness such as measles may precipitate a child who is growing well into kwashiorkor within a month

though the household budget may be adequate. Irregular and badly planned meals by working mothers may impair the health of their families.

Bottle feeding has been a threat to childrens' lives ever since bottles and milk powder appeared in places where cleaning facilities are inadequate or the prices of milk and milk powder are too high to allow for adequate feeding. Gastro-enteritis in young infants has claimed an alarmingly high death rate due to feeding with contaminated bottles and teats, and malnutrition has been caused through feeding inadequate amounts of milk powder often less than one-quarter of the required amount.

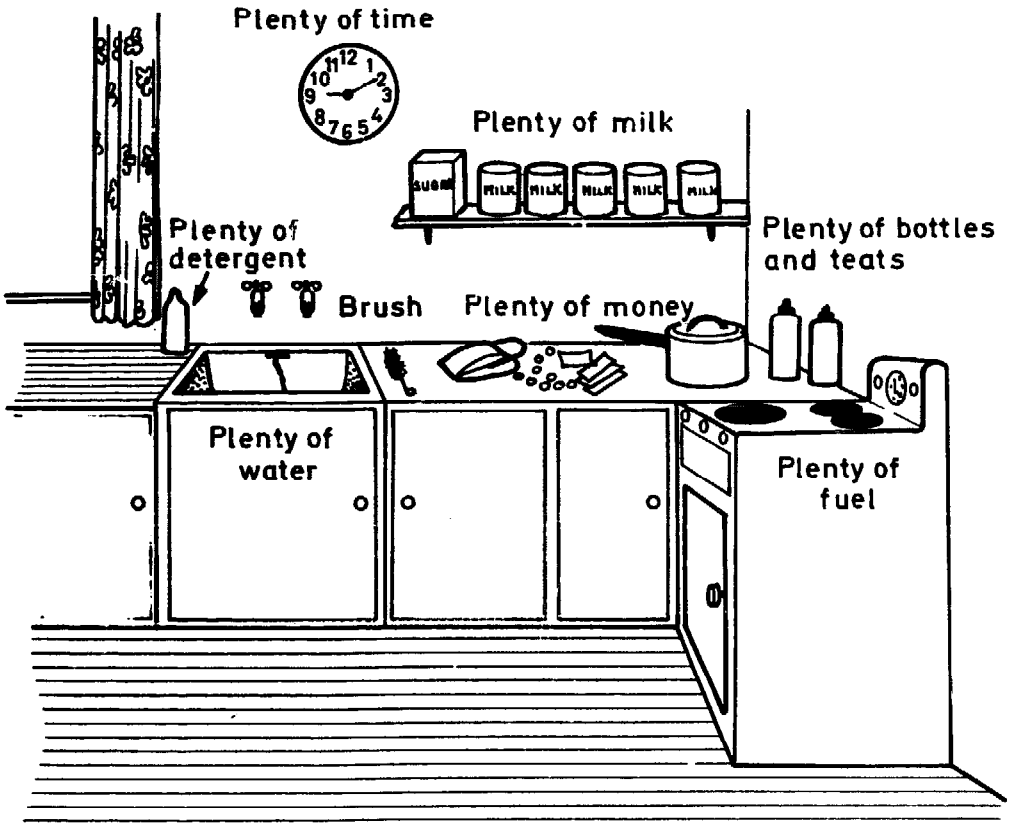

Figure 2.7 Safe bottle-feeding is possible in a kitchen like this

To set examples among the population, hospitals and child care centres should never use feeding bottles but always use a cup and a spoon for child feeding. Mothers are inclined to adopt the use of bottles when returning to their homes from hospital if they see them used by nurses; therefore, cup and spoon feeding should be practised by all nurses, even in new modern hospitals, especially where children

coming from under-developed areas are treated. To persuade mothers to use cups and spoons with which to feed their children has often been a loosing battle. Even if health personnel did all they could, commerce would defeat their aim by persuading the mothers

Figure 2.8 Safe bottle-feeding is impossible in these conditions

with the aid of attractive pictures showing that bottle feeding produces infants as bonny and beautiful as the pictures of the child with the golden crown.

The plastic bottle became a worse threat than the glass bottle; at least the glass bottle would show up dirt while the plastic bottle hides all contamination and is more difficult to clean. Even if the mother buys a bottle, a teat and milk powder, few will realize the

need of a bottle brush for cleaning purposes. There has been criticism from outside sources that women should have a free choice between bottle feeding and the use of cup and spoon; but such criticism has come from those who are not aware of the lethal

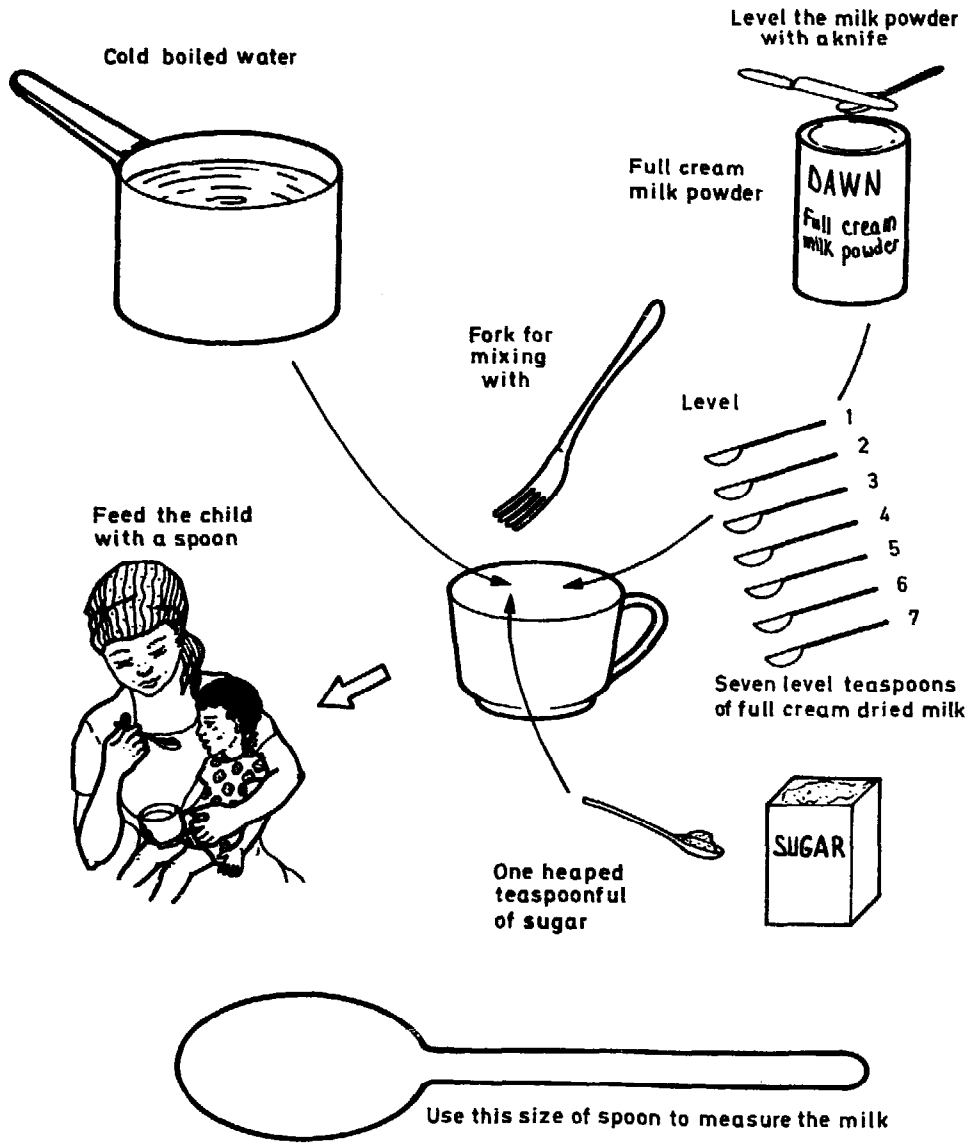

Figure 2.9 Cup-and-spoon feeding

danger of the dirty bottle or its inadequate contents. Such criticism should be firmly opposed and the reasons for doing so explained. The criteria should be that bottle feeding is positively dangerous in areas where there is no tap-water supply, no constant fuel supply such as gas and/or electricity and where a regular and sufficient

supply of milk powder is not possible due to either irregular supplies or too small a household budget.

Any fluid, therefore, should be given to the young infant by cup and spoon. Even from birth a child can be adequately fed with a small spoon should this be necessary as in a case where the mother has died.

Incorrect spending of income

Incorrect spending of the household budget may be due to ignorance on the part of the parents, the head of the family or, as in most cases, the mother. There may be too much spending immediately after wages have been paid at the beginning of the month on expensive foods leaving too little for the remainder of the month – this is often seen amongst the low-wage earners. Household budgetary becomes infinitely more difficult for the mother who has barely enough money and who cannot afford any degree of wasteful spending.

Birth control

The health and survival of a child is also much influenced by the birth interval (*see Table 2.1*); that is, the period of time between his birth and that of his subsequent brothers or sisters. Successive

Table 2.1 Mortality of 1473 children born in eleven villages by parity of mothers, 1955–1958

Parity of mother	*Number of births*	*Infant mortality (deaths per 1000 infants up to 1 year)*	*Second year mortality (deaths per 1000 population)*
1	230	172	76
2	209	117	16
3	210	145	24
4	197	124	92
5	165	172	96
6	136	164	77
7–12	326	206	95
Totals	1473	161*	68†

*Average mortality for all parities.
†After Wijon and Gordon, 1971.

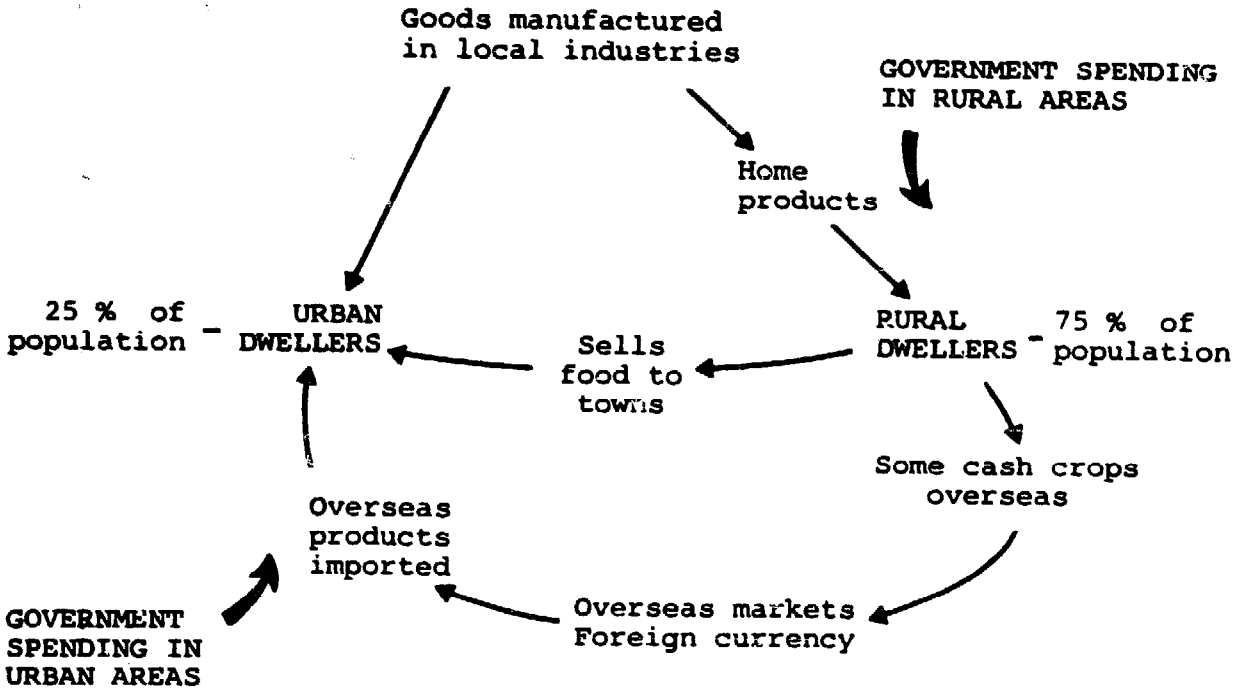

Figure 2.10 By shifting the emphasis of government spending to rural areas, the purchasing power of rural societies will encourage urban industry. This will help the whole economy of the country

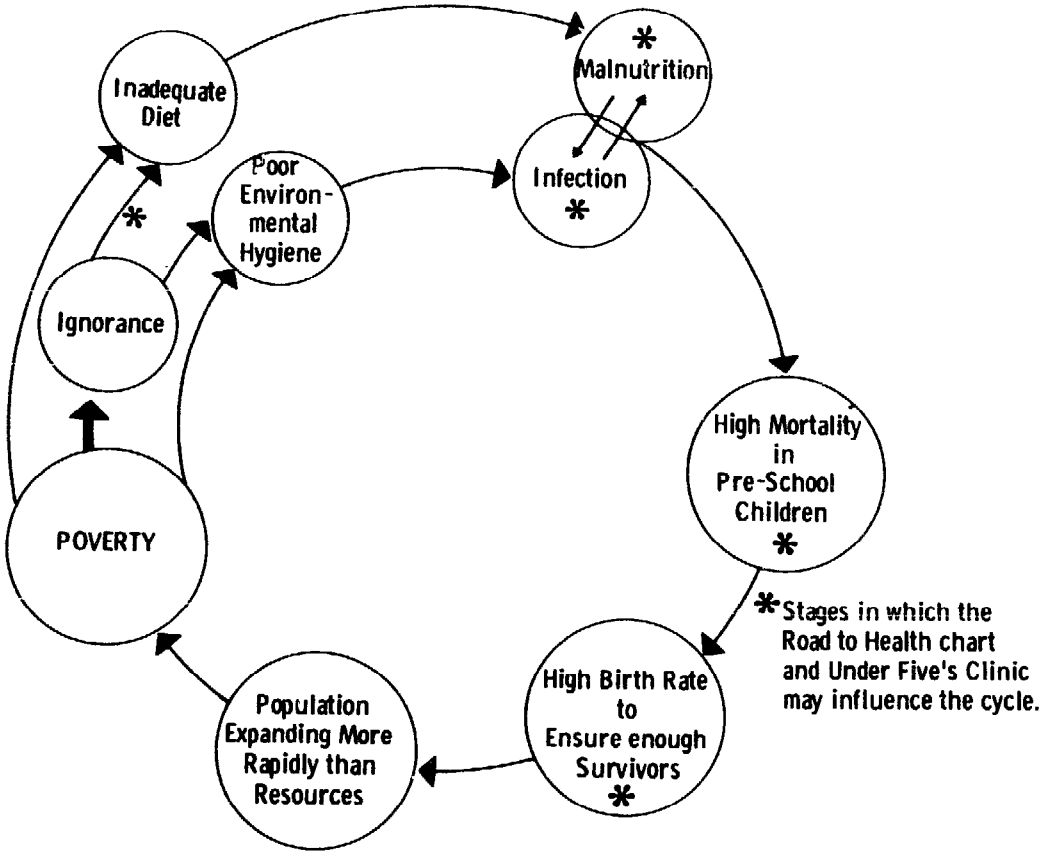

Figure 2.11 Poverty and population cycle. Comprehensive care of children under the age of 5 years and birth spacing may influence this cycle at a number of points

pregnancies at too short intervals prove a tremendous burden to the mother, since in most communities she will stop breast feeding her infant when she discovers that she is again pregnant. This is a great disadvantage to the young child since breast milk is usually the major source of good quality protein.

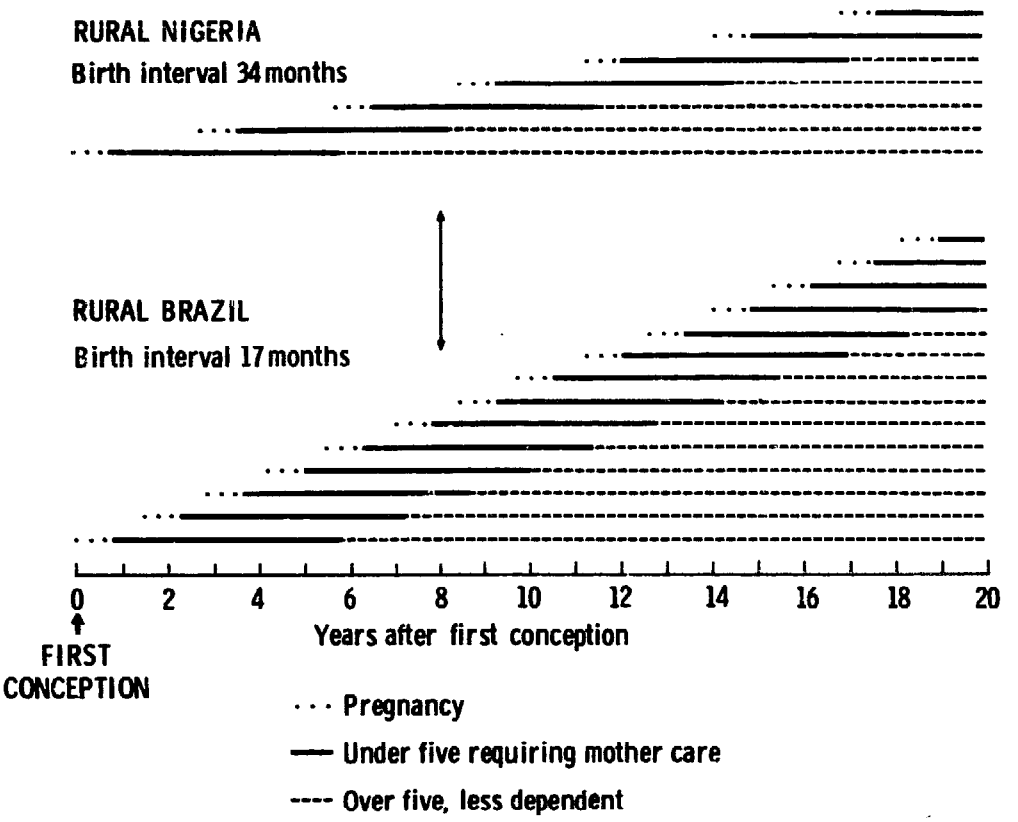

Figure 2.12 Build up of families in countries with a long and short birth interval. In country B the mother will have either 4 children under 5 years of age, or if she has 3 she is likely to be pregnant again. In country A she will only have 1 child under 5 years of age when she is pregnant. Each child in country B is likely to get much less mothering than in country A

Breast feeding, therefore, is a strong weapon in the planning of family spacing – an aspect which appeals to most women and, for economic reasons, may be shared by the husband. The belief that breast feeding prevents pregnancy, however, does not hold as women do become pregnant whilst breast feeding. This should be explained to both the wife and her husband, and advice given on the proper use of contraceptives, followed by supervision once both parents have agreed on the method to be adopted.

Water supply

Adequate water supply, lack of fuel and overcrowding (in urban areas) are yet further components of the malnutrition problem. To combat the various causes of malnutrition a multi-disciplinary approach to the problem is often necessary.

National food policy

A well planned national food policy could do much to improve the nutritional status of the population. Adequate attention should be paid to food production for local consumption. The tendency at present is that too much emphasis is laid on cashcrop production for export so that often too little is left available for foodcrops for the local population. The small subsistence farmer often gets very little help in the way of irrigation and the regular supply of fertilizers, seeds and pesticides. Home gardens, usually the concern of women, also need far more attention with help and advice from experts to achieve an optimum production for family use. Food prices are totally out of proportion with the wages of the lower income groups and very little is done for the masses of the unemployed.

Malnutrition, therefore, can be seen as an environmental problem varying from country to country, but also within a country between rural and urban districts and in rural areas between fertile and poor land or high and low rainfall.

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3

Introduction to Nutrition Rehabilitation

In many countries children with protein–energy–malnutrition (PEM) are still treated in hospitals; this proves to be a very expensive and disappointing approach. The patients stay for four weeks or longer, thereby occupying a badly needed bed for a very long time. They are exposed to the risk of contracting infectious diseases from other patients in the same ward, but more serious, many of the PEM patients die in the hospital or the 'cure' is often only temporary. The child returning from hospital to the same conditions at home, will either be re-admitted after a short while for the same condition or die at home from it.

Hospitals compared with nutrition rehabilitation centres

Hospitalization for malnutrition when compared recently with treatment at home and in nutrition rehabilitational centres has shown quite wide differences as shown in *Table 3.1.* Since then the advisability of spending resources on hospital care for children with malnutrition has been questioned in many countries.

If it is assumed that the hospitals which analysed and reported their results gave only the better findings, then the overall care of children with malnutrition in hospitals may be even worse. Emphasis should therefore be placed more on the treatment of malnutrition outside the hospital environment, and alternatively such children come under the special care of the Under-Fives' Clinics and the nutrition rehabilitation centres. This conclusion may be criticized on

Table 3.1 Treatment of malnutrition in and out of hospital (49)

*Hospital treatment**	*Total cases*	*Range mortality in hospitals (%)*
Central and South America (15)	3,276	11–30
Asia (7)	980	12–46
Africa (12)	8,746	8–52
Further mortality after discharge: Asia 15%, 30%, 37%; Africa 18%; America 34%		
Home and nutrition rehabilitation centres	*Numbers treated*	*Mortality (%)*
Peru	61	0
Nigeria	346	6
Haiti	56	0
Ghana	44	5
Kampala	112	8
Jordan	72	3

*Figures in brackets refer to the number of studies

Table 3.2 Summary of management of children nutritionally at risk

Grouping of children at risk	*Suggested steps to be taken in their care*
'At-risk' children	Relevant 'at-risk' factor entered under 'reasons for special care' as early as possible. Regular attendance encouraged to supervise weight, immunize early and treat infections. Special emphasis placed on feeding and giving supplements early if weight gain becomes inadequate
Children showing inadequate growth over a significant period, as indicated by flattening of the curve on the weight chart	A duplicate paper weight chart is kept in the clinic. Attendance at a less busy clinic may be necessary. Home-visiting increased
Continued poor growth. Early signs of malnutrition	Admit to a nutrition rehabilitation centre, or arrange daily attendance
Severe life-threatening malnutrition	Admit to hospital. By now long-term prospects may be poor

the grounds that those admitted to hospital are more severely ill. This is true but those managed in nutrition rehabilitation centres if untreated would have deteriorated and required hospital admission.

Cook (1971) estimated the cost of hospitalization to range from $95 to $950 per child, and for treatment at nutrition rehabilitation centres to vary from $25 to $70 per child.

Table 3.2 shows the appropriate steps that may be taken with children at various levels of risk from malnutrition.

There are many reasons for 'failure' in the hospital treatment of malnutrition, the main one being that a hospital is not the place where the problems of malnutrition can be attacked at the roots. The staff is too overburdened to give the child and the mother the care and attention they need, neither is there sufficient time to give nutrition education and guidance. The surroundings are all too unfamiliar to the mother and, above all, if the child is cured, she will be impressed by the 'scientific type of medicine' and will not relate the cure with the foods given to the child. Neither will she be given the self-confidence and the knowledge that she herself is the key person in the cure and prevention of PEM.

On the basis of these experiences Dr Bengoa, in 1955, started to develop centres in South America to educate the mothers in the rehabilitation of their malnourished children. A number of different names are used to describe the centres: nutrition rehabilitation centres, nutrition recuperation centres, mothercraft centres, and so on. Since then a number of countries in Africa (Nigeria, Zambia, Uganda, Algeria), in Latin America (Guatemala, Colombia, Peru), and in Asia (India, Philippines) have set up such centres.

Treatment of xerophthalmia has been undertaken at the nutrition rehabilitation centre of the government Erskine Hospital, Madurai, India. Between January 1971, and April, 1974, about 650 children were admitted and 296 were followed up. The aim was to determine the impact of dietary treatment on xerophthalmia and on weight gain as a measure of improvement on the general health, and to study what effect initial treatment with vitamin A had on these processes. Nearly all children had severe eye lesions.

The diet given was based on rice, the local staple, with oil, pulses and condiments. New ingredients introduced were low-fat groundnut cake to provide for extra protein, and dark green leafy vegetables and carrots to provide ample β-carotine. These were all locally available and within the spending power of the mothers. Local pots and pans and cooking methods were used so that mothers would be able to continue with the diet when returning home.

More than half the children were treated with vitamin-containing

diets, the remainder were given vitamin A by injection additionally. The results showed that children with severe corneal lesions recovered equally well on a diet containing vitamin A as those who had the additional treatment of vitamin A by injection. Weight gain was not significantly higher with the extra vitamin treatment.

In general, two types of nutrition rehabilitation centres exist: (1) the residential type which admits mothers and children for 3 to 6 weeks; and (2) the day centres which deal with mothers and children on an ambulatory basis. These two types of centre will be discussed in chapters 4 and 5.

The main purpose of such centres is to educate the mother through her active participation in the nutrition rehabilitation of her child; this requires a well-planned programme. The mother's education not only includes practical nutrition, such as the use of inexpensive, locally available foods, but also health practises, hygiene, and in some countries home gardening, animal husbandry, birth spacing, home-crafts, household budgeting, or whatever is applicable to the local conditions and circumstances.

The aim of such education is to improve her capacity to take care of her children. To be successful such a programme must be adapted to the home situation of the family, and this often means that changes have to be made in the latter. The mother may need further help and advice in making such modifications. When returning home she may have to make changes in order to put her newly acquired knowledge into practice, for example, she may have to alter the way in which she has been feeding her family thus to give them a more balanced diet, she may therefore have to plant different vegetables or start using house refuse as garden manure. If the mother is interested, and capable, in making and selling homecraft articles, a market may have to be found, consequently she may have to change her daily routine. To bring about such changes successfully she may need the help and advice of the community development worker or the local agriculture advisor, she may otherwise become discouraged if her first attempts seem to be failing.

Although many nutrition rehabilitation centres have been started all over the world, it has been noted that many are not obtaining the long-term results which had been expected. Some centres which the present author visited in recent years in Africa have proved to be merely feeding centres, places where mothers and children had been admitted for periods from 2 to 4 weeks to be treated for malnutrition. The emphasis has been on feeding without an adequate teaching programme for the mothers. Local conditions had not been sufficiently

studied and food had been given to the children that was not available locally. This is not surprising considering the limited education doctors and nurses received during their training in the 'diseases palaces' where the problems of the developing countries cannot be appreciated.

Another cause of failure proved to be the wrong selection of staff, inadequately trained for the job and not sufficiently interested.

Building and running costs had not been sufficiently studied beforehand so that financial problems resulted.

The selection of mothers and the willingness of both parents to make use of the centre was sometimes overlooked with the result that mothers would leave before the child was sufficiently recovered and before her training for nutrition improvements had been completed. The involvement of the fathers was not always encouraged, thus making it difficult for the mothers to make the necessary changes at home after returning from the centre.

Home visiting and the evaluation of short-term and long-term results were sometimes inadequately planned or not done at all.

Other centres were exemplary and showed ingenuity as well as imagination in making the most of the often slender resources available, also in finding ways and means of keeping in touch with the families who had attended the centre and continuing with help and advice with their problems after returning home.

The concept of nutrition rehabilitation, although difficult to define with precision, is nevertheless a useful one in practise. It refers to the ill-defined borderland between classical 'treatment' and 'prevention' and essentially is concerned with attempting to restore to nearer normal with supplements (including vitamins and minerals) relatively minor, often subclinical forms of malnutrition, which do not require hospitalization or for whom hospital accommodation is not possible, owing to various factors, including pressure on beds by more serious disease. Plainly the scope of this definition varies with the local circumstances; children that are being nutritionally rehabilitated in a tropical region might be admitted to hospital in a region of the world with more adequate medical facilities.'*

The purpose of this book, therefore, is to give practical information gained by the personal experience of the author as well as from observations made of other centres visited, on the various points found lacking at centres where the results had been disappointing. Also to offer guidelines to those who are planning to set up a nutrition rehabilitation centre.

*Editorial from *The Journal of Tropical Paediatrics* (1960), Vol. 2, No. 2

The reader should refer to the following list of publications for further information on the subject.

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4

The Residential Nutrition Rehabilitation Centre

BASE-LINE INFORMATION NEEDED

To avoid disappointments the start of such a centre needs careful planning. Nutrition rehabilitation centres can be part of the Maternal and Child Care branch of health services, or they can be operated within agricultural, community development, or other programmes. Ideally, such a centre should be started when there is felt a need within the community. In either situation information is needed for planning and organization of action. The following data are required:

Health

The prevalence and type of protein–energy–malnutrition (PEM) and other deficiency diseases.
Malaria, bilharzia, hookworm, and so on, causing anaemia.
Epidemics of childhood diseases such as whooping cough, measles and diphtheria, and so on.
The prevalence of chronic diseases such as tuberculosis, urinary infections, cardiac diseases.
The major causes of death among children; for example, diarrhoea, tetanus and chest infections.

Food and nutrition

Sources of food crops – home produced and/or purchased.
Seasonal hunger periods.

Figure 4.1 Rice planting by women

Figure 4.2 Many market stalls are run by women

Breast feeding pattern.
Weaning – at what age, why, and which kind of weaning foods.
Food habits – avoidances.
Food storage methods.
Food distribution within the family.
Cooking facilities.
Fuel.
Market, shop supplies, prices, quality, wage income and spending power.

Figure 4.3 The brewing of beer is frequently the task of women

The customary manner of spending the working day, especially the women.
The type of work performed on the land by both men and women.

In agriculture, the world over, men and women have their specific tasks at special times, for example, the men do the heavy preparatory work while the women do the planting, weeding and harvesting. During such peak times of work it is difficult for women to attend Under-Fives' Clinics and impossible to stay for a period of weeks at a nutrition rehabilitation centre as the food supply of the whole

year for the family may depend on it. Fishing and the care of livestock are often done by women at certain times of the day, or such tasks may be seasonal. In the case of factory workers, special permission for leave of absence may have to be obtained by the mother if her child is in a serious condition. Women running market stalls may be able to attend only a few days per week or their income, on which the family depends, will be reduced. The time spent away from the home and during family mealtimes are important factors, as are the periods of time when the child must be left in the care of other people, such as the grandmother, sister or aunt.

Sanitation and water supplies

Information on sanitation and water supplies can be made available by people who work in the area if a total survey is not possible. Health aspects can be obtained from medical personnel, while other factors referred to above can be dealt with by agricultural, community development, social workers or priests. Schoolboys and schoolgirls could be of considerable help in collecting data when carefully instructed. With this information an adapted programme can be planned.

FINANCIAL CONSIDERATIONS

When a nutrition rehabilitation centre is being considered the financial resources have to be explored before any other decision can be made. Money may already be available from grants or gifts, and campaigns to raise money can be planned or loans negotiated. The type of centre which can be built depends on the amount of money available or offered.

The subsequent running costs also have to be calculated beforehand – the annual running costs may be as high as 25 per cent of the building cost. With a low initial building cost as would be the case when converting existing buildings, the running costs may be even higher. Regular sources of income should be studied, possible subsidies and regular gifts may have to pay for the major expenses and such income should be guaranteed for at least three years in advance to avoid breakdowns or debts. There is the possibility of other small regular incomes, such as fees, from mothers attending or from the sale of surplus garden produce. Such sums should not be

relied on too much as the amount realized may not come up to expectations.

Salaries are the largest single item in the running cost but these depend to a large extent on the grade of staff employed for full-time services. Interest on loans and the payment of debts can also become a heavy burden. Transport for home visiting, when motorized, is expensive. Maintenance of old buildings is often more costly than anticipated. Food and fuel are usually the lowest items as the household budget should be geared to the local spending power of the mothers.

Sound financial planning may save much worry and disappointment at a later date. So far, few centres are being run by respective governments. This should be encouraged wherever possible as it is the primary concern of governments to improve the nutrition of the very young.

THE LOCATION AND BUILDING OF THE CENTRE

The location

The site for a centre should be chosen with care; various factors must be considered in deciding on a suitable site. Accessibility is perhaps the most important consideration; this implies that the centre should be either near or in the catchment area of the district from where most of the mothers will come to stay at the centre. Home visiting will then be less time consuming, and fathers can keep in touch with their families, which is often desirable. A health station nearby is advisable for medical supervision and referral in the case of sudden illness.

In rural districts there is usually more choice for the site. A centre should not be built at a very isolated place, nor should it be too prominent, as too many casual visitors can be disturbing. There may be land available at an agriculture training centre, a home craft centre or near a health centre. The quality of the land should be considered when home gardening is planned for teaching purposes, and for production of some foods needed at the centre. Water supply should be adequate throughout the year. It should be possible to dispose of sewage and garbage adequately. Sewage disposal in a city district should be connected with the main system; in rural districts, pit latrines can be dug. Purchasing land can be very difficult, especially in city districts where land is often costly. Sometimes existing buildings can be converted into a centre, which may be a better

solution than to build too far away from the problem areas. Some centres have been faced with great problems when the wrong choice of site had been made.

The building

The choice of building will depend on various circumstances: the money available, the number of mothers and children expected to be admitted, and the availability of local building materials which may differ for rural or urban districts.

It has often been emphasized that the building should be similar to the type of housing in the district; the similarity will help the mothers to feel at home, and will give them the opportunity to improve their own homes of necessary. One sees a great variety of buildings from small village huts to sophisticated city centres.

In one country money became available to build nutrition rehabilitation centres throughout that country, a total of twelve being planned. Two different plans were designed at a certain cost price; the first type (*Figure 4.4*) consisted of three separate houses in which three mothers and their children could be housed together. There were separate kitchens where all cooking and some teaching could be done, washing facilities and pit latrines were sited behind the houses. A central committee advised on the building sites, all of which were in rural areas built near or at health centres.

An alternative design (*Figure 4.5*) consisted of one larger building which could house twelve mothers and their children. There was a small office and food store under the same roof, the kitchen was a short distance from the main building and toilet and washing facilities were attached to the main building.

In the same country the local health staff used their initiative by converting a disused sick ward at one very rural health centre into a nutrition rehabilitation centre to accommodate four mothers and their children. A mud and wattle hut was built as a kitchen and there was also an excellent garden and livestock facilities. Very little money was spent on the buildings. This modestly built centre operated with at least the same results and successes as the more costly centre mentioned above.

Such possibilities do not often exist, but before demolishing old buildings they should certainly be considered and made use of if at all suitable.

The combination of a proposed centre with an existing building has several economic and administrative advantages.

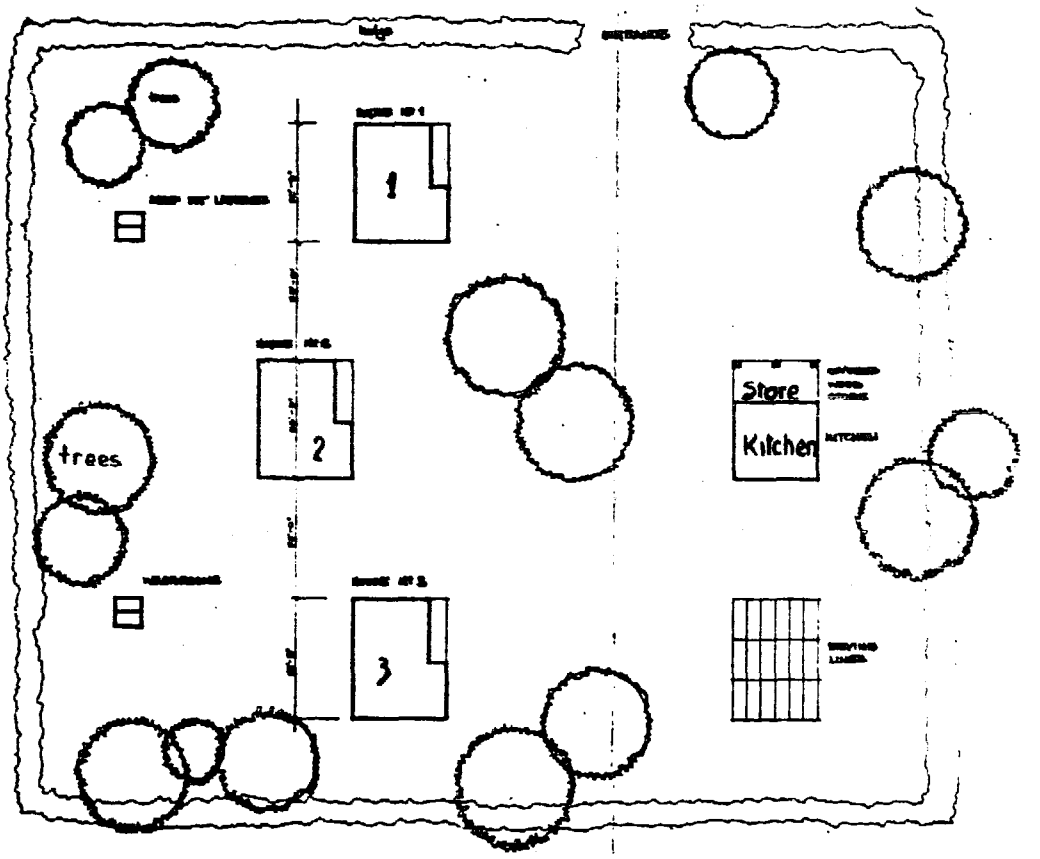
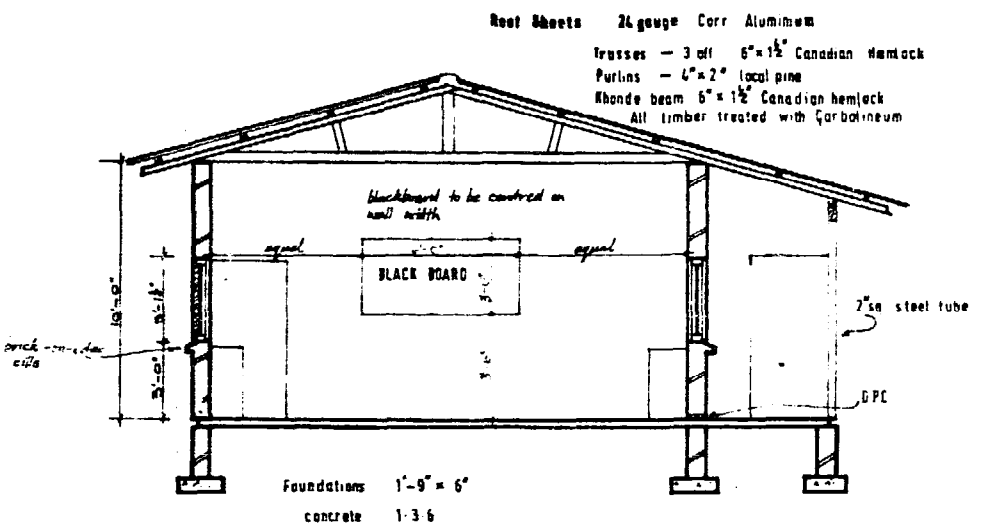


Figure 4.4 A nutrition rehabilitation centre planned for three mothers and their children



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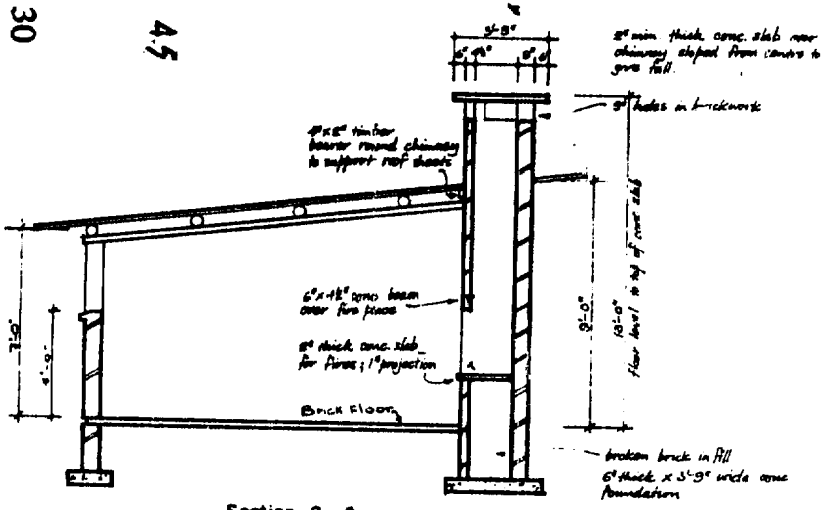

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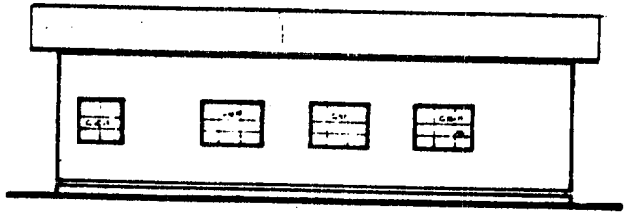
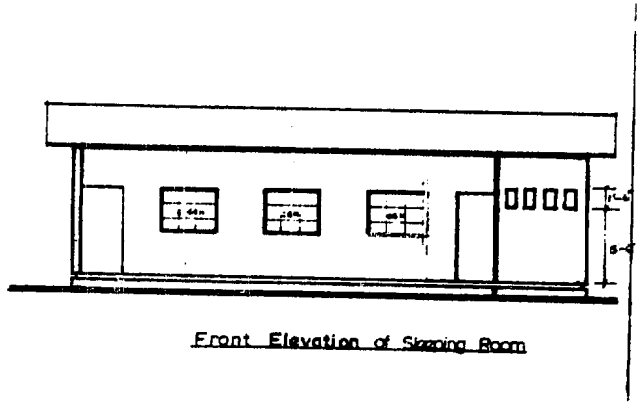
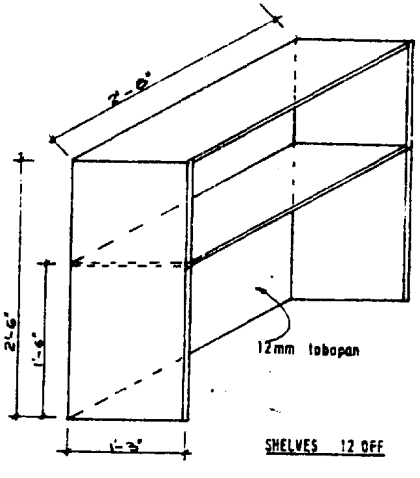


Back Elevation of Sleeping Room



Front Elevation of Sleeping Room



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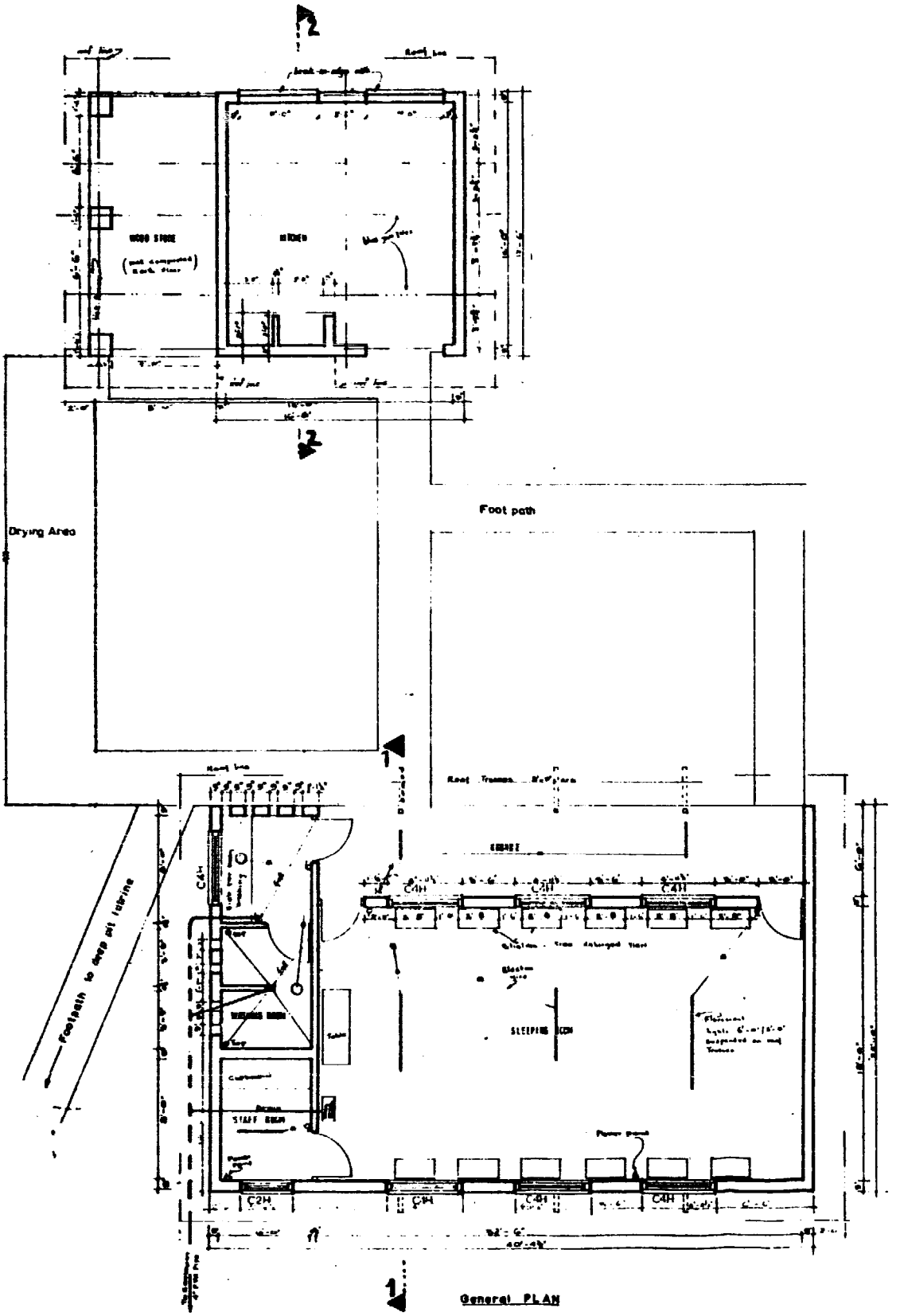
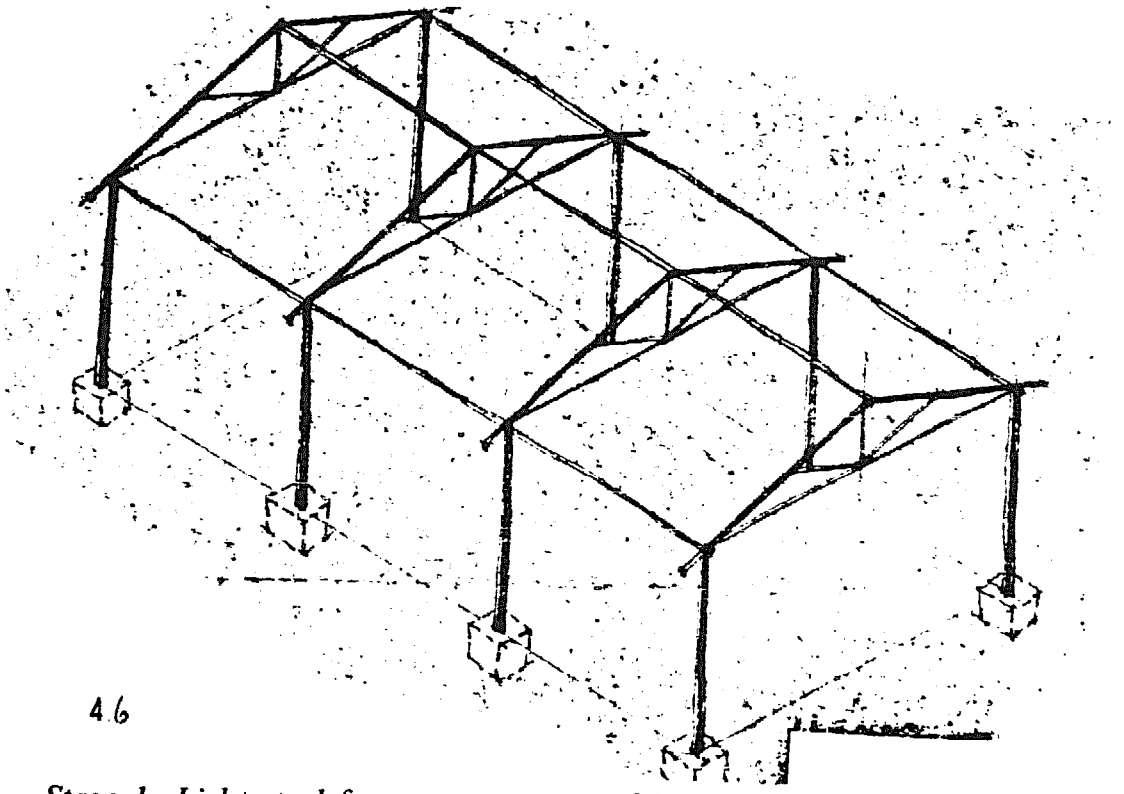
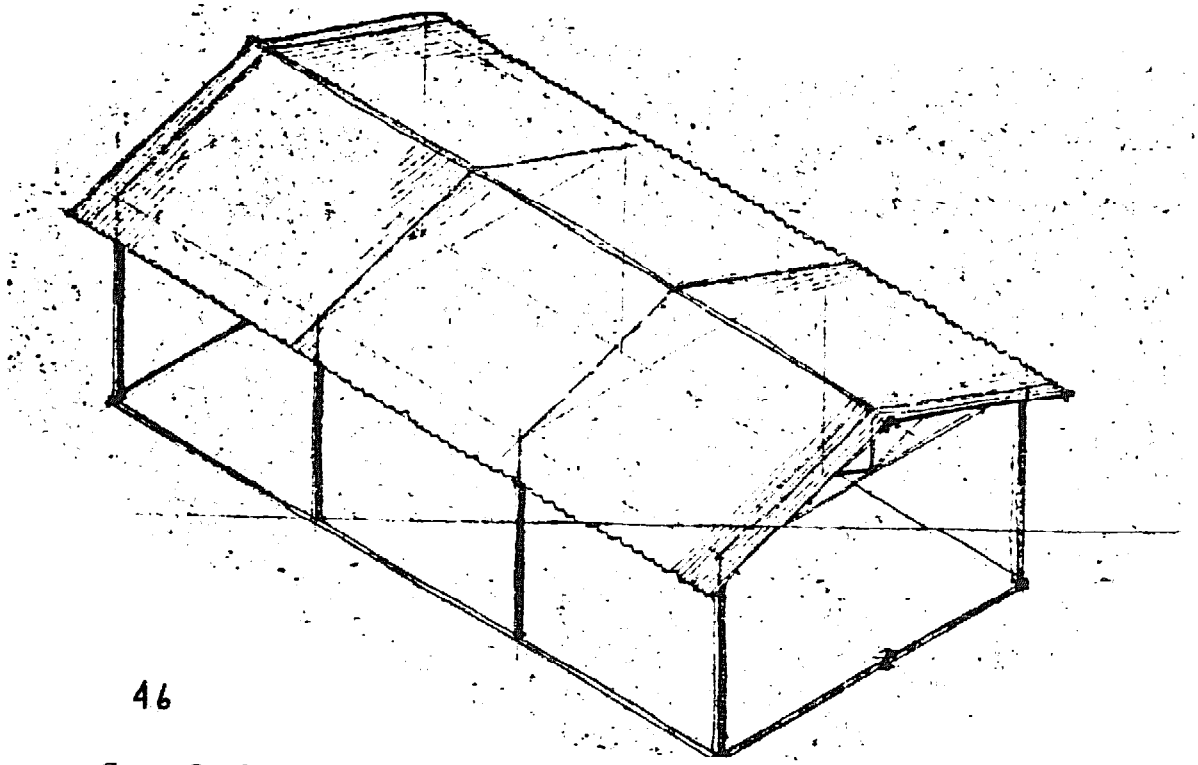


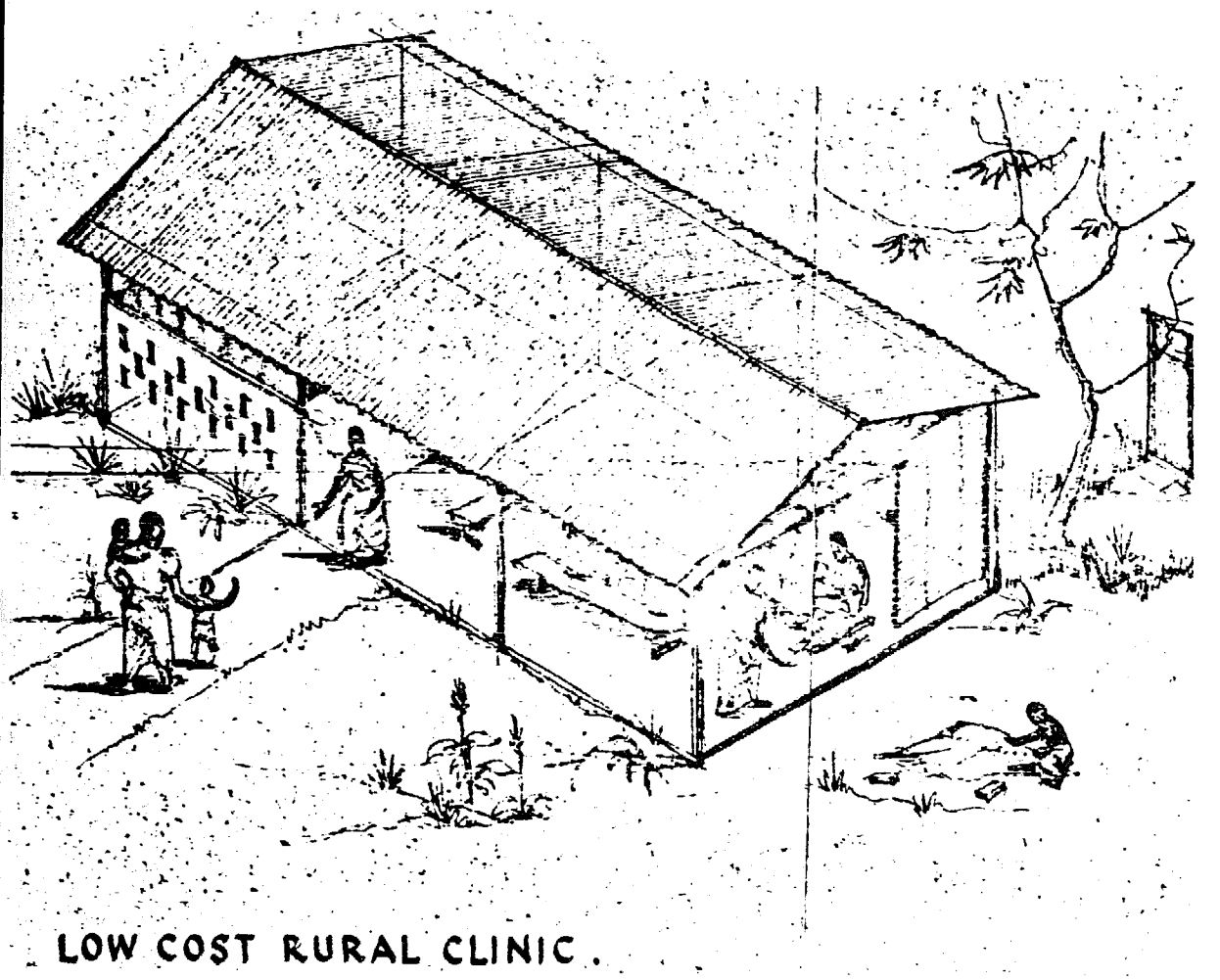
Figure 4.5 A larger centre capable of housing twelve mothers and their children.



Stage 1 Light steel frame structure pre-fabricated and erected on concrete foundations by contractor.



Stage 2 Corrugated iron or asbestos sheet roofing and concrete floor slab added by contractor or local labour.



LOW COST RURAL CLINIC.

Stage 3 Building completed with:–
1. Addition of solid panel walls in concrete blockwork or bricks in areas requiring security or privacy.
2. Reed matting screens suspended from roof structure for weather protection externally and to subdivide space internally as necessary.
3. Pit latrines for adults and children on downwind side of building.
4. Simple furniture which can be kept in secure area of building at night.
5. Children's play area and planting.

Stage 4 Building can be further developed by simple extension with additional steel frames and by addition of internal plumbing drainage and electrical installation. Permanent walling with metal windows may also be added within the steel structural framework if required.

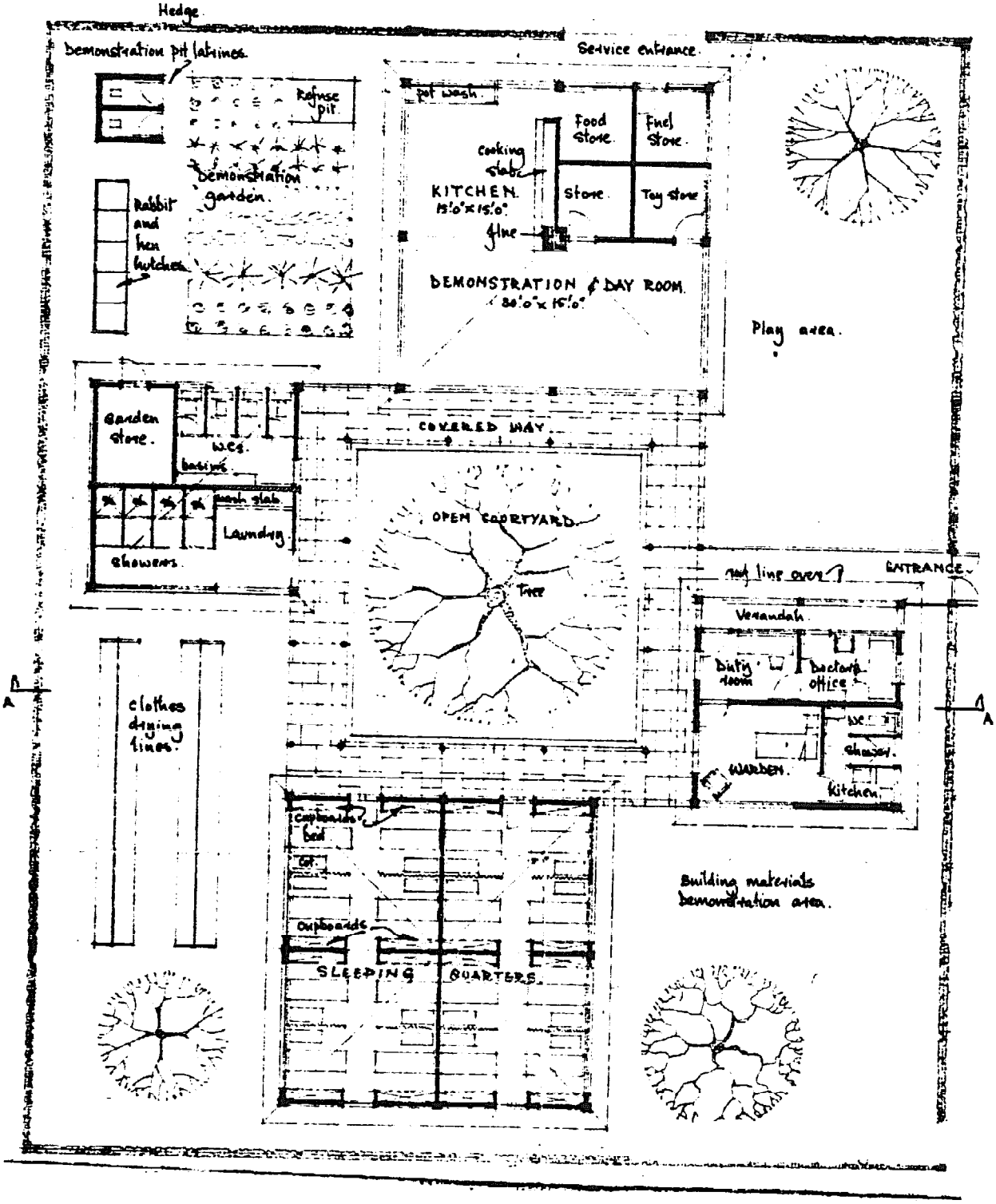
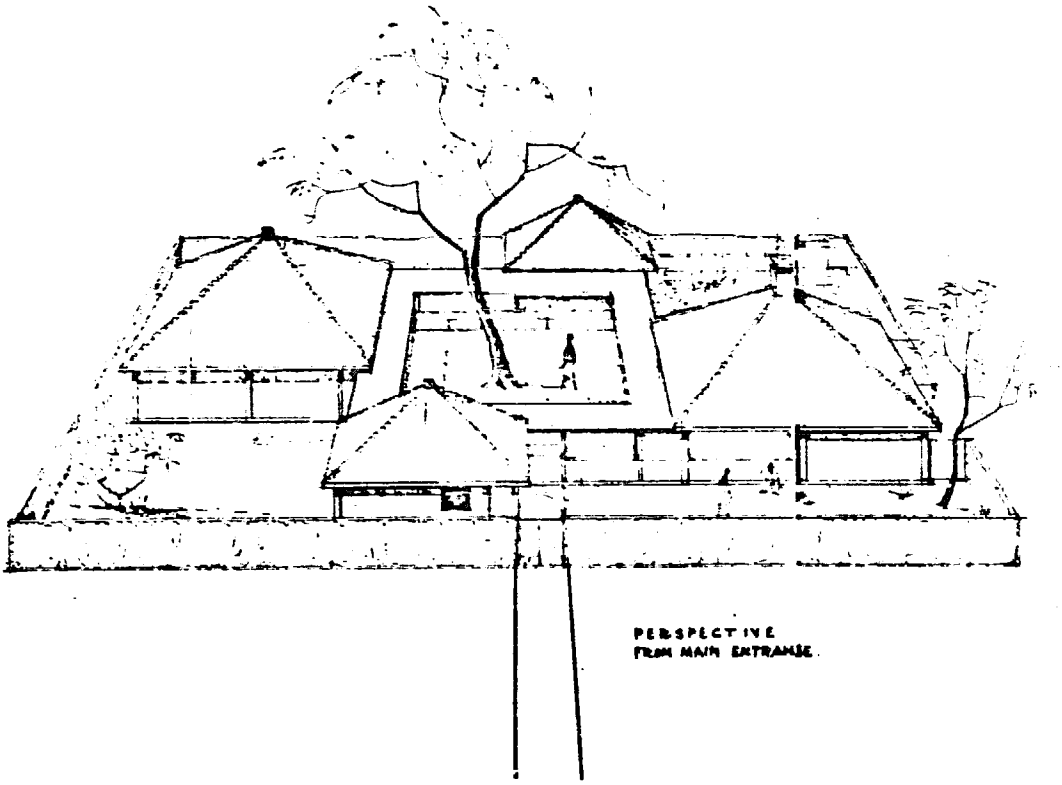
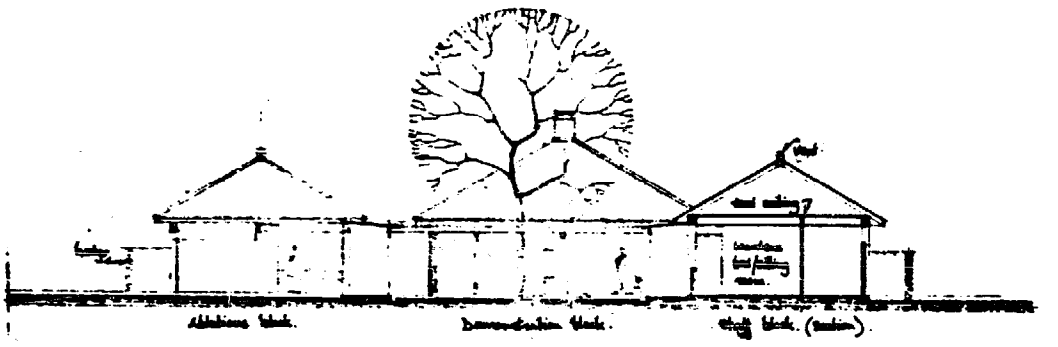


Figure 4.7 A compact centre housing all the necessary features.



PERSPECTIVE
FROM MAIN ENTRANCE.



SECTION AA. Through central courtyard.

(1) Costly buildings, such as the ablutions, can be shared or built adjacent to each other allowing for limited drainage and thus a saving in building costs.

(2) Staff can be shared at busy periods, or when relieving each other for time off.

(3) The best use can be made of the land available, and patients attending the health centre can observe the gardening methods employed and thus become interested in making improvements in their own home gardens.

Such a centre consists of a small maternity unit, an out-patient's department and a nutrition rehabilitation centre surrounded by gardens developed rather like a small farm growing staple foods such as maize and plantain, vegetables and fruit trees, as well as provision for livestock. Cooking is done on the same type of stove as those used locally, but with added improvements such as ovens for baking without having to use extra fuel. Pit latrines are also of a local, but improved, design. This is very much a family centre where not only mothers and young children but the whole family feels at home.

When building a new nutrition rehabilitation centre with limited resources the more expensive and stronger materials, such as a steel framework, should go to that part of the building which has to stand up to the heaviest strain. *Figure 4.6* shows how this is done. In tropical climates wall building can be reduced as is shown. An open verandah and with cement bricks arranged with open spaces left between them will allow for plenty of fresh air to enter the building. With the use of a strong framework the other materials are of less importance. *Figure 4.7* shows another type of nutrition rehabilitation centre with special features giving it a sense of security and homeliness and a very pleasant appearance. Garden space has been utilized all around. The centre was built around a very old tree, making the central garden a focal point of meeting for the mothers and their visitors. Again, ablutions are all in one building, including the laundry facilities. The kitchen demonstration garden is adjacent to the kitchen; there, too, the best use of the land available.

All the foregoing examples of centres, with the exception of the disused converted sick ward, need capital investment and are planned and constructed by outsiders often with foreign but well intended ideas which are not always understood by the local people. The involvement and ideas of the local people should always be encouraged to the full since only they know best what is needed in their own particular circumstances and environment.

The most successful centre, therefore, may well be one which is built on the initiative of the people themselves who have felt the

need for a teaching centre to better their level of nutrition. Built with their own materials and to their local design, the mothers attending such a centre will feel completely at ease. The whole community, right from the start, will be participating and will be interested in the teaching and the outcome of their centre.

This type of centre is strongly advised and may well have the greatest chance of giving the best results.

EQUIPMENT OF THE CENTRE

Similar considerations with respect to the actual building should prevail. Whenever possible the same cooking utensils, fuel and furniture as those found in the local homes should be chosen (*Figure 4.8a* and *b*).

The expenditure on equipment has also to be estimated beforehand; even plain local equipment can be more costly than anticipated. It is advisable, therefore, to list the necessary items according to priorities and then to tour the local suppliers to see what is available and at what cost. It should be remembered that strong, plain, serviceable equipment is more economical in the long run even if the initial costs are higher than for the less expensive clatter one sees at markets and stores. In any event, the equipment should be available locally.

A suggested list of basic requirements for a centre to accommodate 6 to 8 mothers and 10 to 12 children is as follows.

Furniture

8 Beds or sleeping mats, according to local custom. Cots or sleeping mats for toddlers. Bed linen, blankets and mackintosh covers.

The mothers may be asked to bring their own blankets into the centre, especially at low-cost centres where mothers and children sleep on floor mats.

Floormats, benches or chairs, as used locally.

8 Wash basins, one for each family.

8 Chamber pots for toddlers in house training and to avoid the soiling of the surroundings.

8 Fly-proof cupboards for the storage of food and utensils.

Charcoal or paraffin burners, as used locally.

1 Blackboard for teaching purposes.

Kitchen equipment for communal use

3 Buckets, 3 hand basins.

3 Large knives, 3 small knives.

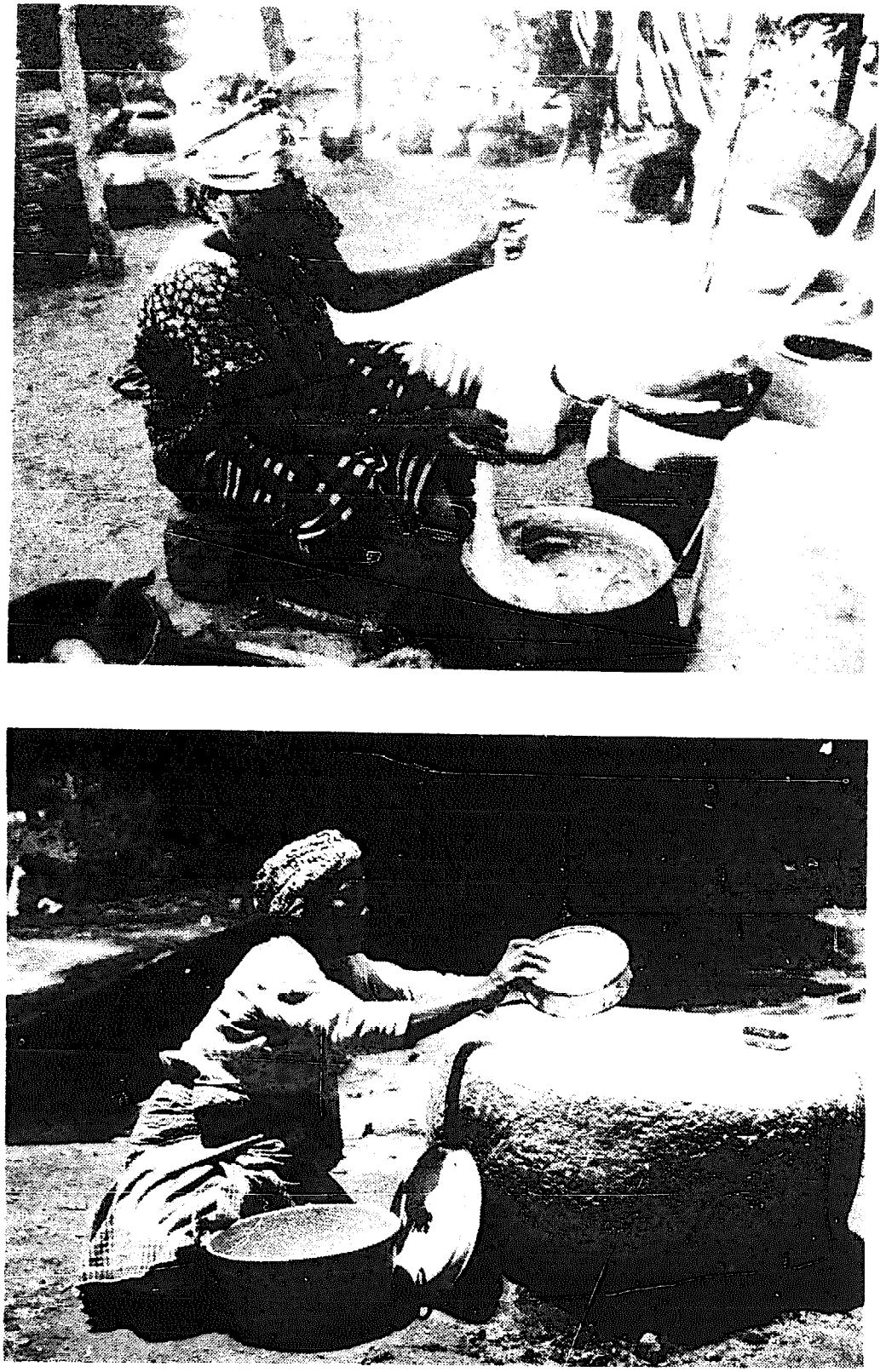


Figure 4.8 (a) and (b) The use of locally available pots and pans

3 Iron cooking pots.
3 Wooden ladles.
1 Sieve for straining infant foods.
1 Wooden carving board.
1 Mortar and pestle.

Feeding utensils for mothers and children

Cups, plates and spoons for children.
Cups, plates, spoons and knives for mothers.

Regular stocktaking is advised to keep a check on losses and breakages, and where possible all items should be clearly and indelibly marked in order to minimize losses. The quality and cost of equipment should be discussed with the mothers during sessions on budget teaching as this may help to improve their own household equipment and expenditure.

STAFF QUALIFICATIONS AND DUTIES

The management of nutrition rehabilitation centres varies from place to place and in different countries. If a national nutrition planning commission exists, as is the case in some countries, advice will come from a central committee in charge of the nutrition programmes, including the nutrition rehabilitation centres. Responsibilities may be delegated to a provincial or district nutritionist supervising nutrition programmes. She will select the staff for the centres and organize training courses. She will also pay regular visits to the centres and give advice on feeding, nutrition education, the purchase of food and administration. She will work in close co-operation with the local medical staff, and obtain advice from the department of agriculture. In some cases the nutritionist is appointed to the health department, which enables close co-operation with medical personnel.

The initiative may, however, come from a person or group of persons working at local level, be it from the medical, agricultural, community development or other fields. Centre planning, staff selection and training has to be carried out by such persons or groups, and this is preferable.

If within a community the problem of malnutrition has been recognized, the solution may also be found and the problems solved by that community. It may need the guidance from a person within that community who has had special training or experience, for example, a teacher or a health worker. A local leader may organize the planning and building of a centre with the help of all members of the community. Building can be done by direct self-help with

locally available materials; also, communal land may be available. Older people can often give sound agricultural advice. Outside help may be sought to improve the land by supplies of fertiliser, seeds and pesticides; improved irrigation may also be needed. The money to make such improvements may not always be available within the community but may be obtained from outside sources such as the government or other organizations.

Advice may be needed on different crops if local yield has not been sufficient to feed the population adequately, especially the young children and nursing mothers. The community may be able to select and support a woman to be trained at an existing centre.

With the involvement of the whole community the chances of success may well be greater than when a plan is introduced from outside by people who do not always understand the needs as felt by the community itself, thus creating a situation which may not be beneficial to those who are most in need of help.

A good plan is to form a local nutrition committee of interested persons, including the local leaders who are familiar with the problems, the needs and the wishes of the people of their district.

CENTRE STAFF

'Housemother' is usually the title given to the woman who is employed full-time and is responsible for the management of the centre. Ideally, she has to be the sheep with the five legs. Surprisingly such women have been discovered quite easily; some have volunteered for the job in many places. If a woman is enthusiastic about the job and has sufficient intelligence it is amazing how well she can manage the centre. Such a person may be discovered amongst the health staff, whether trained or auxiliary; she may have assisted at one of the Under-Fives' Clinics or been recommended as a bright pupil from a homecraft training school. It is essential to look for and perhaps even search for the right person for this position. She should be of the communities' own choice, and most likely will be preferred as a locally trusted and respected woman.

Apart from being enthusiastic and intelligent she should be healthy and not have any responsibilities towards young children or dependent relatives as her task is very demanding. Never should a woman be appointed by emotional motives as being 'such a nice person', or someone who 'needs the job for the money'. She should be given a special course of several weeks in a well organised nutrition rehabilitation centre. If this is not possible she may be

given instruction by the supervisory staff; that is to say, when a centre is to be newly opened, the training can take place before the first mothers are admitted. This has been done successfully at several centres. Above all, the most important qualification of the housemother lies in another field – she should be dedicated, sociable, and able to work with and teach the mothers. A centre may well stand or fall according to the ability of its housemother.

The housemothers duties are organizational, administrative, educational and para-medical. She is responsible for the daily work schedule of the mothers, the purchase of food with the mothers, and issuing the correct amounts of food as decided by the nutritionist. Stockkeeping and the cleanliness of the centre are also part of her duties.

She will be responsible for counselling mothers on various aspects of child care, and will teach nutrition and give basic health advice. If she is the only person running the centre, as happens at small centres, she will also have to supervise the cooking of meals. In the larger centres there is usually a cook who takes care of the kitchen, but she should also then be supervised by the housemother. The housemother will be expected to keep a watchful eye on those fully instructed mothers who, in turn, will pass on their acquired knowledge to those mothers who are newcomers at the centre.

One of the housemothers' most important tasks is the weighing of the children and explaining to the mothers the use of the growth chart. Daily weighing is not advised as the weight of the very malnourished children is inclined to be unstable at first with at times even further losses; this can considerably distress the mothers. Weighing on admission and twice weekly thereafter is less upsetting and often more rewarding. Children with diarrhoea and severe dehydration, however, may even have to be weighed twice daily to assess their weight loss (*Figure 4.10*).

The housemother should also carry out arrangements for referral and discharge and give the necessary instructions to the mothers as well as making appointments for home visits and follow-up, which is done either by herself or by the community nurse.

If an auxiliary is employed as an aid to the housemother as is the case in larger centres with more than four or five families, she too should be of the community and receive an in-service training. Generally, she helps with the serving of meals, feeding and bathing the children, cleaning the centre and assisting with simple homecraft teaching and childrens' play.

If a cook is employed preferably she also should be from the local community. She should be able to follow recipe instructions and

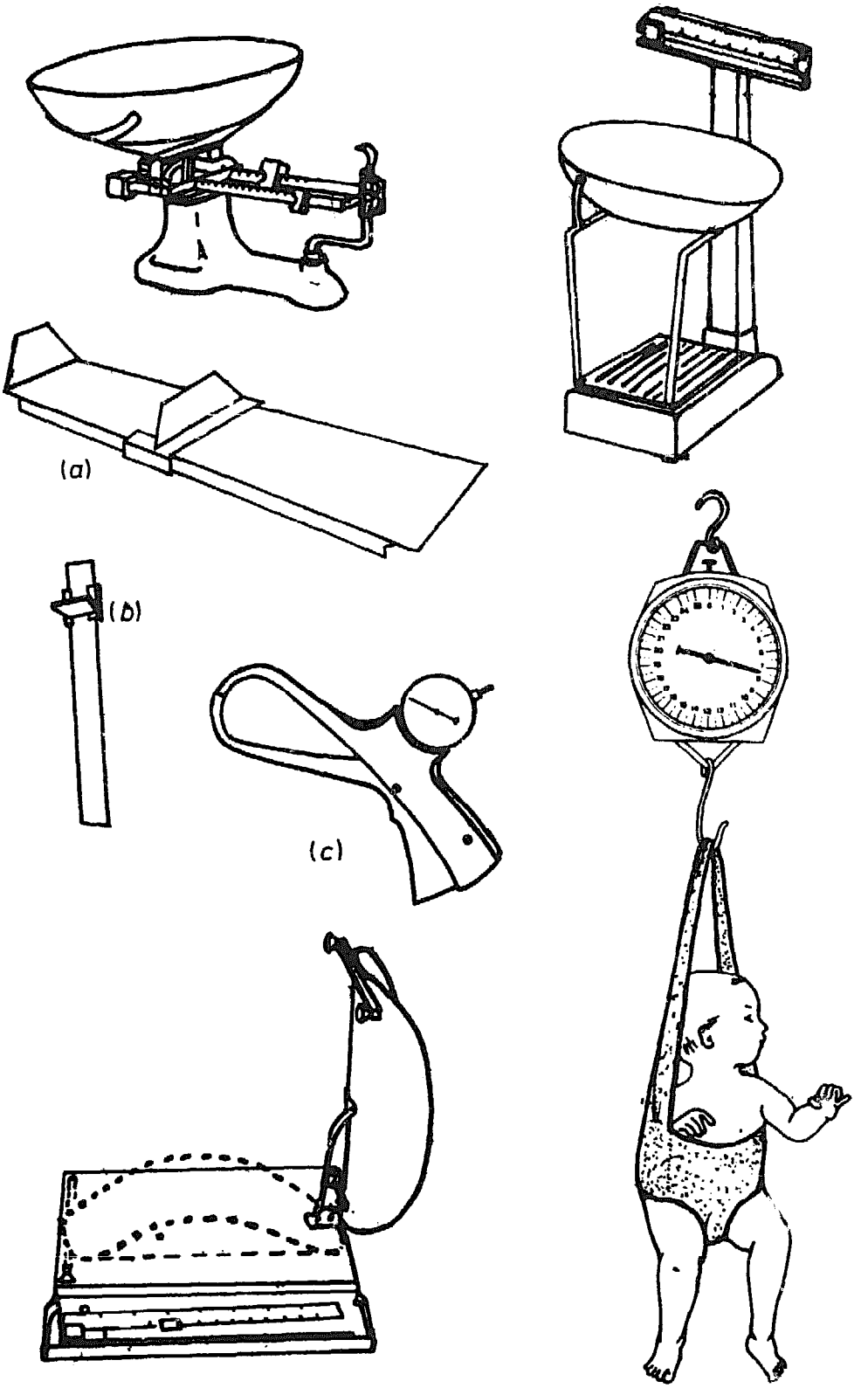


Figure 4.9 Types of scales and anthropometric equipment available from CMS Weighing Equipment Ltd., 18 Camden High Street, London, NW1 OJH

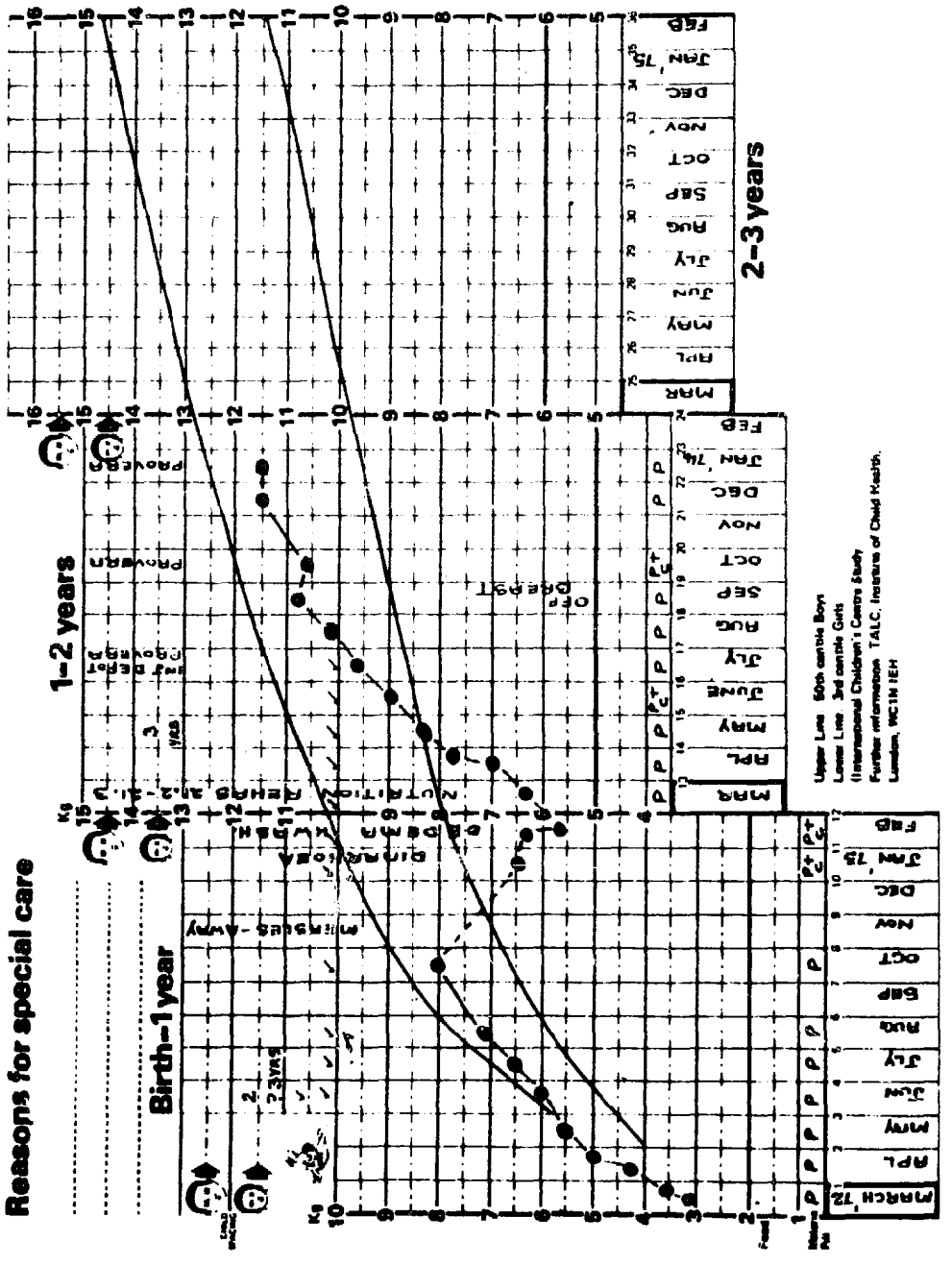


Figure 4.10 A simple growth chart, a type found to be widely acceptable in Under-Fives' Clinics. Those wishing to introduce such charts are advised to use this well tried lay-out and modify it only after local experience has been gained

understand why the preparation sometimes differs from what she has been used to. She must assist the mothers by the cooking of the daily meals. Her routine duties include caring for cooking utensils, keeping a check on the fuel supply and keeping the kitchen clean.

If a centre is putting a strong emphasis on home gardening to the point of being self-sufficient for vegetables and some fruits, then a full-time gardener should be employed. Preferably a man who has had practical rather than college training. He may or may not need the guidance and supervision from the local agricultural adviser depending on his experience. As he will also be a man from the area, he should be able to advise the mothers in their own language on the improvement of their own gardens, being familiar with the local customs of food production, the problems and the possibilities.

Figure 4.11 Housemothers teaching gardening

When only a small part of the centre can be allocated for a garden, and then intended mainly for teaching purposes, a part-time gardener may be sufficient to do the heavy work such as digging and laying out the vegetable beds, which traditionally is done by the men in many families. The housemother is often found competent to do the remainder of the garden work along with the mothers (*Figure 4.11*), teaching them at the same time. Other part-time staff may be needed for teaching and relief duties when the housemother has time off. Health teaching can then be done by a nurse or medical assistant working in the area. Nutrition teaching can be given by a locally

residing nutritionist if one is available. It should be mentioned that many of the rural nutrition rehabilitation centres are managed by just one person.

SUPERVISORY (PART TIME) STAFF

This group is in charge of the planning, education and general guidance of the centre. They work in close co-operation with each other and the staff of the centre. The group may consist of three or more people each representing a different discipline as follows.

Health – a doctor, medical assistant or a nurse.

Nutrition – a home economist or nutritionist.

Agriculture – an agriculture teacher or extension worker.

Within this group the medical person in rural districts is usually a medical assistant or any health worker with authority, such as the barefoot doctor in China or the extension health worker, sometimes a school teacher specially trained to look after the health of a number of families, as is being organized by Dr Hendrata in Central Java. In more developed districts the person may be a community nurse or a doctor. Slum areas in over-populated cities may get the help from medical training schools where students work under the supervision of their tutors.

Functions of the supervisory staff

The duties of the medical person include the selection of children to be admitted to the centre, to provide medical care if needed, decide the time of discharge from the centre, referral to Under-Fives' Clinics or other mother and child health branches in the area.

A person with nutrition training may be someone of the community development department, sometimes a person trained at a higher level in nutrition. She should help to select and train personnel for the centre, devise menus at low cost from local foods, evaluate childrens' acceptance of recipes and advise on the best of what is locally available.

The agricultural worker may give advice on preparing the garden, how and with what to fertilize the soil, what kind of vegetables to grow and at what time of the year. He may also advise on fencing and the planting of trees and shrubs. If livestock keeping is planned for a centre it will be best to seek advice from the nearest animal husbandry department. These advisory activities need not take up a

great deal of time, on an average one or two hours daily. Evaluation of results may be carried out by the supervisory staff (*see* Chapter 8).

Much of the work at the centre can be delegated to a competent housemother and to others of the staff at the centre. It should not, however, be taken for granted that primary-school-trained personnel are able to manage a centre unaided. Centres have failed to succeed due to lack of knowledge and the necessary supervision.

THE WORK PROGRAMME OF THE CENTRE

Working hours will, to some extent, depend on the number of staff employed at the centre. If, for example, there are three staff members then working hours can be shared and off duty periods planned accordingly. If only one housemother is employed then a relief person must be found and trained so that she will be able to take over the work of the housemother when she has time off duty. The relief housemother could be a member of the health staff or a competent auxiliary who also has an interest and the ability to care for children and to teach the mothers.

One day off each week, free from all responsibilities, is necessary to keep the housemother fit and enthusiastic for her demanding task.

Some centres find it necessary to have a daily work schedule. This is especially useful if talks are given by visitors or by part-time staff at certain agreed times. It is advised that a daily work schedule at the centre is applied, as far as possible, to the daily routine of the mothers in the villages or the towns in the way they spend their working hours.

The necessity to give the children the required amount of food divided over the day (*Figures 4.12 and 4.13*), and the need for sufficient sleep at night, calls for a certain amount of discipline. Unscheduled feeding times have caused small children to go short of food as their little stomachs need frequent small meals. The habit of eating only twice a day, as happens in many places, may be acceptable for adults but is a disastrous practice for young children – like chickens, young children should always be pecking. The following is an example of a day's schedule which has been adopted successfully at various centres.

First meal of porridge, followed by the mother's own meal.
Cleaning houses and washing clothes.
Mid-morning snack for the children.
Gardening, food collection or buying, discussion on food value or prices.

Figure 4.12 Regular mealtimes are an essential part of training

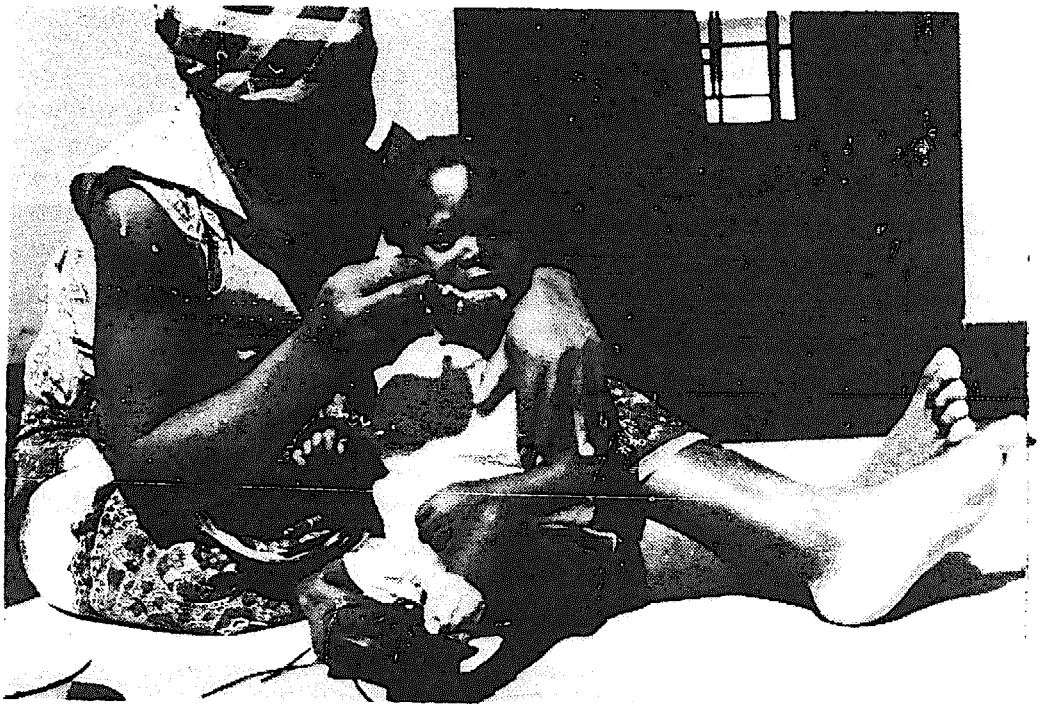


Figure 4.13 Incorrect spending. Note the quality of the child's shoes. He was still unable to walk due to severe malnutrition

Preparing midday meal, feeding children.
Mother's meal and rest.
Lectures, homecraft teaching, childrens' play.
Children's snack.
Watering garden, care of livestock.
Bathing children, preparing evening meal.
Feeding children.
Mother's evening meal.
Discussions, filmshows, etc.

When preparing for the night, a milk drink may be taken as a standby in cases where the young child awakes and is no longer breastfed. Breast feeding, however little, should be encouraged for as long as possible.

Other responsibilities of the housemother and other staff of the centre can be divided over the day. The weighing of the children should be done before breakfast. Record keeping must be done every day otherwise records may lag behind and be entered incorrectly.

The extra work of cleaning the houses after the departure of mothers is necessary before new mothers and children are admitted. If home visiting is carried out by the staff of the centre one or two afternoons of each week may be set aside.

Throughout the day singing may be encouraged; in many societies events and new experiences are expressed in song and action. This can be stimulated by the housemother who by experience and tradition knows how it may emphasize that which has been learnt and is new and of value to the community. It also makes for a happy and relaxed atmosphere.

BUILDING AND RECURRENT COSTS

There is a great variety of nutrition rehabilitation centres in operation. They differ in set up, type of building and staffing. The most primary principle is, however, recuperation of PEM cases at a very low cost when compared with that of hospital treatment. Even more important is the fact that the mother has been instructed in domestic routines during the course of treatment at no extra cost.

The expenditure of a nutrition rehabilitation centre can be divided in two categories: (1) the initial cost of the building and equipment, and (2) the recurrent cost of maintenance of the building, staff salaries, running costs, food and fuel, education material, etc.

Building costs

Centres can be set up by governments, by missions, by other charitable societies or by self-help. The amount of money available can therefore vary greatly. In some countries a standard design for such buildings is accepted by the government, in others the group taking the initiative is free to decide on their own design and outlay. It is clear that preference should be given to centres, built with local materials; they may be a brick building in urban areas or improved wood or clay and wattle huts in rural areas.

When visiting and studying nutrition rehabilitation centres in various parts of the world one is very much impressed with the wide variety of centres, and consequently their cost of building. There are centres built by self-help with local materials completely adapted to the surroundings, while at the other extreme there are those of sophisticated design and built with imported materials. On the one

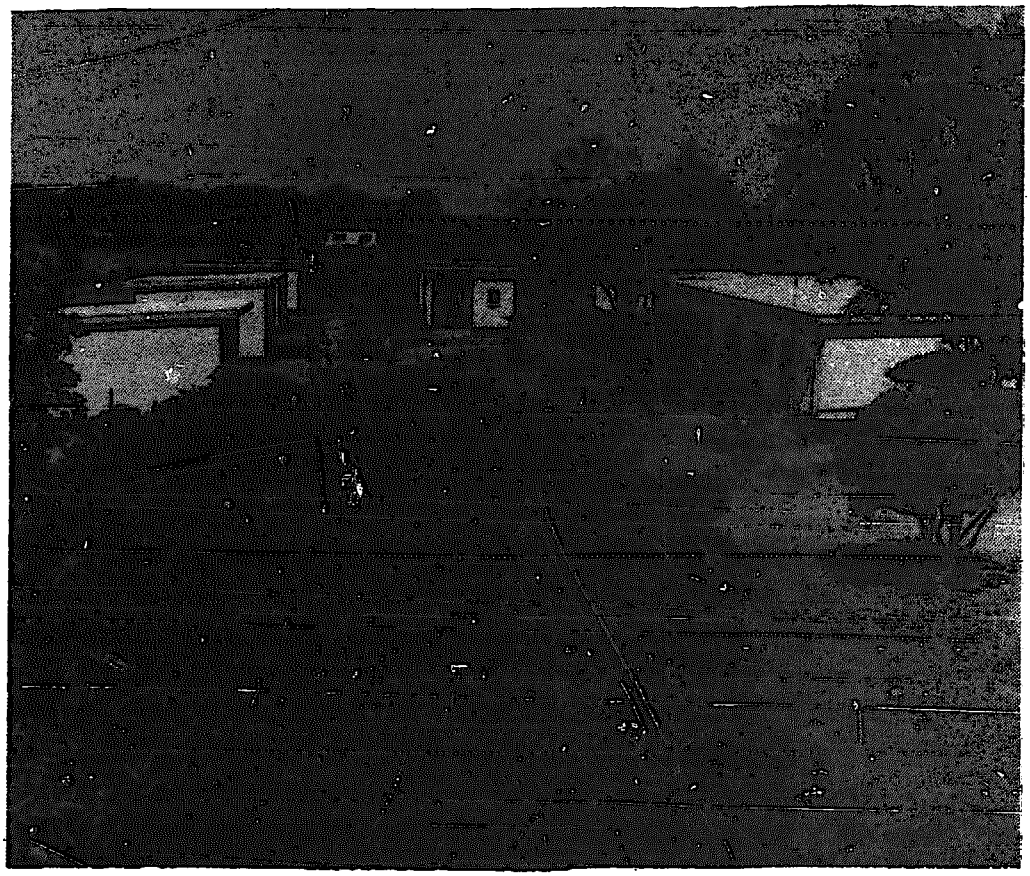


Figure 4.14 The centre at Makeni

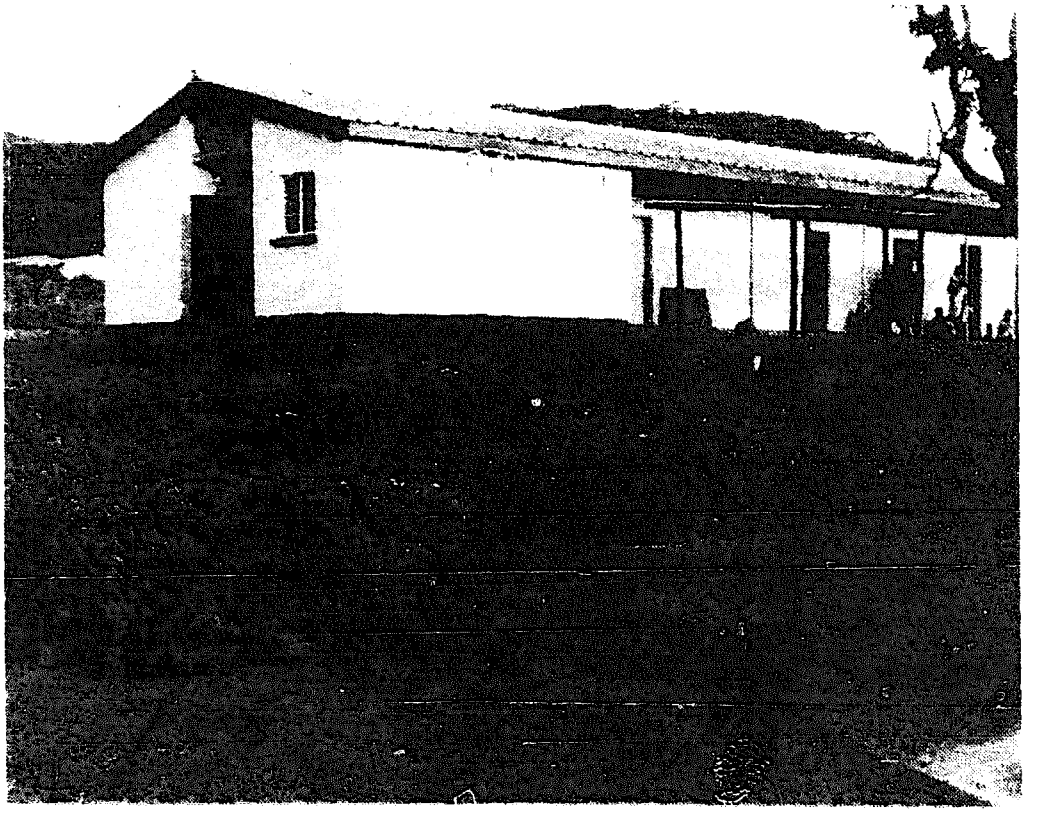


Figure 4.15 The centre at Chipata

hand, a centre which may spend only $500 on building and equipment, may operate equally well if not more successfully than a centre on which $30,000 to $40,000 has been spent.

Various planning possibilities should be studied and local circumstances taken into consideration. In some countries the view is taken that any teaching or training institution should be of a sophisticated design. The planners of nutrition rehabilitation centres may have to abandon their own ideas and submit to such a policy.

One urban centre which the author visited consisted of:

One block of two staff flats and rooms for office and store.

A communal kitchen.

Seven individual houses with showers, toilets, electricity and sewage disposal.

Total cost: $36,000 paid from local society funds. Equipment costing $800 was donated by friends.

A semi-urban centre consisted of:

Two main brick buildings, one to accommodate the staff, the office and the store, the other to house six mothers and their children.

Total cost:	($)
Payments to builder	15000
Planning fee	57
Fencing	185
Building materials	1191.11
Total	16433.11
Equipment : Centre	552.70
: Garden	471.53
: Chickens	97.20
: Depot	31.09
Total	1152.52

No mention was made of whether the land was bought or leased. Both centres operated in the same country and results were similar.

A centre in a very rural area in a nearby country (*Figure 4.16*) was built at a cost of $500. This consisted of two mud and wattle houses, a similar kitchen, a chicken house and a fenced-in garden.

Recurrent costs

Recurring costs for maintenance, salaries, fuel, electricity, food, transport, etc., have to be met by local government or by charitable organizations, while in quite a number of centres mothers are asked to pay a small fee towards the cost of food, or to contribute in kind with products from their own garden. In a well organized centre the money spent on food should not exceed the amount the average family, attending the centre, can spend on their own food.

It is absolutely necessary to estimate the running costs of a nutrition rehabilitation centre before it is started, and to arrange how the expenditure can best be met.

The housemother may be capable of keeping a daily record of expenses such as food, soap, fuel, seeds, chicken food, and on the income of surplus products as well as on the money received from fees paid by the mothers. The daily total of this outlay should be recorded and added to the total expenditure at the end of each month. Salaries and the cost of transport and maintenance are more complicated and are usually recorded by the person in charge of the centre. The total expenditure over the year will include all the expenses paid by the centre.

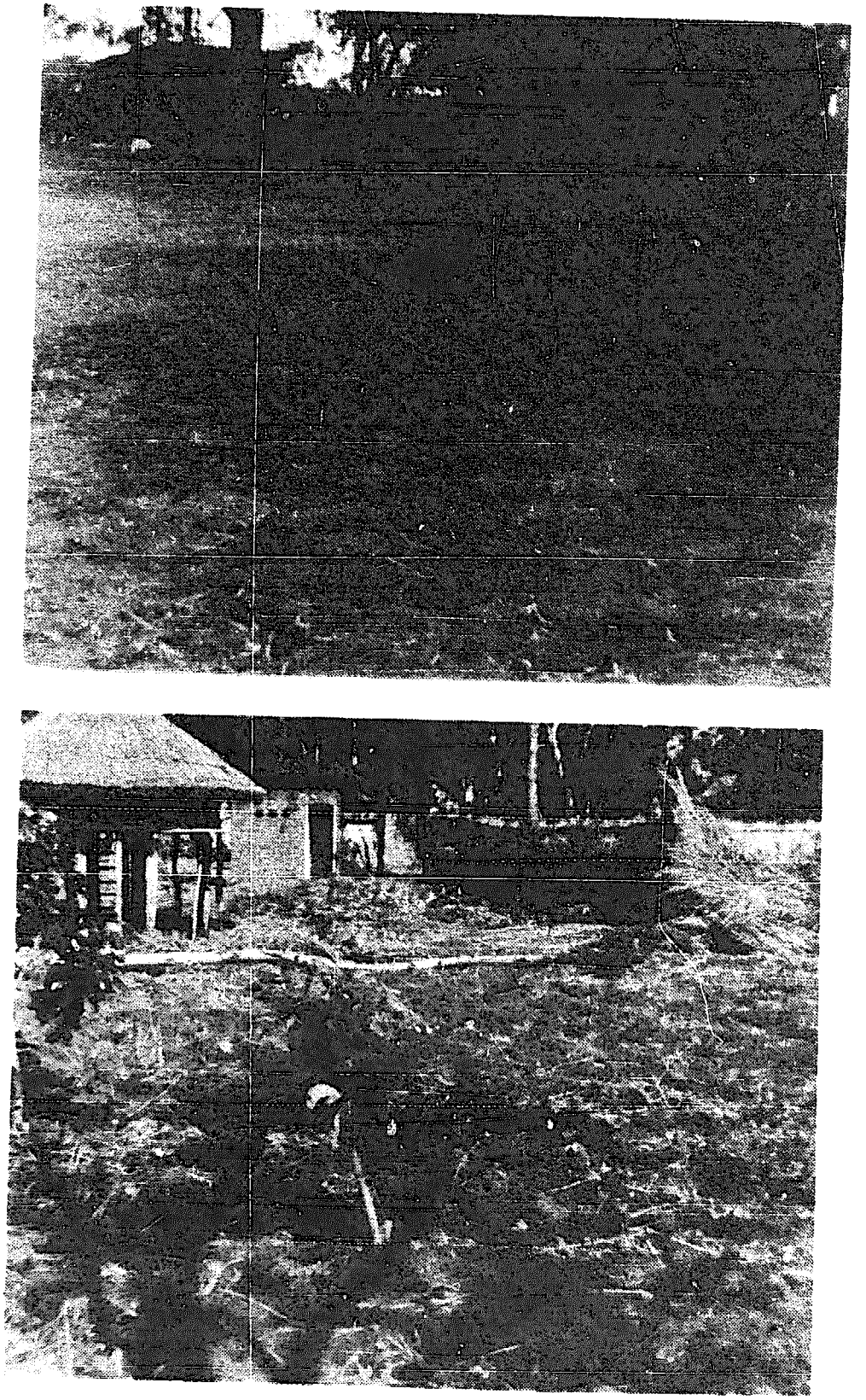


Figure 4.16 The centre at Guilleme

Salaries have to be recorded as a specified entry which includes all part-time staff; the expenditure on part-time staff as a percentage of their total salary. For example: $2 per hour X 25 = $50 per month is 1/8 or 1/10 of their salary. Voluntary labour can, of course, be ignored from the financial point of view but should be mentioned in the Annual Report.

Transport costs can be calculated by keeping a record of the mileage multiplied by the average cost per mile.

If a daily record of attendance is kept throughout the year the cost per child per day and the average total spent on each child and/or mother can be assessed quite easily.

Salaries of staff is the largest part of the annual budget. For many reasons these are not comparable for many countries. The following are a few examples of monthly expenditure:

	($)	
Housemother	20	
Supervisor 1 hour per day (1/8th of salary)	48	
Food	32	
Soap and fuel	20	
Transport (home visists)	25	
Maintenance	5	
Miscellaneous	5	
Total monthly costs	155 = 1860 per annum	
Optimal number of children days 4032	=	0.43 per day per child
On food and fuel	=	0.15 per day per child
On 21 days course	=	9.03 per day per child

From this budget it is clear that salaries play a major role in the running costs of a nutrition rehabilitation centre. The policies of staff and their salaries is often not in the hands of those who took the initiative to build a centre, not even their own salaries which are decided by their sponsoring authorities. In all fairness, therefore, comparison with hospital expenses and those of nutrition rehabilitation centres can only be done if salaries are on similar scales. For instance, should all staff in the hospital and the nutrition rehabilitation centre be on the same scale of salaries including doctors and registered nurses then comparisons can be made.

The following is an example of monthly expenditure on food at a rural centre for 4 weeks for 1 child, multiplied by 12 for 12 children (approximately 800–900 calories including 40 g of protein per day).

		($)
4 kg Maizemeal	X 12 = 48 kg	= 4.80
¾ kg Beans	X 12 = 9 kg	= 1.50
¾ kg Groundnuts	X 12 = 9 kg	= 1.80
½ kg Dried fish	X 12 = 6 kg	= 5.00
¾ kg Flour	X 12 = 9 kg	= 2.30
8 Eggs	X 12 = 96 eggs	= 2.40
12 kg Fat-free milk powder		= 12.00
Fruit		= 2.00
Vegetables from garden production		= --
	Total	31.80

This amounts to $0.10 on food per child per day

The expenditure on food per head per day varies. Few have reported on this or reported on the average cost per head per day on food in relation to the level of income in the district in which the centre is operating.

SELECTION OF MOTHERS AND CHILDREN

From the medical point of view moderately severe and uncomplicated PEM cases can be treated in a nutrition rehabilitation centre. The majority of centres are linked to other centres giving health care. The selection of eligible children and mothers is usually done by paramedical or medical personnel, the children are thus referred from Under-Fives' Clinics or the outpatient departments of hospitals.

Criteria for admission are as follows:

(1) Children especially at risk (*see Paediatric Priorities in the Developing World*, pp. 160–169, by Dr David Morley).

(2) Children who fail to gain weight over a period of about 3 months.

(3) Children who do not 'catch up' in growth after serious illnesses (measles, whooping cough, diarrhoea).

(4) Failure of breast feeding.

(5) Mothers (and children) who are finding difficulty in coping with their problems in spite of the health teaching they received at the Under-Fives' Clinics.

(6) Twins and triplets.

To assess the extent of malnutrition, anthropometric measurements are helpful. Arm circumference can be measured quickly and on a large scale by untrained people.

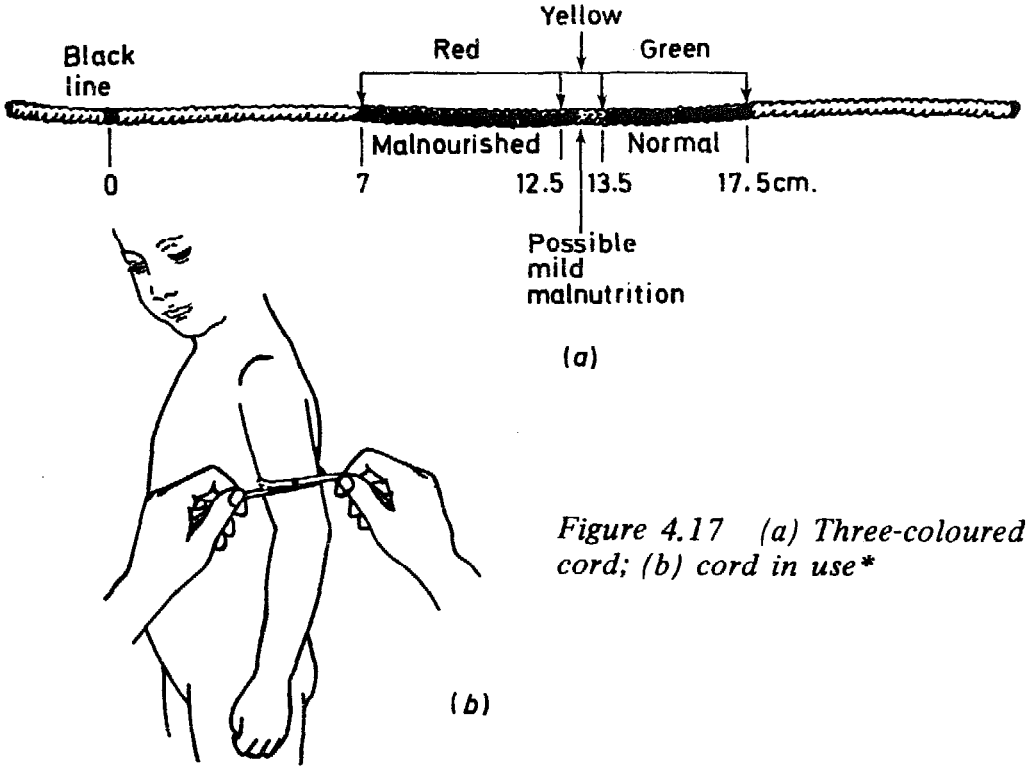


*Figure 4.17 (a) Three-coloured cord; (b) cord in use**

Colour of cord related to arm circumference

Colour of cord	*Arm circumference measured (cm)*	*% standard arm circumference*	*Result with malnourished children and with 777 'normal' Iraqi children*
Red	Under 12.5	<75	All children with clinical signs of severe malnutrition fell into this group. There were no children whose weight exceeded the 80% weight-for-age Harvard standard.
Yellow	12.5–13.5	76–85	Some of these children had mild malnutrition but no child with clinical signs of severe malnutrition fell into this group.
Green	Over 13.5	>85	Most of these children are normal. Only 2.6% had weights below the 80% weight-for-age Harvard standard.

*The cord has now been replaced by x-ray film which is scratched and coloured with a spirit felt pen. Further information is available from Teaching Aids at Low Cost (TALC), Institute of Child Health, 30 Guilford Street, London WC1N 1EH.

On the other hand, the problems are often of a social order combined with ignorance and poverty. Social problems are very much on the increase, especially amongst the ever-growing populations of the big cities. Such problems as unemployment, unmarried and deserted mothers, unwise spending, the high cost of basic foods, etc. These mothers can be referred to nutrition rehabilitation centres by other people in touch with them; for instance, local leaders, community development workers, social workers, and so on. In whatever way mothers are selected they themselves should be wanting to come.

At one centre visited by the author a system of warning had been adopted. If a child failed to gain weight at home, the mother was given special attention and instructions on feeding, the results being carefully watched. At the same time the nutrition rehabilitation centre was mentioned as a possible necessity. If she had not succeeded by herself at home then a stay of three weeks at the centre was advised. In most cases the mother was then more prepared to be admitted than when she had been directly confronted with the issue. She must also be given the time to make arrangements for the other members of the family which she has to leave behind. The greatest problem often being her children under the age of 3 years – the number rarely exceeds 3. In some centres mothers can take with them all their children under the age of 5 years.

The mother will also be able to concentrate more on learning without having to worry about these young children if she had left them behind.

Some healthy children with good appetites will often stimulate the malnourished children to eat better, while their brothers and sisters are happier to have them around. In many centres it is considered necessary to have as large a turnover as possible, as this may point to success. It must be remembered, however, that the success of a centre measured in terms of benefit to the community may be evaluated more on the lasting impact it has made on the local people, than on a large number of children who have put on a great deal of weight during their stay at the centre, often to loose it again when returning home to unaltered conditions, thus again being exposed to the same hazards which caused the malnutrition.

EDUCATION PROGRAMME

It has proved necessary to have a specific teaching programme which will give mothers the information they need to improve their way of living, to keep their families better fed, housed and clothed with the

means at their disposal. Most women are eager to learn; they will welcome the idea of having lessons as education is considered to improve their status. This is especially true for town women, even more so for those who have come to live in towns after having been brought up to a country life. Each centre has to adapt its teaching programme to the local needs and possibilities. Town women may be more interested in handicrafts. They often prefer to improve on their way of living by producing articles for sale, also mending and making new clothes for themselves. The country women, on the other hand, may not be interested in needle work; they often like to improve their food production and make some extra money that way.

The teaching programme should be mainly informal, nevertheless some periods of teaching and discussion on certain subjects should be included concerning nutrition and health complemented with subjects of interest to a particular group of women.

Group teaching

Group teaching by experts is recommended only if the teacher is talking at a level which is understood by the mothers. If this is not possible it may be more beneficial for experts to instruct the housemothers in all subjects. Many of the subjects are interwoven with practical application, for example, food values when preparing meals, budgeting when buying, food measuring and storage. Agricultural instruction is best given on the spot amid the vegetable beds while sowing, planting and weeding. The same applies to the care of livestock when the animals are fed and the houses cleaned.

Discussions

Informal discussion is another method of teaching. Not only do they stimulate interest but they also create a dialogue amongst the mothers many of whom have important information to exchange or pass on. Many family problems will come to light if a sympathetic and understanding ear is offered. Perhaps the most instructive part of the day is when both the teacher and a group of mothers sit together on a mat to talk about their problems during the evening hours when the children are asleep. The friendly atmosphere and the sitting together comfortably will be looked forward to by the mothers and often much appreciated. Not only will food and budgeting problems be

discussed by the mothers but also social and family planning problems will be openly discussed amongst the women and the trusted teacher, giving more understanding of the real problems of the mothers. This kind of mutual understanding and trust rarely develops when a lecturer stands in front of a group delivering a lecture.

Successful rehabilitation also requires the involvement of the mothers in the daily teaching and running of the centre. One therefore notes that successful centres are always associated with a happy

Figure 4.18 A cooking demonstration by a mother supervised by a medical assistant

and industrious atmosphere where both mothers and staff fully participate in achieving the common aim. Some mothers are often influenced by the good example of others when they observe that she is benefiting from new methods, sometimes more readily than by those taught by the teachers. This sometimes happens in an unobtrusive way, as was personally observed at a centre where the author spends a certain amount of time. Most mothers were against the idea of putting their children to bed after the midday meal, they preferred to keep the children on their backs as was their habit, but when one mother came to the centre who had realized the wisdom of putting

her child to bed, thus leaving her hands free to do other things such as sewing or getting on more quickly with other work, one after the other began to follow her example.

An occasional slide show* may be a welcome change but there is no need to have an arranged programme every evening. Colourful posters around the walls will give a cheerful atmosphere and they can also be used in conjunction with the discussions.

Subjects for teaching

In general, the teaching programme should embrace the following subjects: (1) Nutrition; (2) health; (3) household budgeting; and (4) homecraft.

Nutrition

Nutrition must be considered the most important part of the teaching programme. It is best done by someone who is familiar with the local circumstances and who speaks the language. The teacher should also know the local causes of malnutrition as well as the possibility of improvements likely to reduce the incidence or eradicate the condition. She should have an understanding of food values and be able to explain these in very simple language at the level of understanding of the mothers. Never should she use words like 'proteins', 'calories' or 'vitamins' and she should also be careful with the use of comparatives. Body building may be more readily understood by the women when talking and demonstrating on growth, rather than compare this with pictures showing the building of houses. Energy can be demonstrated by physical strength rather than with a picture of a fire. Strange conclusions have been drawn by using posters and flannel-board pictures – only a direct message may be understood. The National Food and Nutrition Commission of Zambia has produced excellent posters with direct messages, and these have been widely distributed.

Weights and measures should be treated in the same practical way by demonstrating handfuls, or familiar local containers. Formerly, cigarette tins were often mentioned but these have gone out of use and it is better to use local utensils the capacities of which will have

*Sets of slides are available from TALC (Teaching Aids at Low Cost) at the Institute of Tropical Child Health, 30 Guilford Street, London WC1N 1EH.

been previously measured by the supervisory staff. Mothers soon become familiar with the amounts required if explained to them at the level of their understanding.

Talks on nutrition are best delivered in the kitchen amongst the pots and pans, and when food is bought at the market or collected from the garden. The nutritional value of the contents of the meals is best discussed during preparation. In most cases this manner of teaching is carried out by the housemother who must be fully informed on the subject; she should not have become confused by the teaching methods she herself received. The author has met housemothers who talked glibly of enzymes and amino acids, but were unable to put a balanced meal together, let alone teach nutrition to illiterate mothers. Visual aids such as posters and films have limited value, but when these are used they should be simple and give a direct message. Participation by the mothers in helping to select food, preparing meals and allowing them use of their own initiative will do much to stimulate interest in what they are being taught. The mention of types of food which are not within the means of the mother should be avoided. She may feel that she should buy such items and, as a result, be left with little or no money to purchase other essentials.

Much practical teaching on nutrition can be done, and valuable information passed on, while the food is actually cooking. Unfortunately, in many developing countries the outdated method of teaching by way of lectures is still used. It is now known that as little as 20 per cent of what is spoken may be remembered, even less when there is distraction as from a crying or feeding child. The old saying: 'When I see I forget, when I hear I remember, when I do it I know' is an undoubtable truth for what is aimed at in the teaching of nutrition.

Learning through singing has already been mentioned, but there are other traditional customs which can be used such as the many old proverbs often illustrating the crux of the matter. Role playing is yet another method of mother participation. Good and bad habits can be played out against each other – also an age-old tradition. Puppet shows can be both enjoyable and instructive when faulty habits are spoken of in a manner which no housemother would dare to relate but which the women would recognize and thoroughly enjoy, being told the truth in such a direct but impersonal way.

In my former nursing days I too would enjoy hearing during the quiet of a tropical evening the songs of lament by the nurses if during the day they had felt I had been too strict or too hasty or, to them, just stupid.

Health

Health instruction is best delivered by a nurse or a medical assistant who is familiar with the local customs, problems, diseases and language. The programme can be prepared with the assistance of the district medical officer, the senior medical assistant, or a registered nurse. The programme should be adjusted to local circumstances with a knowledge of the local health problems and their underlying causes. The causes and prevention of malnutrition should occupy a prominent place in the health teaching programme. The importance of immunization in the prevention of infectious diseases should be stressed. Here the old beliefs on cause and consequence may be tactfully discussed – a very difficult subject indeed. Old beliefs die hard, but many are so harmful that they cannot be overlooked or ignored. The matter should be handled tactfully and seriously, and never be laughed at. Most likely the housemothers themselves may still be involved in such beliefs, but they will also be able to explain the natural causes of disease and the new methods of healing. As one health worker put it guardedly on a questionnaire: Q. What is the cause of measles? A. Caused by droplet infection, and misbehaviour of the parents. Giving everyone their due. Immunization may present a great problem in this respect. A child healthy in the morning may develop a fever at night after having been given an injection against whooping cough at the clinic. Only long-term results as seen by the subsequent absence of such diseases, by the few who were brave enough to have their children immunized, will convince the masses of the value of such preventive measures. This was seen very clearly when starting with Under-Fives' Clinics in rural areas where at least two years elapsed before the majority of mothers became convinced of the value of immunization.

Water-borne and fly-borne diseases such as bilharzia and diarrhoea should be explained, and how to take precautions against such diseases emphasized. Demonstrations on home nursing and first aid should be included, such as the cleaning of wounds, bandaging with dressings made from clean, torn clothes or sheets if the mothers are unable to buy bandage. The preparation of sugar and salt solutions (*Figure 4.19*) for treating dehydration and fever, tepid sponging and the pushing of fluids for very sick children. The applications of lotions and the care of medicines in the form of mixtures and tablets. Expensive medicines issued to the mothers at the hospital or health centre, have often been wasted or given in the wrong manner. The nutrition rehabilitation centre will offer the first opportunity for mothers to learn how to care for their sick children, thus helping to alleviate the heavy burden often placed on health centres and their

overworked staff. With the coming of modern medicine – the responsibility for which was formerly that of the mother and local medicine man – many good and tried remedies have been discarded, many mothers now go to the clinics for the slightest cough or sneeze. With appropriate methods of teaching at the nutrition rehabilitation

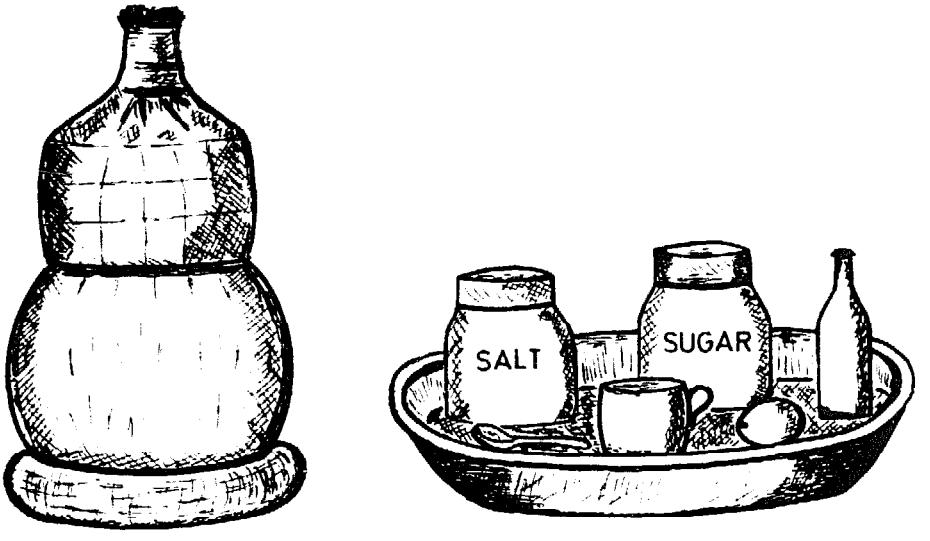


Figure 4.19 The rehydration kit

centre we may still be able to revive some of the good local remedies while explaining the hazards of wrong medicines and dangerous customs.

Household budget teaching

Many women in developing countries have only recently met with cash economy as practised in other parts of the world, having formerly been used to living from their surroundings by producing their own food and enjoying variety by sharing and bartering with their neighbours. In many instances this mode of life still exists to a greater or lesser extent. If one family has a surplus of beans, another may have eggs to spare – an exchange is then a logical procedure. Preservation of surplus food, for example, by drying, will also help with better distribution.

When money comes into the household, and its value and possibilities have been recognized, the problem of how to spend it to the best advantage becomes apparent. In the large cities where in supermarkets all kinds of goods are piled high and loudly advertised, it is difficult for any woman to keep her head cool and her purse closed. Even the well educated and well provided families have to be aware of the need

to keep the family budget within the limits of income and to spend it to the best advantage of each member of the family.

A monthly income is best divided to meet such necessities as food, house rent, clothes, school fees, travel, etc. The cost of food may be divided into weekly amounts. If the staple items such as maize, rice, yams, casava, etc., are obtained outside the cash income, either by garden produce, family sharing, or bulk purchase at long intervals, then the weekly budget can be sub-divided to include the purchase of special items such as cooking oil, sugar, fish, eggs, meat, milk, fruit, vegetables and so on. Market prices must be studied regularly and carefully if the budget is small. Expensive items, such as meat, should be excluded from the diet and replaced by cheaper protein-containing foods such as dried fish or pulses. Irregular buying of expensive nourishing food is a bad way of feeding a family, especially with young children who need a daily supply of balanced food. Group discussion on household spending will bring out many problems. A housemother should be competent to give practical advice on how to buy or to provide for low-cost nutritious meals.

If subsistence farming is the only means of income this pattern can still be followed by advising on the right distribution of food. If there is cash crop farming the husband may have to sell too much to obtain money for seeds and fertilisers. He may spend money on less essential items. In this field a great deal of help and advice may be needed so that the necessary foods are planted in sufficient quantities to feed the family.

Budget sheets

In wage-earning societies the father usually holds the purse and therefore he too should be fully aware of the needs of his family. Budget sheets were available at one centre showing amounts and market prices of the required quantities of food for the family. The following figures are a typical example.

Household budget for a family of four (one week's supply)

	($)	
10 kg Maize flour	1.00	
2 kg Beans	.60	
250 cc Oil	.30	
½ kg Sugar	.15	
10 Eggs	.50	
Vegetables and fruit	1.50	
Total	4.05	(16.50 per month)

With an income of $40 per month approximately two-fifths is spent on food. With an income of $10 per month for casual labour an even more stringent budget has to be worked out. The following figures show such an example.

One week supply for father and mother, 1 child aged 1 year and 1 child aged 3 years

	($)
6 kg Maize flour	.60
2 kg Beans	.60
1 kg Sugar	.30
200 cc Oil	.25
½ kg Dried fish	.40
Total	2.15 (8.60 per month)

Vegetables from own production or from picking green leaves from trees, hedges and weeds.

Calorie and protein requirement for the same family (daily needs)

	Calories	*Protein*
Father	3000	53 g
Mother	2200	41 g
Child 1	1000	20 g
Child 2	1400	23 g
	7600	137 g
(53,200 calories per week.		959 g per week

	Calories	*Protein*
Maize flour 1 kg	3600	95g
Beans (dried) 1 kg	3600	210g
Oil 250 cc	2250	–
Sugar 1 kg	4000	–
Eggs 10	800	70g

It has proved very useful to discuss household expenditure in great detail with both parents. In many societies the husband provides the staple food either by buying or by producing it. What is left of the small income can then go to providing the other necessary items. Fathers have been found to be particularly interested in the budget sheet. When budget advice is given the emphasis should be on the purchase of food needed for growth and maintenance of health, the choice of spending should, as much as possible, be left to the parents themselves. Recently much greater emphasis has been placed on adequate calories and not just to protein in teaching about improved diets.

Homecraft teaching

There is often a great deal of enthusiasm amongst the mothers to learn new skills, homecraft teaching should therefore be included in

the programme, but only given when mothers are really interested. There may be possibilities locally for the mothers to make some extra money by selling homecraft products made by themselves. In the larger cities there is often a good market for blankets, mats or clothes; in tourist areas for fancy souvenirs. The mending and sewing of the childrens' clothes may help to reduce the household expenditure. All these possibilities should be carefully studied in an effort to improve the family income. Working materials have to be supplied by the teacher, but whenever possible mothers should pay the cost price of the materials themselves.

The mothers should be given confidence in their own ability to cope with new situations. Her own skills should be taken into account, and a few words of praise may do much to stimulate new interest and encourage her to pass on her own particular knowledge to others. Mothers should be encouraged to teach others their special skills. Such opportunities should be given to them within the group when attending the centre, but even more so when she has returned home and can tell her friends and neighbours of what she has been taught at the centre.

Rewards and the formation of clubs will encourage those who have attended the centre to pursue the new methods they have learnt at the centre. Forming clubs from the nutrition rehabilitation centre will not only help to keep the contact amongst themselves but will also be of help with long-term evaluation, which will be discussed in Chapter 8. Clubs have been organized successfully by the staff of the Mwanamugumu Nutrition Rehabilitation Centre in Kampala. Similar club forming with reunions at the nutrition rehabilitation centre have been organized at the Campbell Hospital, Jammalamadugu, India.

On leaving the nutrition rehabilitation centre the successful mothers may be presented with a Certificate of Merit; they may show this to their friends, and it will help to remind them of the time spent at the centre.

CHILDRENS' PLAY TIME

Play has been recognized as an important stimulation for mother and child interaction; a mother takes more interest in an active child than in a dull one; for the child, at play is a kind of learning. Once the children have settled down and their conditions are improving, they become more lively and sometimes mischievous. When that time arrives there is an opportunity to give some guidance in their playing with

suitable toys or in group plays. Toys are often presented to a nutrition rehabilitation centre but there may have to be some selection for suitable toys according to age. Little boys the world over are inclined to pull things to pieces but love drumming and beating, while little girls from an early age like to copy mother. Group plays and games will bring the children together and down from the mothers' backs where they are otherwise inclined to cling and remain dependent beyond their age.

Mothers themselves have often not been used to helping the children with their playing, but it has been seen how much they themselves can enjoy this involvement. Early controlled use of hands and feet either by games and dancing or by drawing and fitting will develop their self-confidence and give them pleasure. Formerly, this was done in the villages by community singing and dancing, but as in many places community life is breaking down, and this may leave a vacuum if there is nothing to take its place. When children learn to play together, or by themselves, it will give mother more time to spend on her daily work. Even fathers may be encouraged to become interested and to take an active part in their childrens' activities.

Miserable child → no play → no interest of mother → less contact
Improved child → begins to play → mother interested → increased contact

We had a very interesting experience with such a child; he appeared very neglected after repeated sessions at the local hospital for treatment of kwashiorkor–marasmus. He was aged 5 years and weighed 9 kg, was very miserable and never played. The relationship between mother and child was very disturbed, he was badly dressed and she hardly ever spoke to him. The probable cause was a second child who thrived well on breast feeding and was very cheerful, all the mother's love and interest were centred on the second child. Once at our centre Ben began cautiously to eat some food and within a few days he ate everything we gave him but was still reticient. After one week at the centre we suddenly heard a loud quarrel going on between two children, only to discover that miserable little Ben had come to life and was interested in a toy which, unfortunately, had already been claimed by another child. This, however, was soon remedied as we had plenty of toys so that Ben could make his own choice. Soon after this episode the mother's attitude changed and she began to share her affection equally between the two children.

FATHER INVOLVEMENT

As head of the family, strictly speaking the father is responsible for his children. He has a strong influence on the way a household is managed and the children are fed and reared. In many socities there are set patterns of responsibilities for husbands and wives. Far too little attention has been paid to this important aspect of family life by the health worker. Usually fathers decide on the overall expenditure for housing, clothing, school fees and extras such as beer, the watch, the bicycle, and so on. The mother, on the other hand, is responsible for the daily provision of food. She may be given a small sum of money each day, she may even have to earn the money herself or to grow the food in her own garden, particularly in rural districts. The father, therefore, should be taken into consideration in the nutrition rehabilitation centres. Whenever possible he should be consulted when his child needs admission, particularly since his wife will also be away from the home for a period of at least three weeks. It has been found that if the father is not in full agreement with such plans the mother cannot settle down at the centre, a situation which often results in early absconding. While the mother and the younger children are staying at the nutrition rehabilitation centre, the father should be encouraged to visit his wife frequently. Father's visit to the centre may do much to stimulate the interest of both parents, having the opportunity to discuss together what has been taught to the mother. They should be able to meet and talk in privacy in case family problems have arisen, and the staff may be able and willing to help and give advice if this is asked for. Fathers can also take part in discussion groups as their views may be important and their co-operation essential. Fathers should be made welcome to visit their families at any time of the day.

As a man amongst a group of women, the father, when visiting, may not always feel at ease. The housemother, especially an older woman, can do much to welcome the young father and make him feel that his opinion and his problems are being seriously considered. If a male member of the health staff is involved with the nutrition rehabilitation centre he can be of great help in talking to the fathers on their particular problems and interests.

Many years ago we always sent a special letter to the father when a new baby was registered at the clinic, congratulating him and inviting him to meet the clinic staff. Special permission often had to be obtained from the father's employer for some free time, but this was nearly always granted. As a result of a friendly talk, the father invariable became interested in the clinic activities; immunization and

balanced feeding were always discussed with both parents which subsequently led to a better understanding of the instructions to be followed.

The subject of family spacing (*see Figure 2.11*) can be introduced to the parents at the nutrition rehabilitation centre. Opportunities may be found to talk to them privately where it concerns their own particular problem. Group discussion on the subject can also be very helpful as opinions can be shared, and the advantages of having a well spaced family can be looked at hopefully that all those taking part will come to realise that the whole family can benefit by sensible family spacing. The importance of the mother's health is a major consideration, and the balanced and adequate feeding, with emphasis on breast feeding of the young infant, can do much to prevent sickness and death.

FOLLOW-UP

From experience and what has been observed, the follow-up of mothers and children who have stayed at a nutrition rehabilitation centre still presents many problems, mainly connected with shortage of staff and transport facilities. Nevertheless, it is of the utmost importance that families should be visited after a stay at a centre. As has been mentioned earlier, the period of rehabilitation and teaching at the centre may have been very successful, but real improvement and lasting success can only come about if the acquired knowledge is applied in the home. During home visits, mothers can be given encouragement to continue feeding and rearing their children as taught at the centre. Advice is often needed to adapt what has been taught to the home situation. At first the parents may meet with many difficulties, immediate improvement of food supplies may not be possible; in fact, even on the day the mother returns home, the established routine of the centre, where the children had been given three meals a day, may break down.

As often happened, it was one of the mothers herself who drew our attention to this point: 'what if I come home and the child needs a drink . . . it takes me a few hours to collect, boil and cool the drinking water as you taught me to do?' Also, there is often no food readily available when the mother arrives home and has to prepare the first meal in the way she was taught at the centre. We solved this problem by allowing the mothers to take home a bottle of boiled water and also, if necessary, a quantity of pounded food such as groundnuts. fish or beans for the first meal. Money may not

be available until the end of the month. Such problems have to be considered beforehand, therefore an early visit is very important. Ideally, a visit to the home before admission will give some idea of the conditions, and notes of such should be entered on the records which are kept of each family at the centre. Advice can then be given before the mothers return home. As has already been mentioned, a shortage of staff can be a real problem as home visiting is very time consuming, and motorized transport is very costly. The money may not be available to carry out a well planned follow-up programme. A planned programme will be discussed in a later part of this book.

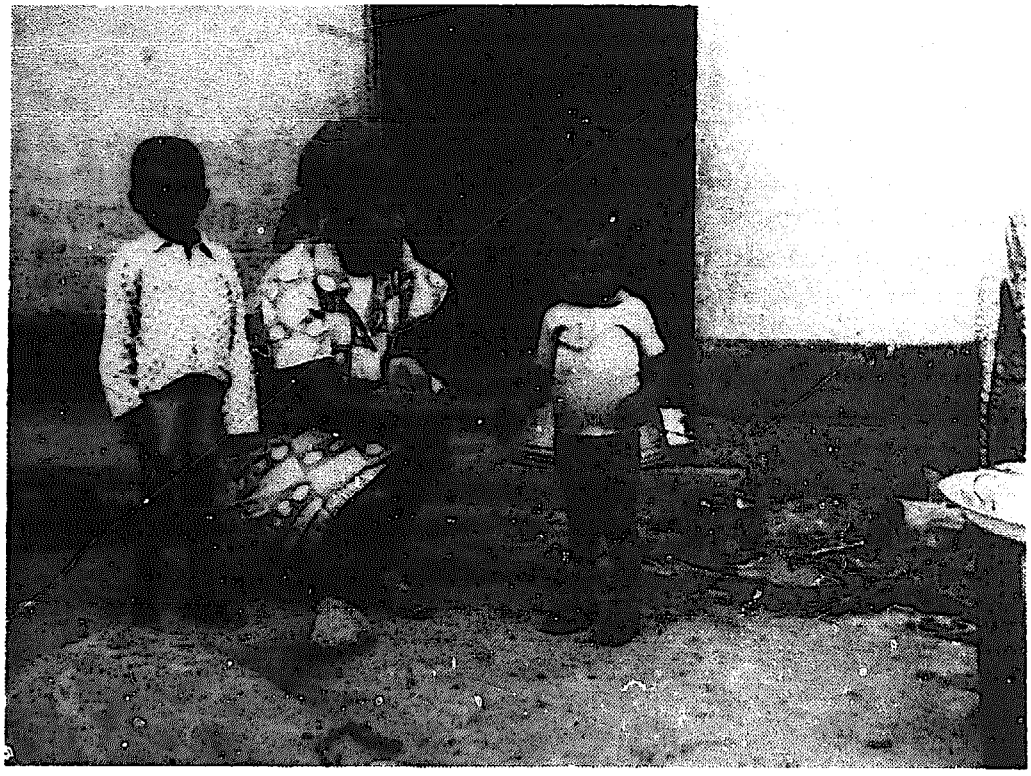


Figure 4.20 A home follow-up visit by a housemother

As a guideline for time and staff the author has seen various methods used. At one centre the housemother made home visits during the fourth week of the month when all mothers had left the centre after a three-week stay (*Figure 4.20*). A few days were spent on both follow-up cases and new admissions. At another centre the housemother spent one afternoon of each week for this purpose, thus covering her district fairly regularly. For long distances a lift in a car was found useful, the nearer districts were visited on foot or by bicycle. On such visits a bicycle is more acceptable than a large

car or Land Rover which immediately creates a false sense of distance. Not all places, however, are within the reach of a bicylce, but if a car has to be used, walking through the villages is much more rewarding than driving the car up to the front door.

In one very extensive rural district the mothers were given a date to come back for a day to the centre for weighing, check-up and discussion of problems. Another centre held reunions of groups at intervals, and yet another worked in liaison with the community nurse and field nutritionist.

With each follow-up visit the health of the whole family, as well as the nutritious state, should be observed and the results entered into the family records at the centre for overall evaluation.

CONCLUSION

Comparatively few centres appear to place sufficient emphasis on teaching; the main aim of many centres being the feeding of the malnourished children. If the children eat well and put on weight it is very gratifying to all concerned. The reason for the lack of teaching might be due to the fact that success is not so clearly visible, that the workload of the staff of the centre is too great, or that the staff itself is not convinced of the importance of teaching. It is the task of the supervisor to see that sufficient attention is given to the education programme.

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5

Day Centres

There are many situations where a residential nutrition rehabilitation centre cannot be operated, but there are various other ways of extending nutrition rehabilitation adjusted to local circumstances. The need for another approach to the treatment of kwashiorkor and marasmus was first noted by doctors and nurses who have met many cases of recurrence of the condition due to the mothers' ignorance or to the unavailability of the required foods.

Apart from hospital nutrition rehabilitation, different programmes have been instituted in communities to improve child nutrition. In this Chapter the author will give a short account of the observations and participation during the last 20 years in the field of child nutrition in Africa. This will include short descriptions on: (1) nutrition teaching to mothers in hospital sick wards; (2) the hospital nutrition rehabilitation day centre; (3) the day care centres; and (4) nutrition rehabilitation in the home.

NUTRITION TEACHING TO MOTHERS IN HOSPITAL SICK WARDS

As is the custom in many places the world over a mother very often insists on being with her sick child when it has to be admitted to hospital. This is often an accepted fact in her family and circle of friends who readily take over the care of the rest of the family during the time she is away with her sick child.

The separation of mother and child often has a very damaging effect on the child and it may take a long time to recover from the ordeal; during such a period a child will often fail to thrive. Even in

modern western hospitals it has been recognized that the mother is very valuable in the nursing care of her sick child and is therefore often included in the team of the nursing staff. Care should be taken that she is included in the discussions on care and treatment, and that she is not left to herself to carry out tasks for which she is not competent. The emphasis with the mothers should therefore be on the feeding and hygiene of her child so that the condition may not recur. When the emphasis is on good food and on the feeding of the children, then the mothers are made aware of the importance of well planned meals at regular times.

Figure 5.1 Agogo hospital teaching centre

The often overworked hospital staff may not have sufficient time to teach the mothers; nevertheless, all hospital staff must be fully aware of their responsibility towards prevention of malnutrition. One extra nurse in the childrens' ward may do much towards nutrition teaching. At one hospital childrens' ward five mothers were selected in rotation, each day, under supervision of the nurse to prepare the midday meal for the children. The day started with a visit to the local market where the requirements for a balanced meal were purchased for the amount of money the average mother could afford at home. In the meantime two mothers collected firewood and all returned to the hospital nutrition centre to discuss the prices and

values of the food that had been bought at the market, after which the preparations began for the midday meal. In this way most of the mothers received several days of very practical teaching, depending on the length of stay of their sick children.

There should be adequate accommodation for the mothers while they are staying at the hospital to enable them to wash and feed themselves; it can be very demoralizing for the already distressed mother if she is to go around untidy and badly fed.

Hospital staff may take a disinterested view of the mothers; they may even find them a nuisance, not realizing how valuable the presence of the mother is in the relationship with her sick child and, consequently, its recovery. However young, the child will get a sense of security when the mother is near in such an alien and often frightening environment where he sees other children suffering and hears them crying in pain and distress. Mothers nearness will do much to reassure him. Mothers therefore should be considered and facilities for personal comfort should be adequate.

All district and teaching hospitals should put emphasis on nutrition teaching with childrens' ward as the focal point. All members of the hospital staff should be involved and take their turn in the teaching programme. Nursing and medical assistant training schools should include nutrition and the prevention of malnutrition as a considerable part of the training. This should be recognized by nursing councils who are responsible for the training programmes of nursing personnel.

A follow-up in the community is important from the family point of view as well as for the hospital staff as it keeps them in touch with what goes on in the district and the causes leading to malnutrition.

THE HOSPITAL NUTRITION REHABILITATION DAY CARE CENTRE

Hospital nutrition rehabilitation day centres have been initiated more recently. Since the increase in malnutrition in recent years large numbers of children who are seen daily at the out-patients departments of hospitals and health centres are suffering from the effects of bad or poor nutrition. Many of these children need close supervision and treatment but the numbers of hospital beds available will never be sufficient to accommodate all children suffering from the effects of malnutrition, especially in places where the condition is prevalent. Hospital beds are also costly to maintain.

Hence, the idea of hospital day centres came about. Many hospitals have also recognized the importance of having a separate childrens' out-patient department where more attention can be given to the children regarding their weight, nutritional status and immunization against infectious diseases. It is also an advantage to have the children away from the adult patients as this will diminish the risk of cross-infection with this very vulnerable group. The staff also becomes more orientated towards the childrens' condition and to what may have led to their ill health.

Many hospitals now have special Under-Fives' Clinic facilities in their out-patient departments, away from the adult sick. The need for such a service was felt when it became apparent that the sick and weak children were seldom seen at the special Under-Fives' Clinic in the districts. Mothers with sick children are more inclined to take the child directly to hospital, where he gets lost amongst the crowds of sick people who daily attend out-patient departments. Not only is the child exposed to cross-infection but he is also missing his most protective shield – immunization and records of his weight and nutritious state. Hence, the idea of the Under-Fives' own out-patient clinic where all these services are administered daily in order of their required needs. The hospital nutrition rehabilitation day centre will be able to give more extensive treatment to the children suffering from the complications of malnutrition than, for instance, at the residential nutrition rehabilitation centre away from the hospital. More expert staff will be available and the daily attendance of the children with their mothers at the hospital centre can do much to promote recovery and in the meantime teach the mothers the best methods of feeding their children.

These centres can put considerable emphasis on practical teaching and give the mothers detailed advice on food values, cooking, budgeting and food production. Even at city hospitals or health centres there may be a garden plot available in a suitable corner. One such centre is located in a large African town where a young local doctor had developed what resembled a small farm; she grew vegetables, reared chickens and rabbits, and even had a fish pond constructed. The mothers attending this centre had to supplement the family income by marketing and could afford only three days a week to attend the centre.

If well organized, the mothers can stay from 9.00 or 10.00 am until 3.00 or 4.00 pm thus giving them enough time to provide for a midday meal in addition to fortifying snacks on arrival and departure. Treatment of the sick children can be carried out during their stay by qualified staff, while the doctor can look in several times a day

to observe the children more freely than during the few harassed minutes at his consulting desk. Nursing and auxiliary staff can give their best and become interested in the family problems. The children can be put to rest after the midday meal on mats or stretchers which are easily folded and removed after use. During the rest hour the mothers can concentrate on lectures and demonstrations of food values, nutrition and budgeting. A follow-up system can be planned with the community nurses who may be attached to the hospital or local health authority.

Staff

If the nursing staff is inadequately trained in nutrition many hospitals now employ nutritionists to work with the health team. In some countries nurses have been selected to follow a 3 to 6 months training course in nutrition.

The work at the hospital nutrition centre consists of two different parts which can be divided into specific tasks. With a limited number of children two staff members will be sufficient, one of whom is either a nutritionist or a nurse with special training in nutrition and the other a competent sick children's nurse. The daily tasks can be divided as follows.

Nurse	*Nutritionist*	*Both working together*
Screening and immunization	Preparation of food	Registering
Treatment of sickness	Lectures and demonstrations on nutrition	Weighing
Advice on health and hygiene	Cooking with mothers	Feeding
		Follow-up

With only two staff members no more than ten to fifteen children should be treated at one time, depending on the severity of the cases. It has been proved that when adequately operated the hospital nutrition rehabilitation day centres can save at least ten beds and four to five staff members.

Medical attention can be given more readily from the paediatric department so that the at-risk cases can get close supervision when needed.

As for the teaching, a well planned programme of the day will promote both the care of the children and the teaching of the mothers. An example of a useful schedule may be helpful.

9.00 am. Arrival of mother and children; a snack is given, followed

by registering, weighing, screening and preparation for demonstrations.
10.00–11.00 am. Food demonstration, discussion on midday meal (nutritionist), treatment and immunization (nurse).
11.00–12.00 midday. Preparing and feeding the meal (mother and child together).
1.00 –2.00 pm. Childrens' rest, mothers divided into two groups: Group 1–teaching nutrition, budgeting and gardening; Group 2–teaching health and hygiene, including family spacing.
3.00 pm. Snack for children before departure.

Follow-up may be carried out by the hospital team, in which case the number of staff should be doubled as home visiting is very time consuming. In such cases it is a good plan to operate alternate duties, such as one week at the hospital day centre and the next week home visiting. A bicycle has often proved to be the most ideal method of transport in towns as well as in limited country districts; however, if the district is extensive and the road surface very rough or steep, motorized transport may be necessary, but this will considerably increase the cost and will seldom be possible on a national basis.

An alternative plan is to travel the longer distances by bus or other public transport to a certain starting point and then visit a number of homes on foot within a radius of 1–2 km on one day, taking another district on a following day; this method will save time and travelling expenses.

If community nurses do the home visiting they should work in very close contact with the staff of the hospital nutrition rehabilitation day centre and be fully acquainted with the mothers and children while they are attending the centre.

THE DAY CARE CENTRE

Apart from the hospital nutrition rehabilitation day centre, a day care centre can operate in any problem area, but is usually located in towns. It may only be possible for working mothers to attend on two or three days a week, in which case alternate groups of mothers and children can attend the centre. Day care centres are less costly to operate than residential centres. A rented house with suitable cooking facilities, teaching space, an examination room and a room to accommodate the children is sufficient. There is, however, little involvement or participation by the mothers – even less by fathers who are usually only free during evening hours or weekends. Recovery from malnutrition takes more time, since only one good

meal a day can be provided for the child; moreover, as mothers are less involved they may be inclined to continue their traditional way of living and fail to apply what they have been taught at the day care centre.

NUTRITION REHABILITATION TEACHING AT HOME

The best approach to rehabilitation may well be to assist the mother in her own surroundings in the task of improving the daily feeding of the family by using her own pots and pans, helping her to obtain or select the right kinds of foods within the limits of her spending power, and showing her the best way to prepare the meal, especially for the weaning child and other young children who are not yet able to get their required share by eating out of the family pot.

Figure 5.2 Nutrition teaching at home

Home nutrition rehabilitation needs the right kind of approach by a tactful person who has gained the full confidence of the family and is able to see the faults and possibilities when she visits the home. The job is very time consuming as the home visitor cannot take on more than one or two families living close together, especially when

the children are in poor condition and a good deal of care is needed. One such a situation comes to mind when some years ago a volunteer nurse received permission from the hospital doctor to treat a child with severe kwashiorkor at his home as the mother had refused hospitalization of the child. The child aged 2 years was unable to walk, had severe oedema and was very miserable. The nurse had to cycle three or four miles through very rough country to reach the village and prepare the midday meal for the child and the mother from food obtained in the same village, then to help her feed the child, only to return again for the evening meal. She continued this for six weeks when, by the end of this period, the child had fully recovered and was running about and playing with other children. This had taken so much of the nurse's time that little other work could be undertaken. It had, however, the advantage that not only had the mother of the sick child been convinced of the importance of balanced feeding but all the village women had looked on with growing interest as the child began to recover without the use of medicine but only by a different way of feeding. It may not always be necessary to give such intensive supervision. Many years ago when the use of skimmed milk powder was first introduced amongst the poorer classes of a large African city, we helped the mothers to prepare the childrens' porridge by adding the milk powder when cooking. This we did in the course of our home visiting at the time when the mothers usually cooked the porridge, consisting of maize flour, for their young children. This proved a very useful way of introducing the milk powder as a weaning food. The milk powder was available locally at a low cost price which the average mother could afford.

It is not necessary to have highly trained personnel for such home visits. A woman accepted by the community with a basic knowledge of balanced feeding can do the job on a part-time basis. Group training courses can be given to women who are interested to do such work. Good results were achieved with the services of such women in rural Zambia after an initial training lasting two weeks, given by a volunteer nursing sister. Health services at present are dependent on numbers of such auxiliaries with a basic training in health and nutrition to cover the outlying districts and isolated villages.

Home nutrition rehabilitation also allows the home visitor to survey other home problems when spending time with the family and whilst preparing the food. Mothers will more readily discuss their problems at such visits, also, one may see other children around and thus get a true impression of the way the household is managed.

Results are not always best measured in numbers. Just as a large number of children rehabilitated in a centre may not necessarily

mean that malnutrition has been overcome, so with home visiting. It is the quality of the work rather than a long list of visits which counts.

Surveys undertaken in recent years (Blankhart and O'Keeffe) have shown that it is largely the socio-economic under-privileged homes where malnutrition is most prevalent. Under such conditions there can only be lasting results if a more constant supply of the right kind of food is assured, and this can be extremely difficult to achieve.

It may well be that by exposing such conditions the health and welfare authorities will become more aware of the real problems and the causes of malnutrition and ill health. Not only the local authorities, where powers to change conditions are often limited, but also the larger powers and international organizations should be made aware of the problem of world poverty so that ways and means can be studied in detail to improve the conditions of the many millions of underprivileged.

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6

Feeding at the Nutrition Rehabilitation Centre

INTRODUCTION

An impressive number of books have already been written on nutrition in general and on infant feeding in particular. One of the latest and perhaps most universally used is *Nutrition in Developing Countries,* by Maurice and Felicity King. It deals with basic problems discussed in a wide variety of circumstances. Miss Cameron's *Manual of Feeding Infants* gives a wide variety of menus for many different countries. Aykroyd's *The Nutritive Value of Indian Foods and Planning of Satisfactory Diets* gives excellent ideas for Asiatic countries. At the end of this chapter a variety of such books is recommended for further reading.

It is not the purpose of this book to give any detailed scientific information but a straightforward workable guideline of what is required, how to obtain, measure and prepare the meals and feed the children. Too much scientific knowledge confuses the housemother who has not received the education to understand it. Housemothers have been known to use terms they have only half understood, yet were unable to put a balanced meal together for the children from locally obtainable foods. This made me realize that straightforward and easily understood advice is therefore needed. At nutrition rehabilitation centres food and feeding must be seen in the light of therapy for the ill effects of wrong feeding, conditions such as faltering growth and, at worst, kwashiorkor and marasmus. Also as a preventive measure against lowered resistance by infections.

CUSTOMS AND TABOOS

Every society has its own customs and taboos on feeding, much of which depends on the various local staple foods to which people have become accustomed over generations, such as rice, maize, plantain, tubers such as yams and cassava, and so on. Unless the people themselves are ready for it, one should not attempt to change to new foods. Certain beliefs, for instance, that eggs are harmful for children, or that fish is only an adult food, should be carefully handled. To convince a mother and her family of the values of food is often a very slow process. Sometimes there is no objection to eating eggs if they are broken and beaten into the porridge, or when dried fish is pounded.

At nutrition rehabilitation centres we should be familiar with the local customs and beliefs and recognize the good from the harmful. In urban situations food habits are often changed to a disadvantage using expensive processed cereals instead of the locally grown staple foods. It is advisable, therefore, to keep to the local traditional pattern of foods but with adjustments to rectify errors which may have caused malnutrition. Changes, however small, should always be discussed with the mothers beforehand and carefully explained, as the food pattern concerns all the family.

FOOD REQUIREMENTS

To be both therapeutic and educational the diet should consist of the following.

(1) Adequate nutrients to treat moderate PEM with sufficient calories and of low bulk.
(2) Suitable when absorption and enzyme secretion has been impaired, as in severe kwashiorkor (for example, lactose intolerance with milk).
(3) The food must be locally available otherwise the mother will be unable to practise at home what she has been taught at the centre.
(4) The local method of preparation as favoured by the children.
(5) Food, if not produced in the home garden, must be available at prices the mothers can afford.

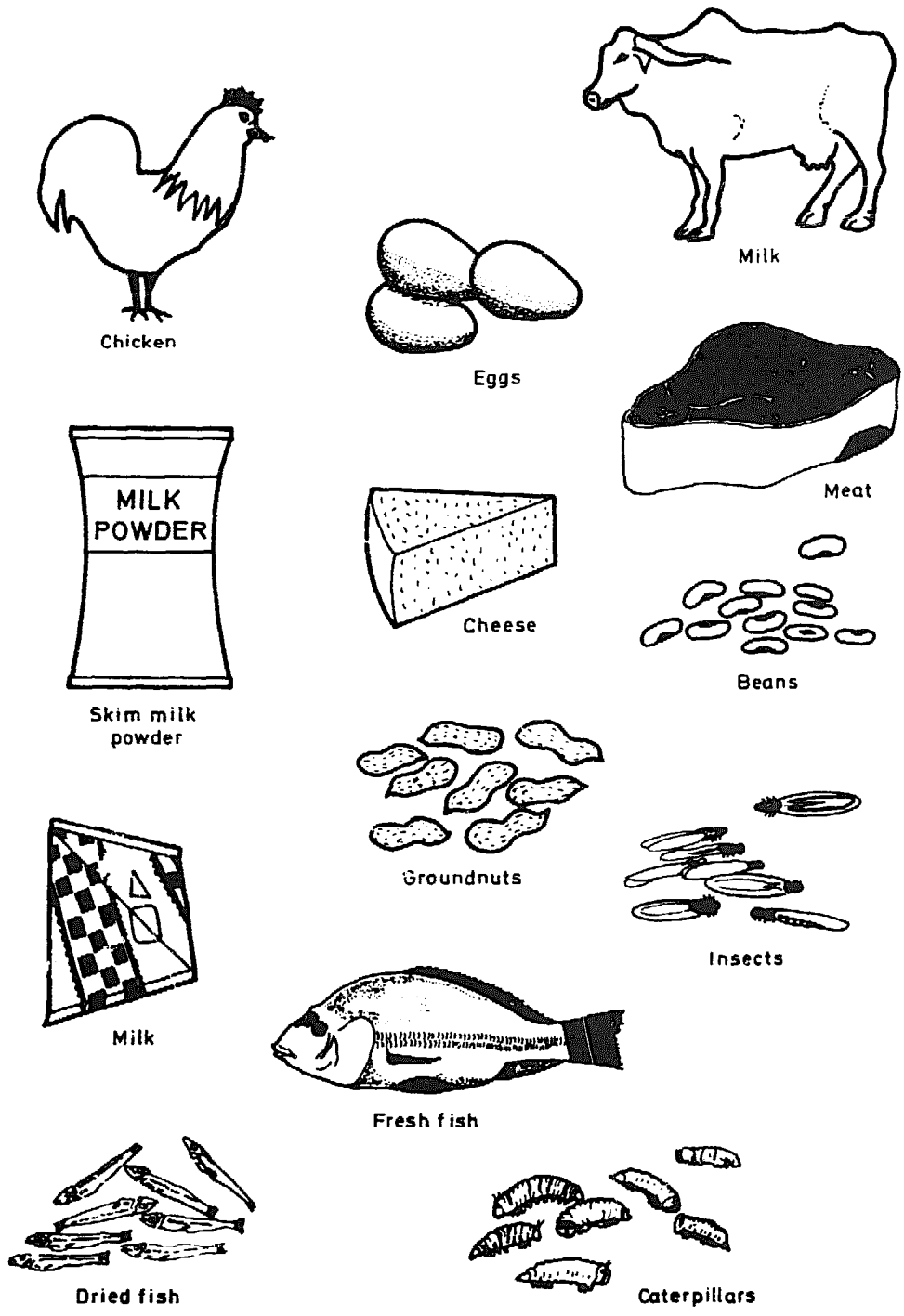

Figure 6.1 Body-building foods

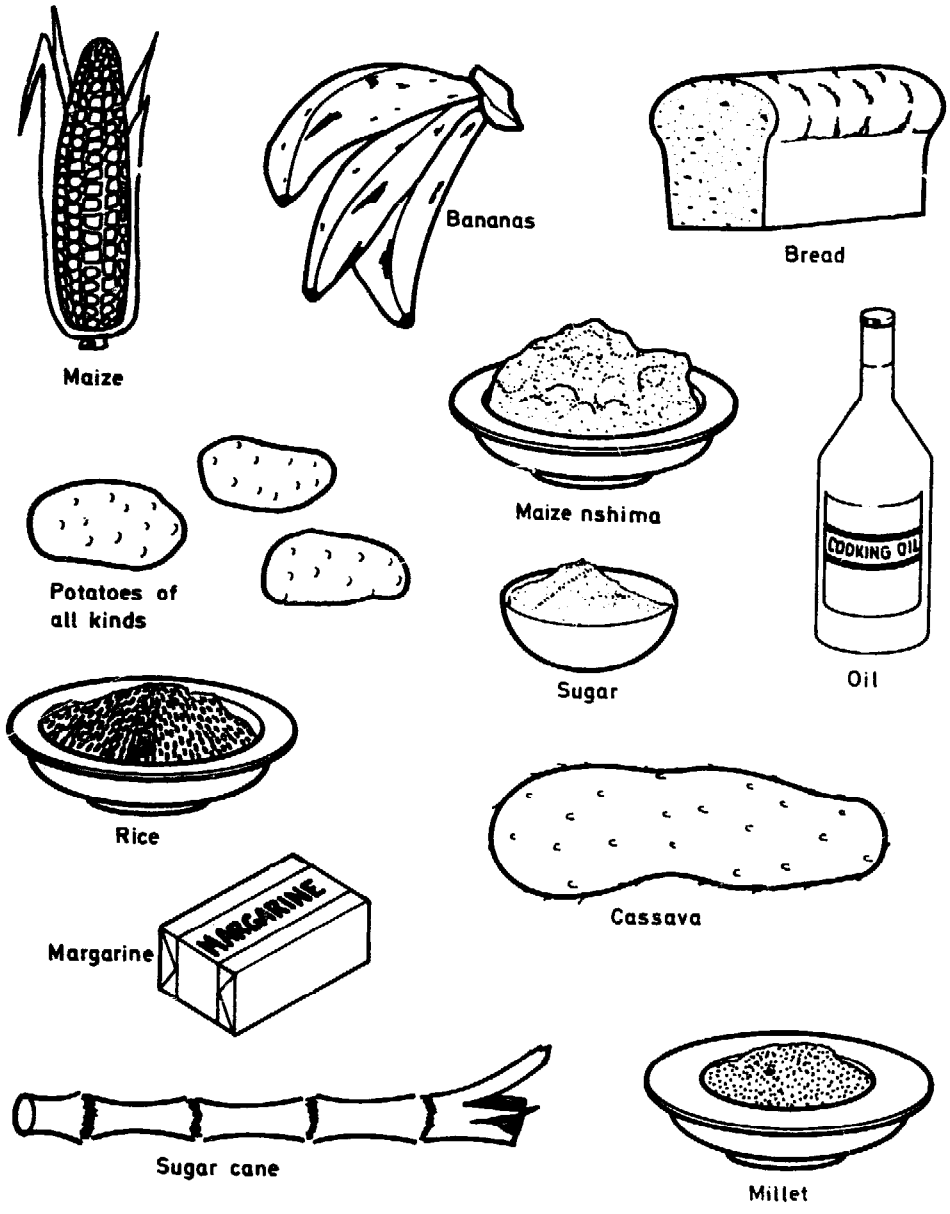

Figure 6.2 Energy foods

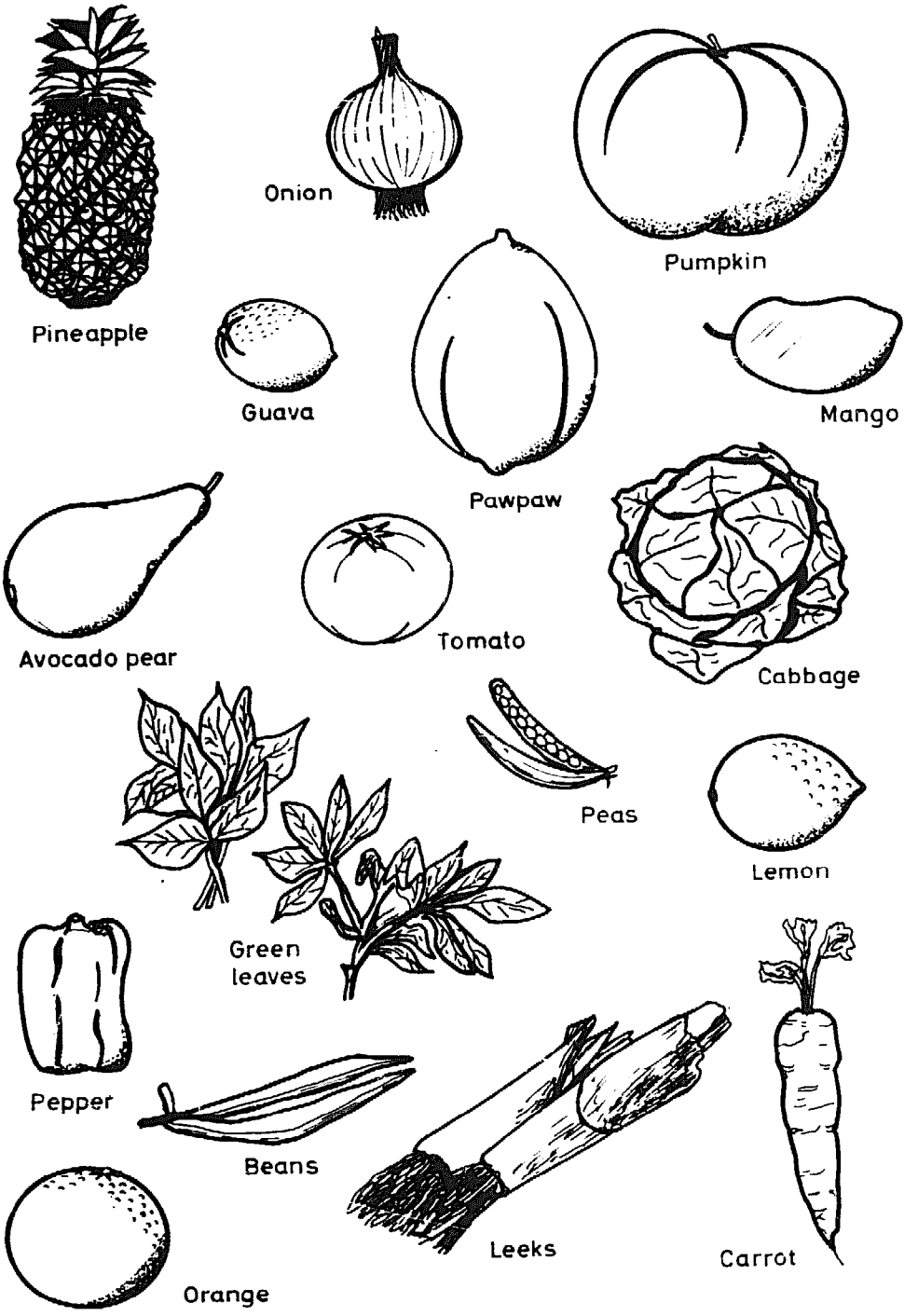

Figure 6.3 Protective foods

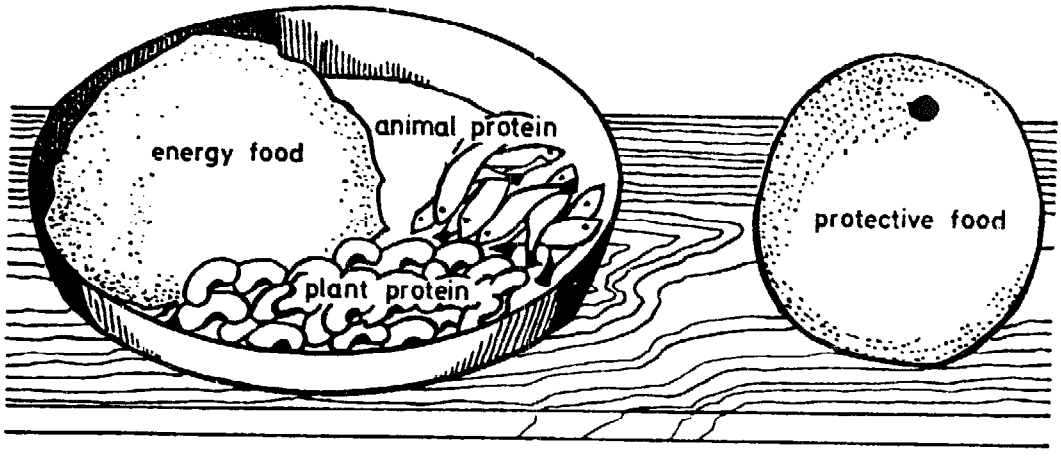

Figure 6.4 A balanced meal

Figure 6.5 Help mothers to buy wisely

The following figures represent the basic requirements according to weight for age.

Basic food requirements per day for a family consisting of:

Father	3000 cal	100 g protein
Mother	2500 cal	80 g protein
2 children	2100 cal	70 g protein
1 child	1000 cal	35 g protein
Total	9600 cal	285 g protein

1 kg Maize flour	=	3600 cal	95 g protein
½ kg Beans	=	1800 cal	205 g protein
250 cc Oil	=	2250 cal	
¼ kg Sugar	=	1000 cal	
4 Eggs	=	400 cal	70 g protein
Vegetables & fruit	=	550 cal	5 g protein
Total		9600 cal	375 g protein

FOOD BUYING AND COLLECTING

The mothers should be involved daily in the collecting of food that has to be eaten that day. It is a good plan to discuss the menu the previous evening. If the food is to be bought at the local market or shops the mothers should accompany the housemother, who also holds the purse. A good housemother will look for the best food at the lowest price. If some of the food is already available in the store of the centre then the mothers should be present when the food is issued so that they will become familiar with the right amount needed for each child. Picking vegetables in the centre garden should be done before the sun gets too hot and while the dew is still on the leaves.

Meals should be varied as is locally possible; a varied diet will prevent malnutrition. This is also a point to stress when teaching nutrition to the mothers.

FROM WEIGHTS TO MEASURES

When the required amounts of food have been worked out by weight, these must then be translated into household measures. Very few mothers will understand grammes or litres but will use their hands (*Figure 6.6*) or a calabas as measures – at best a spoon or scoop. The housemother should decide whether to use either hands and fingers or the locally used utensils (*Figure 6.7*). Weights should have

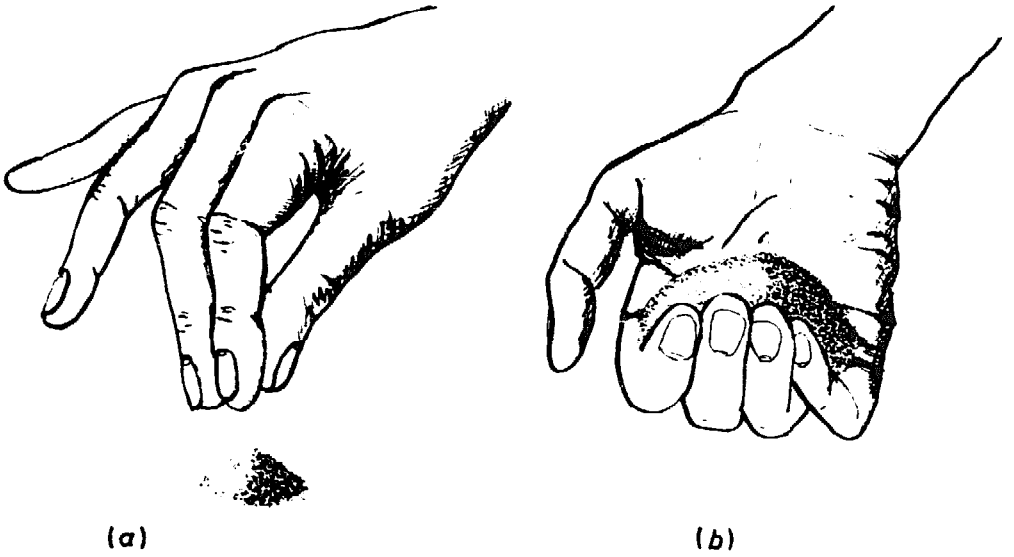

Figure 6.6 (a) Thumb and two-finger pinch; (b) the four-finger scoop of sugar = 30 g

Figure 6.7 Locally used utensils, Upper Volta

been converted previously by the staff into the chosen measures, and when these are decided upon the same system should always be used. A good housewife will usually develop an eye for what she needs once she has been shown how to do this.

Some commonly used measures for weight:

Cereal flour	1 Large level tablespoon	= 10 g
Dried fish	1 Large level tablespoon	= 10 g
Milk powder	1 Large level tablespoon	= 10 g
Sugar	1 Dessert spoon	= 10 g
Dried beans	1 Handful	= 20 g
Cooked vegetables	1 Tablespoon	= 25 g

If spoons are not used by the community, their measure can be converted to the locally used utensils by the use of the above figures.

MENUS

It is a good plan to have a series of menus drawn up according to the child's requirements. To do this correctly each centre should have a food table listing all the locally available foods. Many countries have compiled such lists of their own local foods. If such a table is not available *Platt's Tables of Representative Values of Foods Commonly Used in Tropical Countries* is most universally accepted.

The use of some local foods varies from one country to another. When the staple food is bulky and of a low calorie value, such as fresh casava, taro (*Figure 6.8*), yams or plantains, the calorie requirements have to be made up by adding palm oil or other vegetable oils, or sugar, depending on what is locally available. Maize, although having a higher protein content, is very heavy in bulk and can only be eaten in small portions by the young infant.

In many parts of the world milk is not available, either fresh or in powder form, therefore other protein-containing foods have to be used for infant feeding. When milk is unavailable in any form other proteins can take its place. Food such as fish, eggs and meat in many varieties from goats, beef, chickens and rabbits to insects and larvae can take the place of milk in the young infant's diet, provided that it has been made into a suitable substance for the very young who have not yet grown teeth and are therefore unable to chew. Legumes such as beans, groundnuts (*Figure 6.9*) and soya beans can also take the place of milk but are better utilized with some animal protein.

Young infants are best fed on a mixed *porridge* with the addition

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Figure 6.8 The preparation of taro

of other foods in order to obtain a balanced infant diet. This is common practice by mothers the world over, although the need for sufficient proteins is often not realized.

Porridge can be made from almost any staple food, from cereals as well as from tubers. To make a porridge acceptable to the young infant 100 g of dried cereal or tuber should be mixed with 1 litre of

Figure 6.9 Groundnuts

water. This amount is as much as the young infant is able to eat during 24 hours. This porridge can be prepared once a day and then divided into the required portions during the day. Other foods can then be added to each meal so that the required amounts of calories, proteins, vitamins and minerals are maintained. The following are varied examples of menus put together according to body requirements for weight.

FEEDING AT THE NUTRITION REHABILITATION CENTRE

For infants aged 1–1½ years weighing 10–12 kg

	Weights & Foods	*Measures*	*Calories*	*Total per meal*	*Protein*	*Total per meal*
Breakfast	50 g Maize flour	5 table spoons	180		4g	
7.00 am	10 g Milk powder	1 table spoon	30		3 g	
	10 g Sugar	1 dessert spoon	40	250		7 g
Morning drink	25 g Maize flour	2½ table spoons	90		2 g	
	10 g Milk powder	1 table spoon	30	120	4 g	6 g
Midday meal	50 g Maize flour	5 table sppons	180		4 g	
	30 g Dried beans	1 handful	90		6 g	
	20 g Ckd. spinach	1 tablespoon	24	294	2 g	12 g
Afternoon drink	1 Banana & water		50		1 g	
	10 g Milk powder	1 table spoon	30	80	3 g	4 g
Evening meal	50 g Rice	2½ table spoons	180		4 g	
	1 Egg (medium)		50		3 g	
	5 g Sugar	1 teaspoon	20	250		7 g
	Total per day			994		36

Alternative menu

Breakfast	25 g Casava flour	2½ table spoons	90			
	20 g Dried fish	2 table spoons	35	125	8 g	8 g
Morning snack	25 g Sorghum	2 tablespoons	90		2 g	
	20 g Groundnuts	1 table spoon	60		3 g	
	10 g Sugar	1 dessert spoon	40	190		5 g
Midday meal	75 g Casava flour	7 sp.	250			
	50 g Chicken	2 table spoons	140		10 g	
	25 g Cooked vegs.	1 table spoon	20	410	2 g	12 g
Afternoon snack	1 Orange ½ Banana		90	90	1 g	1 g
Evening meal	75 g Sweet potato	1 cupful	175		1 g	
	Dried beans & 1 tomato	1 handful	140	315	8 g	9 g
	Total per day			1130		35 g

The following is a list of commonly used foods showing their average calorie and protein values.

Legumes, such as groundnuts, green gram, goabeans, horse beans, soya beans, lentils, chicken peas and similar beans contain 22–25 g of protein and 350 calories per 100 g.

Cereals, such as rice, maize, sorghum, wheat, millet, teff, oats and similar grains contain 8–10 g of protein and 350 calories per 100 g.

Starchy roots, tubers and fruits, such as bread fruit, casava, jack fruit, plantain, yam, sweet potato, taro and similar tubers contain 1–2 g of protein and 100 calories per 100 g.

Oil seeds and nuts, such as almond, brazil nut, cashew nut, dika nut, melon and pumpkin seeds, pistachio nut, sunflower seeds and similar seeds and nuts contain 20–30 g of protein and 600 calories per 100 g.

Vegetables, such as bamboo shoots, bean sprouts, beetroot, broccoli, carrots, egg plant, pale green leaves such as cabbage, colerabi, chinese cabbage, lotus root and others contain 1–2 g of protein and 40–50 calories per 100 g. Dark green leaves, such as spinach, pigweed, sweet potato top, kale and bledo contain 5 g of protein and 50 calories per 100 g.

Fruits, such as bananas, cape gooseberries, blackberries, citrus (lemons, oranges), fresh figs, grenadilles (flesh and seeds), guave, jujubi, litchi, papaya, pineapple, pomegranate and others contain 0.5–1.5 g of protein and 50–100 calories per 100 g. These are also rich in vitamin C and some in vitamin A.

Milk, fresh and dried, cow's milk (fresh) contains 3.3 g of protein and 64 calories per 100 ml. Cow's milk powder (full cream) contains 25.5 g of protein and 500 calories per 100 g. Human milk contains 1.3 g of protein and 75 calories per 100 ml. Goat's milk contains 3.3 g of protein and 70 calories per 100 ml. Buffalo milk contains 3.8 g of protein and 102 calories per 100 ml. Skimmed milk powder (cow's) contains 36 g of protein and 357 calories per 100 ml.

Eggs (chicken and ducks), contains 13 g of protein and 158 calories per 100 g. (An average egg weighs from 50–60 g.)

Fish (dried, fresh-water fish with edible bones) contains 63 g of protein and 300 calories per 100 g. Canned fish, such as sardines and herring, contain 20 g of protein and 300 calories per 100 g.

TIMING OF MEALS

When the amount of food needed for the day has been divided into meals and snacks, care must be taken to ensure that the child is fed at regular intervals. This is important as the small stomach can take only a little food at one time. Therefore, if the total daily amount is not correctly divided over the day the child will not get enough. The first morning porridge therefore should be ready early in the morning. When the child awakes he will be hungry after a long fast and should not be kept waiting for his food. Snacks in between the meals are also important to make up for the required amounts. Malnutrition can be caused by infrequent feeding, which is a bad practice with young children.

FEEDING AT THE NUTRITION REHABILITATION CENTRE

PREPARATION OF MEALS

After the food has been collected and the values discussed with the mothers, preparation and cooking should commence allowing for regular meal times.

Fireplaces and fuel should be used in accordance with local custom and availability. Alternative fuels sometimes have to be introduced

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Figure 6.10 Open air oven and charcoal burner used at the Makeni centre

when firewood is in short supply (*Figure 6.10*). The fire should be lit in good time so that no time is wasted while it gets sufficiently hot.

For mothers to help in the actual cooking will stimulate their interest as well as enable them to use their own methods. Either all the mothers can participate while their children are playing in a safe place, or only a section of the mothers may be selected for this purpose each day depending on other activities and the work plan of the centre.

The chopping and pounding of certain foods is necessary for young children (*Figure 6.11*) who have, as yet, few teeth. Dried

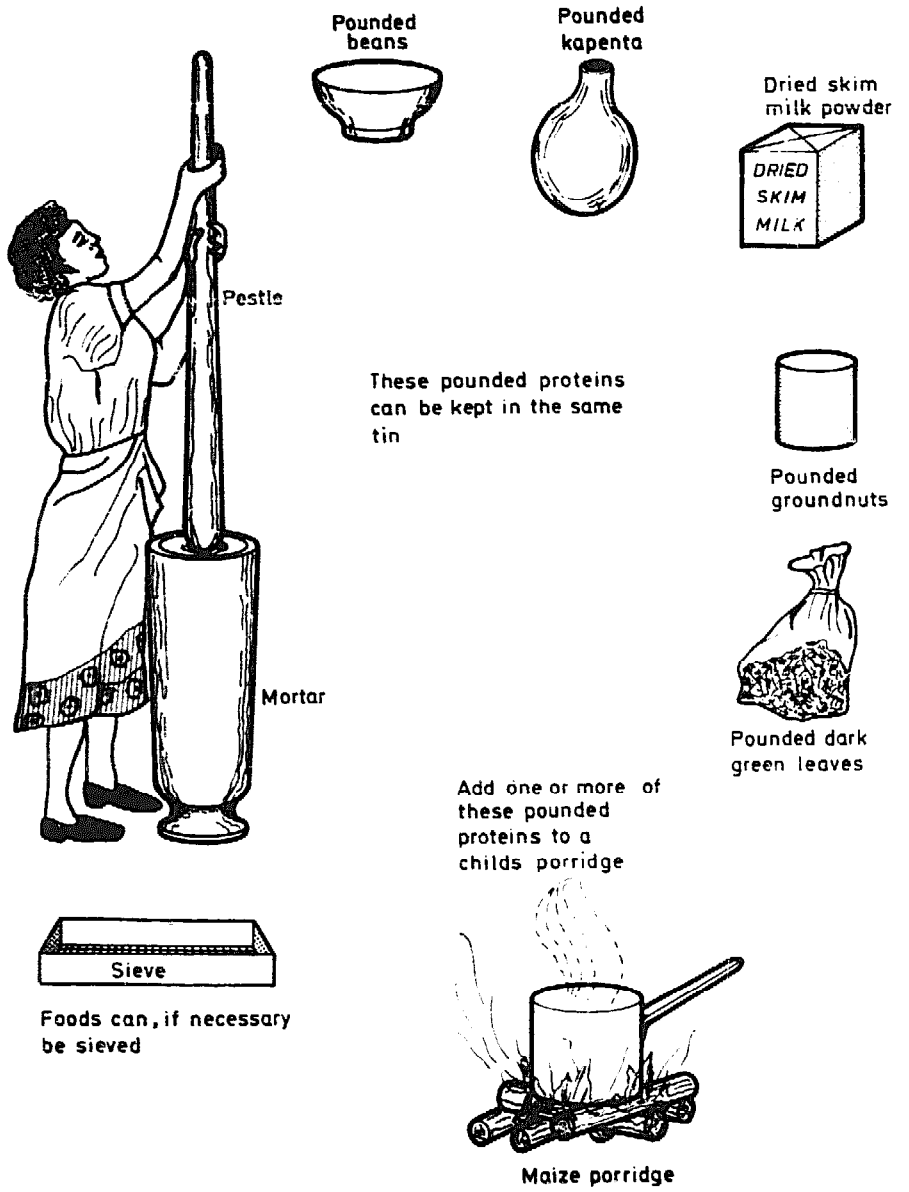

Figure 6.11 Pounded protein foods that can be added to a child's porridge

beans, groundnuts and dried fish are among such types of food. As this is a rather time consuming task it may be done beforehand and kept ready for use in jars after which it can be issued as required, measured by hand or spoon. Everything should be ready before the cooking is started. Salt and sugar should be used sparingly; spices should be avoided altogether. The calorie value of sugar, when used, should be noted, but vegetable oil when available is better used to make up calorie requirements when necessary.

The mixing of all foods is to be recommended when the child is

very young and at the spoon-feeding age. In this way he receives a balanced mixture with every spoonful he eats. When children are older perhaps mothers and children will prefer to have the various items separate on a plate, but great care should then be taken to ensure that everything that is served is eaten. Plenty of time should be allowed for slow eaters; the more hungry children may encourage the slow ones. In any event, a relaxed atmosphere at mealtimes will help to make feeding a success.

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7

The Centre Garden

INTRODUCTION

Emphasis has already been stressed (Chapter 4) on the importance of vegetable growing to supplement the family food supply, be it under rural or urban conditions. Mention has also been made of some of the hazards and risks inevitably attached to home gardening.

This chapter will give brief advice, in general, mainly to stimulate the initiative for home-grown produce and to those who are planning to make the centre garden an important part of their teaching programme. It is not possible within a few pages to cover all the various aspects of gardening as they apply in different parts of the world; therefore to obtain more detailed information on local conditions and advice, a list of books and pamphlets for additional reading has been compiled in order that specific advice may be found for those planning nutrition rehabilitation centres in various parts of the world.

PLANNING AND MAINTENANCE OF THE GARDEN

The purpose

The centre garden has two distinctly different objectives: (1) to teach the visiting mothers better and new methods of home gardening, and (2) to supply food for consumption at the centre.

The second objective should never be dependent on the first because the labour by the mothers and their participation in the garden are not regular features. The actual work done by the mothers should be seen in the context of learning, and the time spent in the garden should be only a part of the teaching programme.

The Layout (Figure 7.1)

Any garden, however small, needs a plan of action, remembering that when starting a garden a period of time may be needed for experimentation and adjustment. Some vegetables grow better than others under certain circumstances. One should start with the best known local varieties, and these will vary enormously in different parts of the world. Actual food values should be considered and the best and easiest to grow should be decided upon. Dark green-leafed vegetables are of a high-food value, are found in a number of varieties and are easy to grow. Pumpkin can be very rewarding, the flesh of the fruits have a good food value (protein and vitamin C and A), the seeds have

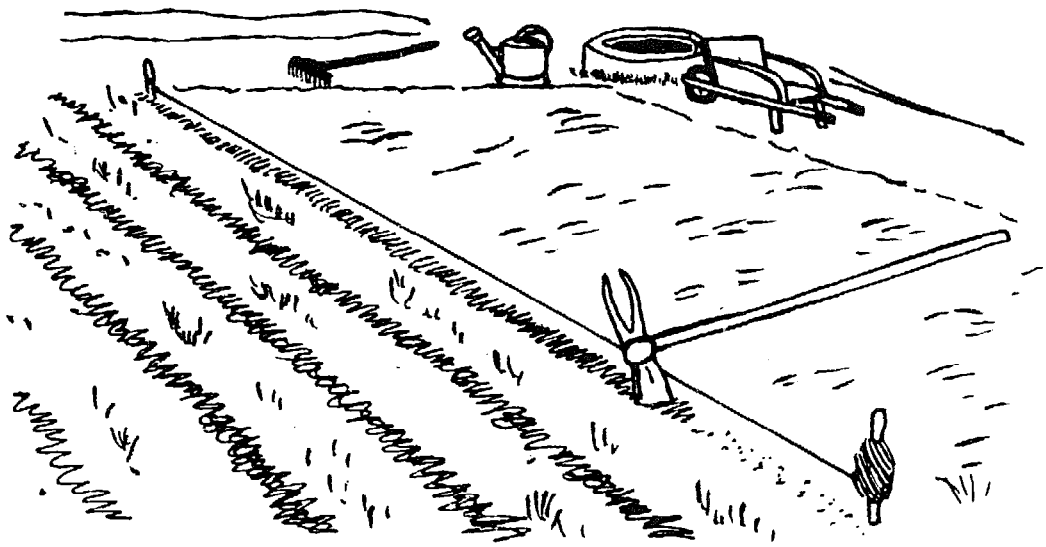

Figure 7.1 The lay out of the garden

a very high protein content (+30 per cent), and the top leaves can be used as a vegetable with a 1.5 per cent protein content. They grow well in a moist tropical climate but prefer a rich soil. Western varieties of vegetables should only be introduced if they have good food value, are accepted by the women and are likely to grow well. Carrots have a good food value and are liked and easily digested by young infants but they need good soil – the same can be said of tomatoes.

Interplanting (*Figure 7.2*) is recommended only when the soil is good; cabbages can be planted between maize or tomato plants when these are still young, as cabbages mature sooner and will have been harvested before the others bear fruit.

For a successful line of action it is necessary to plan the lay-out

of the garden according to the most suitable sites available; for example, the vegetable beds on the most open spaces, easy to water and to drain after heavy rainfall, the fruit trees where the shade is needed, the livestock cages in a sheltered corner and the refuse heap at some distance away from the houses as it will attract flies and other insects which can be a nuisance and a health hazard. Finally,

Figure 7.2 Method of interplanting vegetables

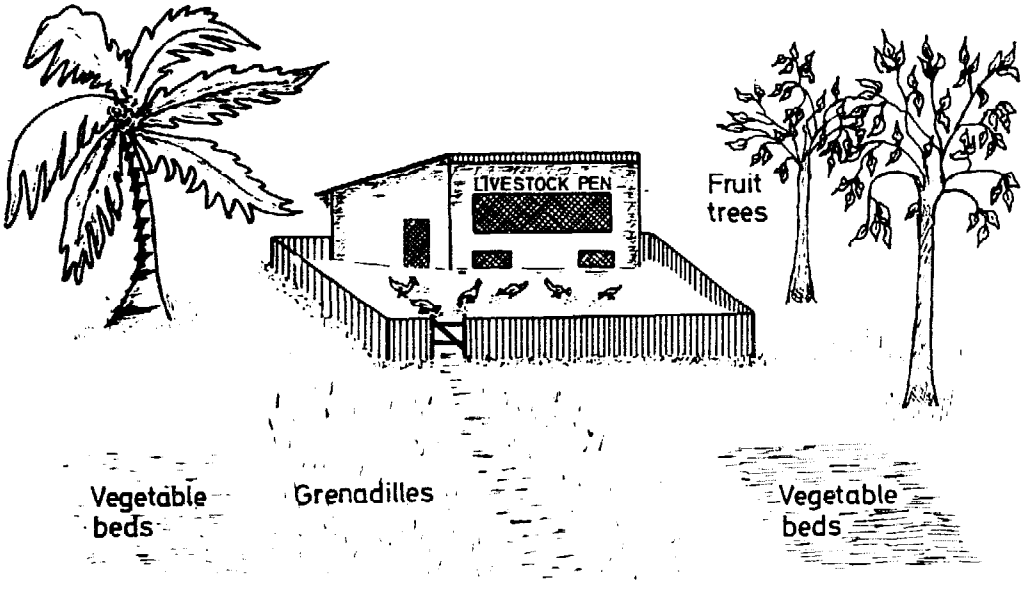

Figure 7.3 Centre garden plan

the fencing may also be a productive part of the garden, formed by grenadilles which offer a rewarding fruit and are easy to grow, or its bitter leaves as a nutritious vegetable. *Figure 7.3* suggests what can be done with a garden plot and may help to give the planners ideas on variations depending on the space and facilities available. The three different commodities – vegetables, fruit and livestock – all need specific knowledge, but only brief advice can be given here.

Fertilization

Before starting any sowing and planting the soil must be prepared by digging and fertilization. If the land has not been used for cultivation and has been well nourished by decomposing matter, for example, fallen leaves, a fertilizer may not be necessary at the beginning since artificial fertilizers have become very expensive in recent years, and often difficult to acquire, emphasis is laid more on the home-made fertilizer – the household refuse. This will consist of leaves, weeds, grass, rice-hulls, cornstacks and soft kitchen waste such as vegetable and fruit peelings, fish and chicken bones and skins, and tea leaves. Animal manure from chickens, rabbits, goats and pigs is very valuable for its nitrogen content and will keep the soil well nourished. Ashes from the kitchen fire also make a valuable addition and should be added regularly to the refuse heap. To prevent the heap from becoming to wet during heavy rainfall, which may cause excessive rotting, a

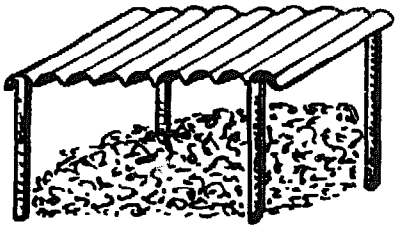

Figure 7.4 The compost heap with protective covering

cover as shown in *Figure 7.4* will keep the water off. When the soil has been basically prepared by digging and adding the rotted refuse from the compost heap, a start can be made on the next stage – laying out the vegetable beds.

Sowing and planting

The sowing of vegetable seeds can be done in seed boxes (*Figure 7.5a*), on seed beds or, as in the case of spinach, carrots and leaf vegetables, directly in the vegetable beds. Beans are planted in the soil at a distance of about one foot apart. Other vegetable plants such as all varieties of cabbage, peppers, tomatoes, egg plants and others are sown in seed beds or first in boxes and then transplanted when 10–12 cm high (*Figure 7.5 b, c, d*). The beds must have been previously prepared and the soil should be sufficiently soft. Planting should be as deep as

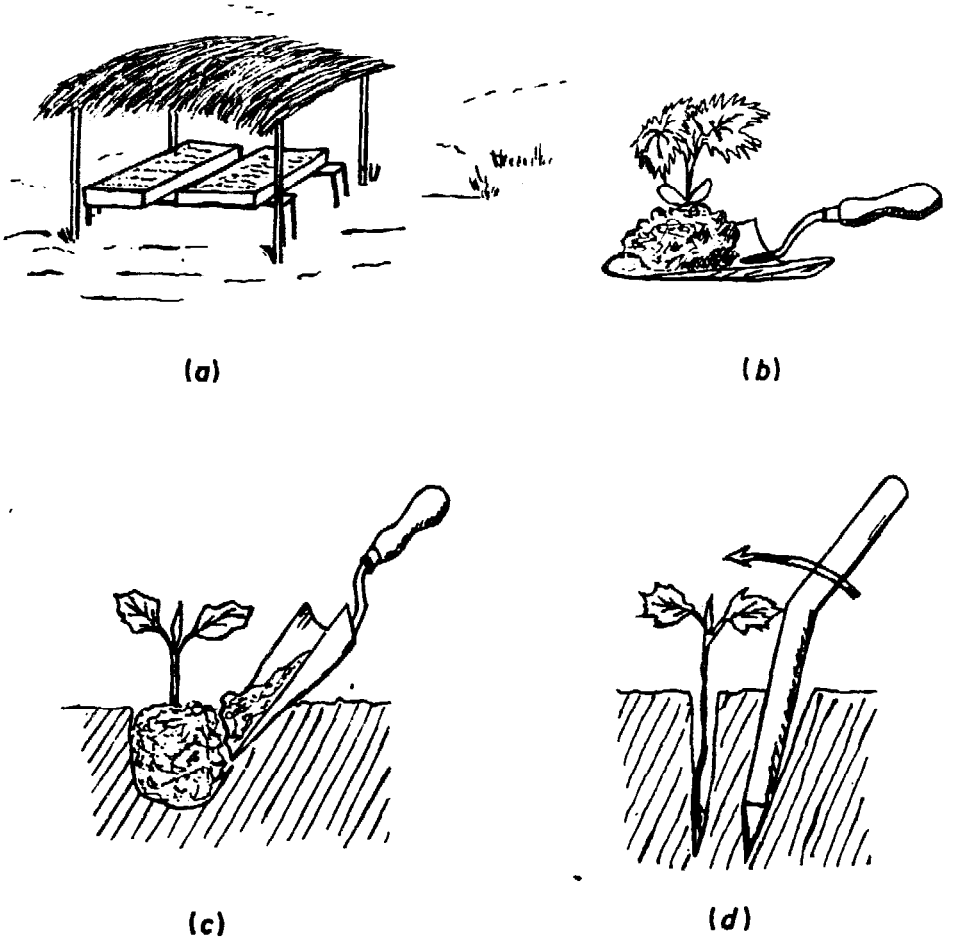

Figure 7.5 (a) Seed boxes with protective covering; (b), (c) and (d) transplanting to open ground

possible as this helps the roots to develop more quickly. To promote good growth the plants should be firmly embedded and well spaced out. When sowing directly into the vegetable beds the soil must be kept moist but not too wet. It may be necessary to cover the beds with netting or strips of old rag to prevent the birds from eating the sprouting seedlings.

Vegetables need a good deal of attention all the year round. They can easily be grown if water is available either from rainfall, a well, or a river. Very heavy rainfall will tend to wash away the young plants and night frost may damage them.

Rotation planting for the right crops at the right time needs some foresight. It is necessary to know how long the different plants take to be ready for harvesting; for instance, spinach and other green leaves take a shorter time to grow than cabbages and carrots, tomatoes give their fruits over a period of time, the length of time for the

plants to mature also depends on the temperature and moisture of the soil.

It is a good plan in tropical countries to sow different plants in small numbers at intervals during the year, depending on the weather and type of vegetable. It must be remembered that heavy rain can be very destructive to young plants while, during the dry season, daily watering is very necessary. To plant the same kind of vegetable on the same bed in succession must be avoided as too much of the same nutrient may be taken from the soil, it will also encourage the increase of unwanted insects and plant diseases.

Maintenance and watering

Plants, like animals and children, have to be tended and cared for throughout the period of growth. Weeding is necessary (*Figure 7.6*) since these may compete with the crops for soil nutrients, moisture and light. Certain plants, such as tomatoes, cucumbers and melons need pruning. Beans, peas and tomatoes need support during growth. All this has to be done at the right time and in the right manner otherwise the results will be disappointing.

Figure 7.6 Weeding and discussing progress of an onion patch

Watering at certain times of the year may have top priority or the plants will soon die when the sun beats down on them or a dry scorching wind prevails. The most profitable time to water the vegetable beds is in the evening just before sunset so that the precious water can penetrate to the roots. Watering on young plants needs to be done gently and evenly otherwise the plants may be damaged or washed away. A watering can with a rose spout is ideal but some women may not be able to buy such elaborate equipment in their own homes, therefore a simpler method can be adopted by using a pot or a calabas. This may take more time but the results can be equally rewarding. Waste water from the kitchen and bathroom should be used even when water is plentiful as this may encourage the mothers to do the same in their own home gardens. It must be stressed that waste water should be used for this purpose without delay and not left to stagnate in a container as this may promote mosquito breeding.

Harvesting

Vegetables should be picked when they are still tender but fully grown, because leaving them too long on the plants will make them coarse and difficult to cook and digest. On the other hand, picking too early is wasteful. The vegetable yield may well be greater than the needs of the household or the centre in which case the nearby hospital may be interested in buying the surplus, or market facilities may be present. To avoid waste it may be possible to preserve the surplus either by drying in the sun, as can be done with leaf vegetables, or preserve in salt as with runner beans. Fruits can be made into jams with the addition of sugar. In many communities the preservation of certain foods has been done traditionally, and this should be revived or encouraged as much as possible.

Fruits

Fruits are obtained from a variety of plants: (1) *from trees:* avocado, mango, papaya, oranges, lemons, peaches, etc.; (2) *from shrubs:* berries, mountain papaya, tree tomatoes, etc; (3) *from herbaceous plants:* bananas, pineapple, melons, strawberries, grenadilles, etc.

Many nutrition rehabilitation centres have started their gardens with the help and contributions from friends and well-wishers who have presented them with cuttings and seedlings, often with good

results. Buying young trees will cost money, which is often scarce, but this must be considered a good investment. Most trees have to grow for a number of years before they bear fruit, but little labour or attention is needed to maintain them, and an annual supply of fruit can be very rewarding. Expert knowledge, however, is required for pruning and protection against diseases. Before planting with fruit trees advice should be obtained from a local expert. One of the most rewarding variety of fruit trees is the papa-paya (paw-paw) which needs little attention and grows fast in a tropical climate; the fruit has a high vitamin C and A content and is very much liked by children.

Shrubs also grow fast provided they are planted in good soil with enough moisture; they give an annual supply of fruits and, apart from pruning, need little attention.

Herbaceous plants, such as bananas and pineapple, grow quite well but a period of about 18 months will elapse before the first yield of fruit is ripe and ready to be picked. Melons grow directly from seeds planted in warm moist surroundings; they grow particularly well near the compost where they will bear fruit within a few months. The grenadille is very suitable to climb up and over a fence; they can grow fast and prolific, need little attention, and can provide a constant supply of fruit rich in vitamins A and C.

Tools

The use and availability of garden tools very much depends on local conditions and tradition. The centre should have garden tools within the price range of the women (*Figure 7.7*). Certain tools imported from western countries may be too costly, too elaborate and unfamiliar. In many countries the women only use one tool with which to do all the digging, weeding and harvesting. A few easy-to-come-by tools may be introduced but only if they help to improve the gardening programme and save some of the energy of the often very hard-working women.

LIVESTOCK

The keeping of livestock adds to the responsibility and risks at the centre. Nevertheless, many centres have been successful with chickens, rabbits and sometimes even a fish pond. A few words of advice are given here, to be supplemented by the very useful booklets listed for

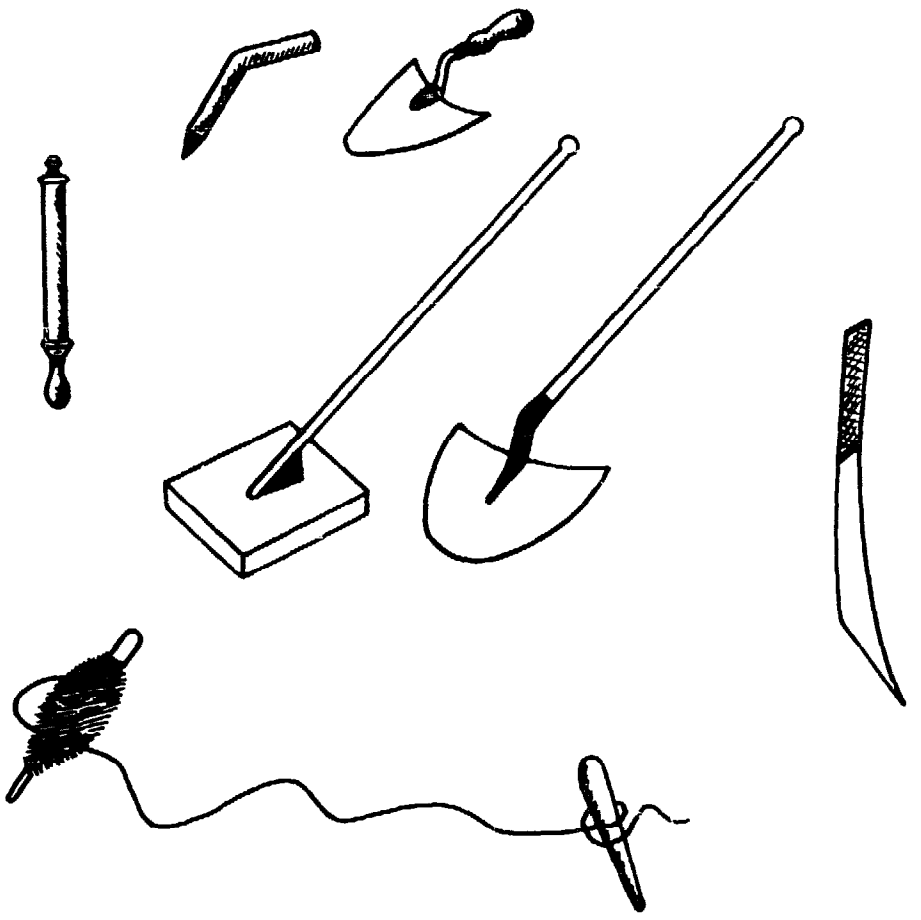

Figure 7.7 A few useful gardening tools, with the more common local one on the far right

further reading at the end of the chapter. Local livestock officers may be able to give further advice.

It is important to remember that when a vegetable garden is cultivated all livestock should be kept in cages or there will be little profit from the garden after the chickens, rabbits and goats have fed themselves on the young vegetables, even though it may be homely to have such animals roaming about to fend for themselves.

Chickens

When kept in a cage chickens will have to be fed and watered twice daily and kept on clean bedding consisting of straw or chaff (*Figures 7.8* and *7.9*). Good stock, although more costly, is more profitable than the surplus from the next door neighbour's breeding efforts.

Figure 7.8 Simple penned-in chicken house

Figure 7.9 Improved village chicken houses

The most economical time to buy chickens is when they are about to lay eggs. They will be more expensive at this stage but there will be less risk attached. Overcrowding should be avoided since chickens, like rats, have a protective instinct against over-population and usually destroy the weakest amongst themselves. Although more expensive, a good well balanced layers mash will pay dividends. The chicken who is fed on poor quality food will, in return, be disappointing in egg output. Water should be changed twice daily and must be clean and fresh if the chickens are to remain healthy.

Cleanliness is an absolute necessity as chickens are very prone to infection, and apart from immunizing them against the most prevalent diseases of the district, a clean cage will do much to protect them from disease. Frequent change of bedding is advised, the old bedding with the droppings being placed on the compost heap for garden fertilization.

Nests suitable for laying eggs must be easily accessible and lined with straw or chaff which must be changed frequently. Eggs should be collected daily or they may become cracked or broken by resitting. The length of the laying season is from 12 to 18 months with healthy stock. When egg production becomes less in spite of good feeding it is more economical to use the chickens as meat for the centre or to sell them. Book keeping is advisable to show the costs against the profit. It is a simple matter to assess the value of poultry keeping by making daily records of expenditure and yield.

Rabbits

Rabbits are easy to keep and can be very profitable as they are inclined to multiply quickly when starting with a healthy pair. The cage must be kept clean, and in a warm tropical climate it should be placed in a cool shaded corner of the garden.

Goats

Goats are rather more difficult to keep since they require a large grazing area. If not kept on a lead or inside a fence, goats will completely destroy the vegetable garden in a very short time.

Pigs

Pigs need good houses and regular balanced feeding. The slaughtering of pigs and goats is hardly in the line of work of the housemother who, on the other hand, may be able to kill and dress a chicken or rabbit quite skilfully.

Fish

Fish ponds are a comparatively new idea which has proved successful at some nutrition rehabilitation centres. Cheap fresh fish are a welcome addition to the menu at the centre, but a liberal water supply is needed to keep the pond clean and fresh. There is also a danger with young children who love to play near water and may therefore put themselves at risk.

SUMMARY

The foregoing sections are short and represent no more than general guidelines. Advice from the local agriculture department should be sought in all aspects of home produce and livestock keeping. Most countries now offer a special advisory service on home vegetable and fruit growing, sometimes through specially trained extension workers. Also, much useful and easy-to-follow literature has been prepared for home gardening under local conditions with advice on the right kinds of vegetables and fruits to be planted. At the end of this chapter will be found an extensive list of publications which are recommended for the appropriate countries and districts.

After leaving the centre most women will need further help to plan, lay out or improve their gardens. If the husband has been interested during his wife's stay at the centre he may be able to help, but even then further advice and help is often needed from the agriculture and water departments. If there is no land near or around the house help may be given to find a communal garden at a suitable place where some good soil and water is available.

At nutrition rehabilitation centres the digging and preparation of the vegetable beds is usually done by a man; sometimes a part-time gardener is employed. A well trained man may be able to work with the women and teach them while the work is being done. As has already been mentioned, the women should not be made to feel that the garden produce depends on their labour; their days are full with

many different kinds of work and learning as is shown in the section on education. Therefore, only a suitable time in the cool of the morning or late in the afternoon may be set aside for practical work and teaching in the garden. Some of the women may be familiar with gardening, but there is every possibility of their learning new methods and the use and value of different vegetables and fruits. It should be remembered that it is always difficult to break away from old traditions, especially so when they concern food growing and eating habits. Town dwellers without any gardening experience may not wish to take part, and a tactful approach may be necessary. However, when gardening is made interesting by good teaching, and the results are seen in the kitchen as well as in the garden, they may then become interested. In many cities small gardens have been developed near the houses providing just a little extra for the daily table and thus saving money on vegetables and fruits which are often expensive in city shops and markets.

FURTHER READING

The following references give several publications which contain general and world-wide information on the growing of vegetables and fruits in tropical regions, as well as animal husbandry.

West Africa

Navez, S. (1969). *Manuel du jardin scolaire en Afrique occidentale* (100 pp.). FAO Nutritional Studies, Rome; Food and Agriculture Organization of the United Nations

Tindall, H.D. and Say, F.A. (1965). *Fruits and Vegetables in West Africa* (260 pp). FAO Nutritional Studies, Rome; Food and Agriculture Organization of the United Nations

Tindall, H.D. (1962). *A Guide to Vegetable Growing in Sierra Leone* (pamphlet). Published by Prov. lit. bur. dept. agric. Njala, via Mano, Sierra Leone

Thitleton, G. (1957). *School Gardening in Nigeria* (127 pp). Published by Longmans; London, New York, Toronto, Calcutta, Bombay, Madras, Delhi, Hyderabad and Dacca

Education et Techniquec jardinage scolaire et Cote O'Ivoire. Published by UNICEF

Mamadou a Son Jardin Familial (picture only on p. 22). (1963). Haute Volta. Published by UNICEF

Central and East Africa

Hadfield, J. (1960). *Vegetable Gardening in Central Africa* (178 pp). Published by Purnell and Sons, Cape Town, South Africa

Shanks, I.F. (1964). *School Gardening and Agriculture* (158 pp). London; Oxford University Press. Printed in Kenya by The English Press Ltd., Reata Road, Nairobi, Kenya

McDonald. *A Guide to Vegetable Growing and Fruit.* Published by the Ministry of Agriculture, Lilongwe, Malawi

Williams, R.O. (1964). *School Gardening in the Tropics.* (143 pp). Published by Longmans, 48 Grosvenor Street, London, W1

India

Pamphlets:

Vegetable Growing in Kitchen Gardens (28 pp). *School Gardens* (16 pp). Published by Andhra Pradesh, Hyderabad. *Grow Your Own Vegetables* (30 pp). Published by the Ministry of Agriculture, Federation of Malaya

Raise a Kitchen Garden (14 pp). Published by the Ministry of Food and Agriculture, New Delhi

North East Asia

Grow Your Own Vegetables (22 pp). Published by the Department of Agriculture, Sarawak

The Samaka Guide to Home Side Farming (164 pp). Published by Samaka Service Centre, Manila

South America

Nossa Horta (242 pp). Published by Melhoramentos, Sao Paulo

UNICEF *Nuestra Huerta Escolar* (192 pp). Published by the Food and Agriculture Organization of the United Nations

Haga Su Nuerta (28 pp). Published by the Ministry of Agriculture, Ganaderia, San Jose, Costa Rica

Mondial

Terra, G.J.A. (1966). *Tropical Vegetables – vegetable growing in the tropics and sub-tropics, especially indigenous vegetables* (101 pp). Published by NOVIB, Royal Institute of the Tropics, Amsterdam

Broeky, d. A.P. *Basic Knowledge of Poultry Feeding and Making a Ration.* Published by Presbyterian Church Settlement, PO Box 270, Tamala, Ghana

References on fish ponds

Micha, J.C. and Frank, V. (1975). *Biologie des principales Especies*

utilisees en pisciculture Africaine. Symposium FAO/CPCA sur'L aguiculture en Afrique, Accra, Ghana Sem. Oct. 1975

Nion, H. (1974). *Technicas para la production de semillas en cultivo de peces en America Latin.* symposio FAO/CARPAS sobre acuiculture en America Latina, Montevideo, Nov.–Dec. 1974

Okun, A.B. (1975). *Community Waste Water Collection and Disposal* (287 pp). Published by World Health Organisation, Geneva

Pillai, T.G. (1962). *Fish Farming Methods in the Philippines, Indonesia and Hong-Kong.* FAO Fish biol. techn. Paper No. 18, Rome 53181–62

Vaas-Oven, A. (1957). *Experiments on Different Stocking Rates of the Common Carp in Nursing Ponds.* Proc. Indo-Pacific Fish Council, 7 (11) 13–34

References on rabbit keeping

Attfield, H.D. (1969). *Raising Rabbits.* Peace Corps Technotes

Kukowski, G. (1969). *Rapport Volontaires du Corps de la Paix*

Snyder, J.M. and Millar, R.I. *Profitable Rabbit Management.* Beacon Feeds

References on poultry keeping

Krusch, P. (1969). *Poultry Handbook for Africa.* Peace Corps Information Resources

de Pury, P. (1968). *Comment elever les poules.* Editions Cle', Yaounde

Thomann-Fry, C. (1965). *Rapport de la Reunion de la FAO sur la production avicole en Afrique au sud du Sahara.* tenue a Lagos, Nigeria

West Africa

Epenhuisen, C.W. (1974). *Growing Native Vegetables in Nigeria.* Rome, Food and Agriculture Organization of the United Nations.

8

Evaluation and Record Keeping

INTRODUCTION

To assess the value of a nutrition rehabilitation centre – its successes and failures – it is necessary to maintain an efficient record-keeping system. More evidence is also needed from around the world that nutrition rehabilitation is an effective method of dealing with the problem of malnutrition, especially if governments and aid agencies are to put their support and money into these projects. Information is needed on how cheaply such a centre can be run with the maximum effectiveness, how it is adapted to the local conditions and problems and what are the long term results of such a centre on the population especially on child mortality, growth and improved family health.

Evaluation need not involve complicated and expensive survey techniques. Simple methods of record keeping on day-to-day activities can be utilized to monitor the effects of the centre.

Two types of records should be kept; the first are individual records for patients or children which provide continuity of care and help to improve the quality of care for such individuals. A file on each family can be kept at the centre to register all information concerning nutrition, health and home conditions. The second set of records are those kept by the person in charge of the clinic or centre which provides information on the overall activities of the programme, and the means of evaluating these. It is the latter which we shall deal with in this chapter, with the design and methods to be used, so that reports can be easily compiled to illustrate how far the nutrition rehabilitation centre is achieving its objectives. The following is an outline of data which should be collected in order to assess the

effectiveness of a nutrition rehabilitation project. It includes base-line data before the project is started, on-going data on the project itself, long-term follow-up of children and final assessment after some years to judge its impact in the community. Some of the data required have been simplified, bearing in mind that most projects of this nature do not have the resources to devote to detailed in-depth evaluation.

INITIAL BASE-LINE INFORMATION

(1) Estimate of catchment area and population

Many institutions have problems in defining catchment areas. In some cases a large referral hospital is intended to serve the whole district. In practice, normally around 80 per cent of its patients come from the immediate surroundings. One of the easiest methods of defining the catchment area is to take a one-day census of the patients attending the out-patients' department (or the in-patients), to determine where they live. On this basis an area can be defined within which most of the patients live – an immediate area from where most of the patients come – and perhaps a more extensive one. For the purpose of establishing the need for a nutrition rehabilitation centre it is necessary to determine an area where it is planned to make the most impact, that is, to define an immediate area from where most patients are likely to come, although it will be assumed that a small number of patients are likely to come from outside such an area. The prerequisite for any community health programme is to define the area in which the programme is to operate, by so doing the project is assuming a responsibility for the health of the community living in that area, regardless of whether they present themselves at the health facility. It is the effect of the project on this community that must be assessed. For further information on catchment area the reader should refer to Chapters 2 and 3 of *Medical Care in Developing Countries,* by Dr. Maurice King.

(2) An estimate of the number of children under the age of 5 years in the area

(3) Mortality data (estimate, or from sample questioning)

A simple method of obtaining information on mortality is by collecting data from ante-natal records or hospital out-patient records

(if correctly kept). Random samples taken in villages or markets may be less reliable. It may be very time consuming to obtain the correct information from a group of women if their attention is drawn away, such as at markets.

(4) Nutrition data from hospital admissions (based on previous years)

(a) Number of cases where malnutrition (PEM) is the primary diagnoses in the percentage of total admissions aged under 5 years.
(b) Mortality as a percentage of total admissions aged under 5 years plus mortality from gastro-enteritis and/or measles.
(c) PEM as a primary diagnosis and/or as a secondary diagnosis (percentage of admissions/attendance below standard of weight/height, or weight for age) only possible where anthropometry has been recorded routinely on admission. Anthropometric assessments can be done by weighing all the children and plotting the weights directly on a weight chart, boys and girls separately. Unfortunately, this method involves calculating ages which may be difficult. An alternative is to measure height and weight and express weight as a percentage of height, comparing with recognized standards. When the majority of children attend the Under-Fives' Clinics in the area information can be obtained from the weight–growth charts.*
(d) Classification of PEM by age and type.
(e) Home background of cases to be admitted.

(5) Nutrition surveys

Any data from nutrition surveys if available (from nutritionists or home economists), or dietary history obtained from patients.

ON-GOING EVALUATION

This includes all record keeping at the nutrition rehabilitation centre. Some records have to be kept daily, others monthly, but all are finally compiled in 6-monthly or yearly records.

(1) Number of admissions/registrations (age and malnutrition classification breakdown).

*Overlays for this are available from TALC, Institute of Child Health, 30 Guilford Street, London, WC1N 1EH

(2) Average length of stay/attendance.
(3) Outcome.
(4) Assessment of the mother's knowledge (by completing a questionnaire or by testing on admission and discharge), for example, knowledge of weaning and balanced meals.

The above can be compiled in tabular form as a monthly, quarterly or half-yearly report in the following manner.

It is suggested that a large Admission Book be kept at the centre. On the left-hand side columns are drawn with headings concerning condition on admission and during the stay at the centre. On the right-hand side discharge information, dates, weights and the degree of the mother's knowledge on leaving the centre are recorded. *A number* is given to all children on admission identical to that recorded on the personal file. *At the end of each month* it is a simple matter to count all 'child days' and 'mother days'. Details of those who have not completed the treatment are carried on to the next month. *Weight gain* or loss are entered as well as the child's condition on discharge, also a date for the first follow-up home visit. *Knowledge gained by the mother* can be assessed by the amount of interest shown by her, and by questioning her on the subjects which have been taught during her stay. Results should be marked by +, ++ or +++ accordingly. *Condition on discharge* is one of the most important criteria for on-going evaluation of the centre and is of particular importance to long-term evaluation (*see* below).

The criteria for satisfactory weight gain should be measured as a rate (the slope on the line of the weight chart) (*Figure 8.1*). This should be greater than the normal rate for a child of similar age. For example, if a child is discharged from the centre after 3 or 4 weeks the line on his chart from his admission weight should be steeper than the line of the standard at the same age over the same period. This can be measured by using a transparency showing the normal curves over the child's own chart and comparing the curves, or it can be calculated from the tables showing average rates of weight gains at different ages. During his stay at the centre the rate may have been steeper, settling down to a more steady weight gain after returning home. This would be the best indication of good results or failures after treatment at the centre.

In the column headed *other outcome* of the Admission Book should be entered such details as referral to hospital, death, departure from the centre before treatment is completed, those who discharge themselves for various reasons, any other outcome other than normal discharge, or any additional information considered to be important (*Table 8.1*).

ON-GOING EVALUATION
SEPTEMBER, 1975

No.	Date of admission	Name	Age	Address	Weight (kg)	Class of PEM	Internal disease	Date of discharge	No. of days	Weight gain-loss (g)	Condition on discharge	Mother's knowledge	Date of prev. HV	Remarks
62	1/9	Mary D/O Nathan	$1^{8}/_{12}$	Marabu Village, Plot 5	8.250	A	Diarrhoea	21/9	20	200	Improved	+	1.11.75	Poor home conditions
63	1/9	Tommy S/O Nathan	$2^{2}/_{12}$	Marabu Village, Plot 5	10.5	D		21/9	20	750	Good	++	1.11.75	Small garden
64	4/9	Peter S/O Andrew	3 yr	Kerio Village, Plot 2	13.5	A		21/9	17	500	Satisfactory	+	1.11.75	Needs help with home garden
65	4/9	Annie D/O Samuel	4 yr	Adato Village, Plot 6	10.0	C	Cough	28/9	24	750	Good	-	8.11.75	Widow, 5 children, needs further help
66	15/9*	Eddy S/O Agato	3 yr	Ketate Village, Plot 3	8.0	C	Diarrhoea		15					Father absent, needs advice
67	18/9*	Ruth D/O Agato	1½ yr	Ketate Village, Plot 3	8.5	A			12					Father absent, needs advice
	6 children and 4 mothers admitted							Total = 108 child days						

OCTOBER, 1975

66	15/9*	Eddy S/O Agato	3 yr	Ketate Village, Plot 3	8.0	C		8/10	8	700	Good	++	15.11.75	
67	18/9*	Ruth D/O Agato	1½ yr	Ketate Village, Plot 3	8.5	A		8/10	10	500	Good	++	15.11.75	
68	1/10	Mary	2 yr	Lutate Village, Plot 12	7.0	D		20/10	20	500	Improved	–	28.11.75	Widow, very poor, needs help
69	2/10	Peter	$1^{2}/_{12}$	Adale Village, Plot 6	8.7	B		21/10	20	250	Improved	+	28.11.75	Mother keeps market stall, instruct grand-mother
	2 children and 2 mothers admitted							Total = 58 child days						

*Carried on from September to October

Mother's knowledge: Not interested –, Interested +, Very Interested ++

TABLE 8.1

Total admitted = 144	*No.*	*% of total admitted*
Children discharged with rate of weight gain greater than average for age	78	61
Childrens' weight gain equal to average for age	40	22
Children with less than average for age gain	5	3
Died	3	2
Transferred to hospital	8	5
Absconded before treatment completed	4	3
Still under treatment	6	4
Total	144	100%

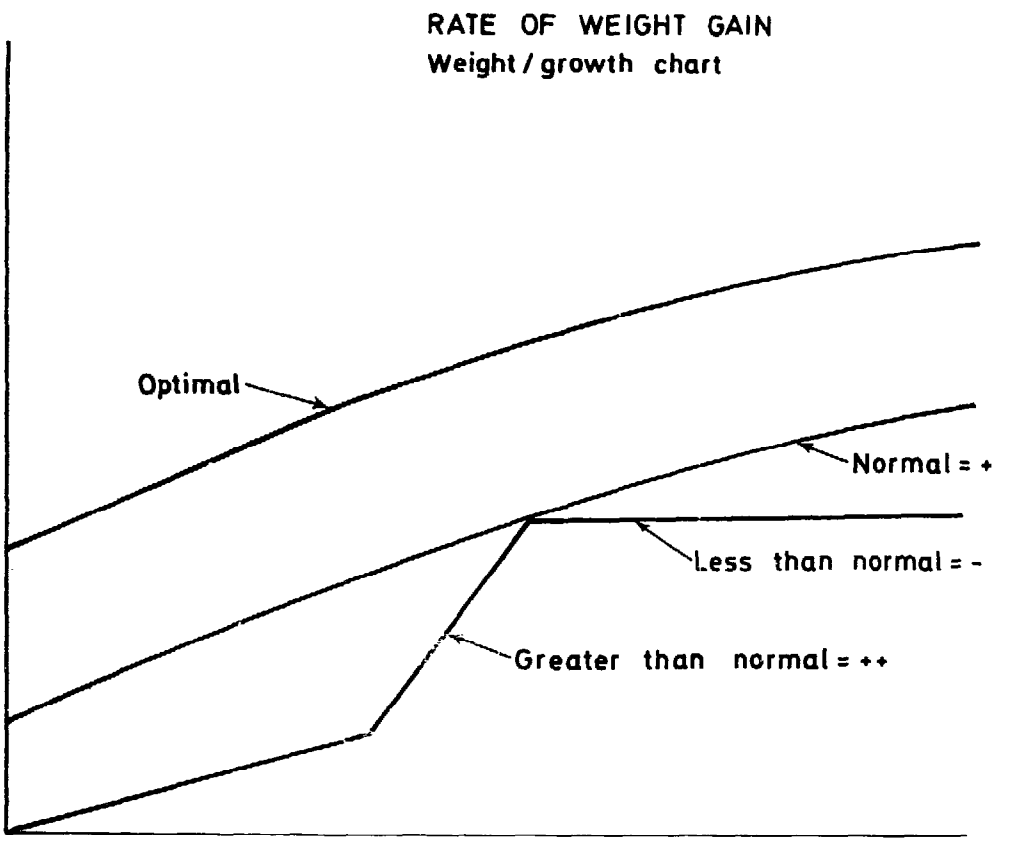

Figure 8.1

LONG-TERM EVALUATION (6 OR 12 MONTHS AFTER DISCHARGE)

The following information is relevant to the long-term evaluation of a centre.

(1) The total number of children discharged from the centre during a period of 6 to 12 months or 1–2 years (specify time period).

(2) The number of children followed up in a clinic (percentage of total.

(3) The number of home visits made following discharge (average per child).

(4) The total number of children contacted (percentage of target group).

(5) The number of children showing weight gains equal to, or greater than, that expected for age (percentage of total contacted).

(6) The number that died (percentage of total contacted).

(7) The number showing weight gains less than expected for age (percentage of total).

(8) The number admitted to nutrition rehabilitation centre.

(9) Other long-term outcomes, for example, episodes of illness.

(10) The number of families with improved kitchens, latrines, facilities for boiling water, regular meals, etc., or whatever is appropriate to what was taught at the centre.

(11) The condition of other siblings in the family.

Methods of obtaining data for long-term evaluation

On discharge from the centre the child's weight chart should be marked with an asterisk or a coloured sticker so that the health worker in the Under-Fives' Clinic can recognize the child when he attends the clinic for follow-up. If the health worker sees the child at the clinic he should make an entry in the home visiting book or follow-up book regarding the child's progress.

The home visiting book (or follow-up book)

On discharge from the nutrition rehabilitation centre the child's particulars are also entered in the home visiting book as follows: admission number, name and address, discharge weight. These are entered in the left hand side of the book which is used for follow-up records (*see* below).

LONG-TERM EVALUATION (6 OR 12 MONTHS AFTER DISCHARGE)

FOLLOW-UP BOOK
(Left-hand side)

Admission number	*Name*	*Address*	*Date of discharge from NRC*	*Weight on discharge*	*Siblings and/ or pregnancy*
21	Mary X	Plot 6, Door 25, Mania	22.4.76	7.5 kg	S (2) P

For the 'siblings' or 'mother pregnant' column use the key letters P for pregnant and S for siblings under the age of 5 years. For the right-hand side of the book at least two lines should be kept for each child. This should be divided into double columns, one for the date and the other for recording progress and whether it was a clinic or home visit when the observation was made. 'Progress' should record the rate of weight gain since last seen, whether equal to or greater than normal for age by (+) or less than normal by (–). The abbreviations Cl or Ho can be used to denote whether the observation was made at a home visit or at the clinic.

FOLLOW-UP BOOK
(Right-hand side)
Clinic and/or home visit

Date	*Progress*	*Date*	*Progress*	*Date*	*Progress*	*Date*	*Progress*
3.6.76	+ (Cl)	10.8.76	– (Ho)	4.9.76	+ (Ho)	5.10.76	+ (Cl)

Any other outcome as a result of visiting, such as death, or moved from area, etc., can also be entered against the date, for example, 15.12.76 died or 12.3.76 readmitted to centre.

From this home visiting book the data required for ongoing evaluation (1–9 above) can be summarized for the 6-monthly or annual report. This will give the percentage of discharged children who were followed up in the clinic and the number of home visits, also the numbers of children doing well or badly nutritionally.

It is advisable to leave the home visiting book at the centre and use a small note book when going out in the district visiting, as the loss of such a book would be rather disastrous. Data can be entered in the note book and transferred to the home visiting book on returning from such visits. Compilation of the report at the end of a set period of time becomes simple and quick.

Information on home conditions from home-based records can also be recorded to supply data for a 3–5 year overall assessment, which should indicate the impact made by the centre on the community as a whole. Optimal morbidity (PEM incidence) can be collected annually.

Repeat data similar to base-line information as follows.

(1) It is difficult to find comparative data for mortality unless vital statistics were collected during the interim period. Retrospective questioning of mothers might show changes after a 5-year interval.

(2) The number of PEM admissions to hospital (percentage of total admissions) classifiable by age and type.

(3) Sample surveys.

(4) The percentage of admissions to the centre after its first year of operation which were: (a) re-admitted, or (b) were siblings of previous patients.

This information will be obtainable from the admission book at the centre.

FURTHER READING

Latham, M.C. (1972). *Planning and Evaluation of Applied Nutrition Programmes.* Rome; FAO

Beghin, I.D. and Viteri, F.A. (1973). 'Nutrition rehabilitation centres: an evaluation of their performance.' *J. trop. Pediat.*, **19**, 404

Beaudry-Darisme' M. and Latham, M.C. (1972). 'Nutrition rehabilitation centres, an evaluation of their performance.' PAG. **11** (2), 36

Cutting, W.A.M. (1972). 'Nutrition rehabilitation reunions.' *J. trop. Pediat.*, **18**, 296

Yanhauer, A. (1975). 'An evaluation of nutrition classes for mothers in a pediatric clinic setting.' *Envir. Chld. Hlth.*, April 1975

Webb, Fougere and Papillon. (1975). 'Evaluation of education benefits of nutrition rehabilitation centres as measured by the nutritional status of siblings.' *Envir. Chld. Hlth* February 1975

9

Guidelines for Carrying Out a Nutrition Survey

A nutrition survey of a community will serve to define the extent and causes of the problem, to pinpoint groups in most urgent need, and to show the appropriate methods of control. Although preliminary nutritional assessment of all age-groups within the community may be the ideal, surveys are commonly limited to children under the age of 5 years because of their especial vulnerability to malnutrition. Since malnutrition tends to be widespread in communities it is necessary to carry out a sample survey with detailed examination of all young children in the sample.

The essentials of one kind of simple, quick and inexpensive nutrition survey may be considered under five headings: (1) the sample; (2) the record form; (3) execution of the survey; (4) the analysis; and (5) the action.

THE SAMPLE

The object of a survey is to obtain information on a population by examining a part of it. In order to ensure that the part examined is representative of the area as a whole special methods must be used in selecting the sample to exclude as far as possible the possibility of a bias. For this reason the area selected should be reasonably uniform in ecology and level of development, etc. If the area contains widely different population groups, such as those living in towns as well as in rural areas, or different racial groups living very differently, then the sample has to be very much larger, and different techniques are employed to ensure that all the groups are represented in the sample.

The next question is how large the sample should be. As a general rule, if the area is homogenous (similar in ecology, etc.) and where the expected incidence of malnutrition is high, a good-sized sample should be around 500 children. Probably the most practical method to use is cluster sampling (so-called because the individuals in the sample are clustered in one place). It should be arranged so that as far as possible each cluster is sufficient to provide one day's work – depending on the number of staff and the amount of information to be collected, but probably around 50–100 children. In most cases, people living in villages which constitute ready-made clusters. However, these villages may be too small, in which case several nearby ones may be added together to make up one cluster. Or they may be too large, in which case they may be broken down into two or more clusters, using natural boundary lines such as streams to divide them. Each cluster should be approximately the same size. There are several different ways of cluster sampling but the following methods are suggested as being relatively easy to carry out, with limited staff and time.

Define the area to be examined, preferably all parts of similar ecology. This will normally be an administrative area such as a district, sub-district or chief's area and the population will probably be known from census data, or at least from official estimates. It is preferable to select a small rather than a large area (by population) so that the number of children in the sample will not be less than 10 per cent of the total 'under five' children in the area.

Exclude atypical areas, such as towns or labour lines, etc.

Subdivide the area into smaller units such as villages, or areas containing approximately 400–600 people (that is, to provide one day's work if *all* children in the cluster are examined. If staff is limited and less children can be seen at one time, then the size of the cluster should be smaller. In this case more clusters will have to be selected to make up the total numbers to 500 children. Number the villages, clusters or sub-divisions.

Identify the clusters or villages to be examined. select the required number to make up the total target of 500 using random number tables.

Check briefly that the selected clusters do not differ in any significant or obvious way from the other areas.

Identify all the children under the age of 5 years in the clusters or villages chosen and try to ensure that they all attend on the day specified for the examination. This will mean several visits to the village to explain what is required and to enlist the help and support from village chiefs and elders, stressing the importance of the need

for all the children to be present. It is important to know how many are expected to attend so that the actual attendance can be compared with the expected attendance. If less than 80 per cent attend, the sample will not be representative. An attendance of 100 per cent should be the target for the chosen villages, and those who do not attend should be followed up, or at least the reason for non-attendance identified. If, for example, some mothers do not attend because they have gone to the market, this introduces a bias because they may represent the more affluent mothers whose children may be nutritionally better off.

THE RECORD FORM

An individual record form will be completed for each child included in the survey. This will comprise a number of sections, according to the particular requirements of the survey.

(a) *Personal identity*, including name, age, sex, father's and mother's names, address and relationship to the head of the household are usually required in any survey. Additional information such as the father's occupation or the mother's education level may sometimes be relevant. The date of completion of the record and the interviewer's identity must also be recorded.

(b) Mortality data (*see* explanatory note on page 113 of Chapter 8).

(c) *Anthropometric data* may include the weight, height, arm circumference, head circumference and number of erupted teeth. Techniques for obtaining these measurements must be standardized.

(d) *Clinical signs* of protein energy malnutrition.

(e) *Food intake* for the previous day may be elicited by questioning the person who fed the child (questioning other informants is liable to error and should be avoided). Each item of food must be described in terms of its basic ingredient, for example, whole maize, wheat flour, dried skimmed milk, and the method of cooking. In addition, the method of feeding, the reason for someone other than the mother feeding the child, and the number of breastfeeds may be recorded.

(f) *Other diseases.* Since infection and malnutrition are interdependent some information about the child's medical history may be recorded. The temptation to record too much information must be avoided and a single question on the child's health on the previous day may be sufficient.

EXECUTION OF THE SURVEY

On the day selected for a particular cluster, after preparation of the community, the 'line of flow' method should be used which is similar to the way an Under-Fives' Clinic would be organized. This allows examination of large numbers with a minimum of delay (that is, no going from house to house to search out families). As stressed earlier under the sampling technique, *all* children in the village must be examined on this day.

Each child progresses in sequence via a series of stations, from registration and questioning, to weighing and other anthropometric examinations, to clinical examination and whatever other examinations are proposed, depending on the number of staff available and the information required.

An important point to mention is the need to ensure accuracy in getting dates of birth. It is worth while putting a very experienced person on the registration and questioning station who knows the area well and who can use local events, and agricultural and climatic cycles or historical events to jog mothers' memories of when births occurred. As with the use of the weight chart, do not try to ask for ages of children, no-one will know this. Try to find out dates of birth (approximately to the nearest month) which can be elicited without too much difficulty with careful and patient questioning. If the ages obtained in the survey are not reliable it will not be possible to use weight for age as a criteria for malnutrition.

The last station should be the collection of the survey forms making sure that all numbers are present sequentially and that no mothers have strayed from the line of flow. This last station could be combined with the administration of medicines to any children found to be ill. The opportunity of the survey could also be used for mass immunization provided enough staff were available. However, it can sometimes be a mistake to try to combine too many activities in a survey of this nature and it must be borne in mind that this is only a sample and immunization would also need to be organized in the other villages.

A member of the survey team may have to return to each cluster sample on a day following the survey, perhaps to examine children who were temporarily absent, or to ensure that those identified as being severely malnourished receive medical care.

THE ANALYSIS

The following examples illustrate the types of analysis which can be made.

(a) Prevalence of severe protein – energy malnutrition (defined by reference to an accepted classification) by age-group in each cluster and in the total sample. Prevalence of individual signs of malnutrition.

(b) Distribution of anthropometric measurements by age-group, expressed as appropriate summarizing indices, for example, mean. Relation of these distributions to national standards or other known standards. The most commonly used are the Harvard Standards of weight for height or weight for age (found in the WHO monograph No. 53 'Assessment of Nutritional Status of the Community', by D. B. Jelliffe). Both *(a)* and *(b)* above could be combined in a simplified way and tabulated in the same format as suggested for the hospital admission data on page 114 of Chapter 8.

A method of carrying out the survey which simplifies the analysis still further is to plot all the childrens' weights directly on to a Morley weight chart for boys and girls separately for each village cluster, either at the time of the survey or later from the forms. This is, in fact, a weight for age analysis. Using plastic overlays obtainable from the Institute of Child Health, in London, the number of dots in different standard categories can be counted and expressed as a percentage of each age-group and of the total.

(c) Food intake in each age-group may be quantified by the number of different items of food recorded as being taken on the previous day. The children may be divided into two groups: those with normal anthropometric indices, and those with impaired development whose indices fall more than a certain percentage below the standard. A comparison is then made between the two groups in terms of the average number of times different foods are taken, the frequency of bottle feeding, the age of weaning, and the frequency of feeding by persons other than the mother.

(d) The frequency and severity of diseases such as measles and gastro-enteritis in normal children may be compared with that in children with impaired development.

It is most important that the results of the survey are fed back to chiefs, political and other leaders of the villages as malnutrition is basically a socio-economic problem to be overcome by the community.

THE ACTION

Whatever action is taken as a result of the survey it should be evaluated. As part of this evaluation further cluster samples may be surveyed, or the same cluster re-surveyed, to determine what changes in the nutritional status of the community have been effected by the action taken.

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