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INTRODUCTION

This manual is intended to assist those involved in the planning, implementation, and supervision of Supplementary Feeding Programs (SFPs) in refugee camps. While the primary aim of SFPs is to provide additional food to individuals who are malnourished, SFPs can also be used to monitor and reinforce essential health services. In general, this nutrition-centered approach can be used in any situation where people live in camps or dense settlements and are supplied wholly or in large part by relief agencies.

Drawing on current knowledge of nutrition, health, and program planning, the manual is divided into 11 lessons which examine different aspects of operating an SFP. Part One describes different types of feeding programs before focusing on the role of SFPs. Part Two examines the role of nutrition by analyzing the function and sources of nutrition and the problems associated with special foods. Part Three explores the causes of malnutrition, techniques for diagnosis and measurement, and the treatment and prevention of diseases. Part Four presents various issues around program planning, implementation, and evaluation of SFPs. Part Five presents a summary of these lessons in the form of guidelines for organizing an SFP as a nutrition-centered health program. These lessons are followed by extensive apprendices which provide essential information for implementing the approaches developed in this manual. For example, the appendices contain reference charts, for interpreting indicators of malnutrition, describe sampling techniques, present survey forms for assessing the nutrition and health conditions in a refugee camp, and even include specific menus for serving different foods through an SFP. Extensive use is made of cross-referencing throughout the manual to avoid unnecessary redundancy.

The manual is written as an "action guide" providing check-lists and emphasizing techniques and procedures designed to prepare the reader to operate an SFP. Our primary concern is not how to treat an individual under ideal conditions but how to efficiently operate an effective SFP that meets the health and nutrition needs of the greatest number of people in the less than ideal conditions which exist in many refugee camps.

Acknowledgements

This manual was developed by combining portions of three excellent references. They include:

- The Management of Nutritional Emergencies in Large Populations, by C. de Ville de Goyet, J. Seaman, and U. Geijet, World Health Organization, Geneva, 1978.
- A Guide to Emergency Feeding, by Sue Peel, OXFAM, Oxford, 1983 (Revised).
- Manual on Management of Group Feeding Programmes, FAO Food and Nutrition Paper, Food and Agriculture Organization of the United Nations, Rome, 1981.

Other references are noted in the text.

The editing of the text was carried out by staff members of INTERTECT with guidance from Don Allega, M.D., and Phillip Nieberg of the Center For Disease Control. The text was reviewed by a panel of experts including:

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Definitions

Management definitions

Assessment is the first essential step in good management. It requires collection, analysis and appraisal of selected information on food, nutrition and related matters (p __).

Baseline data is the information collected and analyzed during the assessment of the existing situation. It tells us what the situation is before an SFP begins and is used as the basis for formulating objectives and plans and in evaluation (p __).

General objectives are achievements to be reached at the end of the SFP (p __).

Specific objectives are statements about targets to be reached through particular activities of the SFP (p __).

Indicators are tools for measuring change during the implementation of a program (p __).

Monitoring is one part of a supervisor's responsibilities. It involves the continuous control of activities throughout the program's duration (p __).

Evaluation is the systematic process of collecting and analyzing data pertinent to the planning and execution of a program and especially, to the measurement of its progress, results and side effects. The judgement about whether a program is successful or not is reached by comparing information collected as baseline data with the same data collected at subsequent stages of the program (p __).

Participant. An individual selected to receive food rations and to participate in SFP activities.

Screening is the process of body measurement to identify individuals needing nutritional or health assistance.

Surveillance is the repeated and constant monitoring of nutritional status and health.

Food and nutrition terminology

Anemia is the condition when the red blood cells contain less than normal amounts of haemoglobin (red blood pigment).

Food acceptablility. The attitude of people towards foods with special reference to palatablity, ease of preparation and conformity with existing food habits and patterns.

Food delivery system. The organization of food distribution in a controlled manner from the place of supplies to the participants (p __).

Food habits. The ways in which an individual or group selects foods and consumes them in response to physiological, psychological, cultural and social infuences.

Food handling. The sum of processes and treatment to which food is subjected from its production until its final consumption.

Food patterns. The broad picture of the foods consumed by a given community.

Food supply. Foods available to a population group from all sources.

Group feeding. The feeding of selected groups of the population over a specified period of time.

Kwashiorkor. A severe disease of young children, caused by chronic deficiency of protein and calories in the diet and characterized by stunted growth, edema, and a protuberant belly.

Malnutrition. A pathological state resulting from a deficiency in the diet ofone or more essential nutrients.

Marasmus. Severe wasting away of fat and muscle.

Edema. An abnormal accumulation of fluid in cells, tissues, or cavities of the body, resulting in swelling.

Protein energy malnutrition. A range of pathological conditions arising from a lack of enegy and protein which occurs most frequently in young children and which is commonly associated with infections (p __).

Staple food. A food which is regularly consumed in a country or community and from which a substantial

proportion of the total energy supply is obtained (p __).

Supplementary food. A food added to the diet to make up for a deficiency in energy and/or other nutrients.

Xerophthalmia is the term used to describe the clinical signs in the eye caused by vitamin A deficiency.

PART 1:

LESSON 1

TYPES OF FEEDING PROGRAMS

Supplementary feeding (in refugee operations) means the feeding of selected, high risk groups of the population during times when food supplies are minimal. During these times there is a chance that certain segments of the population, called "vulnerable groups", will be more affected by food shortages than others. The absence of necessary nutrients at certain critical stages in a person s life can have significant and irreversible consequences in the future. Vulnerable groups include children under five years of age, pregnant and lactating women, the elderly and certain other high risk groups. An analysis of the condition of these people is important because:

- Their needs for food and nutrition are higher than for other groups in the displaced or refugee population.

- They are less able to provide for themselves -- young children are dependent upon their mothers in order to survive and women with dependent children are less able to leave the home to work.

- Deaths and illnesses affect these groups first; thus, their health and nutrition status is considered to be a reliable indicator and an "early warning" of problems affecting the entire population.

- Not only are young children at risk from disease, they are unfortunately subject to cruel decisions that must be made by their families for survival. In a society where families are large and fertility rates are high, parents are often forced to make decisions regarding survivability. In refugee situations, families preferentially support working-age males and children who have reached five years of age. After age five, children's chances of survival are statistically much greater, and they can begin to share in productive family activities such as taking care of younger children and participating in the family's efforts to obtain a livelihood

Supplemental Feeding Programs (SFPs) are one of the three principal feeding programs carried out in refugee operations. The other two are general ration (or "food

basket") feeding programs which distribute bulk rations to the entire population in a refugee camp or therapeutic (sometimes called intensive) feeding programs which target the most severely malnourished refugees.

General feeding (of the whole family) provides a certain level of rations to the whole family based on the number and ages of family members. Ideally, the food basket should provide approximately 2350 kilocalories* or kcal/day of rations for each individual but this can be reduced to 1500-1800 kcal/day if relief feeding is for a limited period only. Where families can provide some staple foods for themselves or when the program is being phased out, "reduced" rations of around 1000 kcal/day can be given. (see _____ for simple methods of calculating family rations).

Therapeutic feeding may be required by severely malnourished persons, usually small children, who comprise up to ten percent of under-five children. This can take place at supervised day-care or residential rehabilitation centers or in a hospital.

Cases of severe protein, energy malnutrition (PEM) require 150-200 kcal and 2-3 g protein/kg body weight/day. In practice, 1 1/2 liters of a formula (containing 900 kcal

* Energy values are expressed in kilocalories also referred to as the thermochemical kilocalorie ($kcal_{th}$).

and 20 g good quality protein per liter) given in 5 feeds over the day, will be suitable for most small children. Additional iron and vitamins (especially vitamin A) are also needed.

Supplementary feeding

Supplementary rations are often needed to provide an extra high energy, high protein meal to those most vulnerable to malnutrition. This will include children 6 months - 5 years old (especially those aged 1-3 years), pregnant and lactating women, some medical cases and some old people. These groups may account for 40% of the population.

In the emergency, the supplementary food is given as an extra meal eaten "on-the-spot" to make sure it is consumed by the recipient. This meal should not replace any of the regular family meals.

Food supplying an extra 600 kilocalories and 20 g protein (p.__) are usually sufficient to cover most of the nutrients lacking in the diets of both mother and child participants. A vitamin A-rich food should be included in some areas. (Simple rations are given in Appendix 7.)

The recommended period of feeding for each type of participant is:

- children aged 6 months to 5 years, until weight remains in "normal" range for at least 2 months (e.g. is above 80% of reference weight-for-age or weight-for-height)

- pregnant women, last half of pregnancy

- lactating mothers, first 6 months of lactation

The purpose, or general objective, of an SFP depends on the particular nutrition, or nutrition-related, problems in the area. It is usually one (or more) of the following:

- to improve the nutritional status of the participants(i.e. those individuals selected to receive food and to participate in program activities);

- to rehabilitate undernourished children and women among the refugees;

- to <u>prevent</u> hunger and famine during and after the emergency, or during resettlement schemes;

- to provide a "safety net" for vulnerable groups when normal rations/supplies are irregular;

- to act as a "vehicle" or "tool" for nutrition education;

- to conduct surveillance of the nutrition and health needs of the entire refugee population by monitoring the conditions of its most vulnerable members.

Several developing countries have national food and nutrition policies which set out objectives, priorities and budgets for nutrition intervention programs. Where these exist it is important that the objectives of the SFP are in line with the overall policy and that SFP staff understand the aim of the policy and how their efforts may help achieve this aim.

B. Types of food used

The types of food selected for an SFP depend on:

- availability
- cost
- nutritional needs of participants (see Appendix 7 for recommended intakes of nutrients)

- food habits of participants
- acceptability by participants
- food logistics/distribution system
- facilities and equipment for food handling, preparation and cooking.

There are two main sources of food:

1. Locally available foods

All fresh foods such as vegetables, fruits, meat, fish, eggs and dairy produce should be bought locally with funds from local, national or international sources. Mothers and volunteers may help with the marketing. Occasionally some free food may be available from refugee gardens. (Appendix 8 gives the nutritive value of some common local foods.)

Local foods should be used as much as possible because:

- they are more economical;
- there are fewer problems with acceptability;
- participants are more likely to use "improved" recipes at home;
- local food production may be stimulated.

2. Donated foods (food aid)

Donated foods usually come from a foreign country or through an international organization such as the World Food Program (WFP), UNICEF and USAID. Some may be donated by local or national agencies. Funds must be available for the transportation, storage and distribution of these foods within the country.

Appendix 9 gives a list of WFP donated foods together with their nutritive values.

As far as possible the donated foods used should be similar to local foods or suitable for inclusion in local dishes. If they are unfamiliar, recipes must be devised using local cooking methods. Basic recipes for some WFP foods are given in Appendix 19.

Whenever possible donated foods should be supplemented with local foods. Appendix 5 shows the maximum quantities of donated foods recommended for supplementary feeding programs.

If donated food proves unacceptable this should be reported through the proper channels. Food donating agencies need this information in order to send the most suitable foods to each country. Acceptability tests should

be carried out before commodities are shipped whenever possible. (Techniques for increasing the acceptability of new foods in specific cultures should be considered.)

Any SFP using donated foods should know the length of time they will be available and how and when they will be phased out.

Table 1-A

Problems associated with some donated foods

- Blended foods such as wheat soy blend (WSB) and corn soy milk (CSM) may not be liked. The addition of sugar to the recipe may overcome this problem.

- Soy fortified cereals may have to be cooked differently from regular cereals so suitable recipes must be devised and instructions for their preparation provided.

- Dried egg should be used within a day of opening the can as dangerous germs multiply very quickly in it.

- Reconstituted dried milks go "bad" quickly in warm climates and should be used within a few hours. As contaminated, unboiled water might be used to reconstitute these milks in the home, it is advisable to show mothers how they can mix the milk powder directly into gruels, or bananas or into foods that will be cooked (p.__).

- Dried milk should not be distributed if it is likely to replace breast feeding. Any dried skim milk that is used for feeding young children, especially malnourished children, must be fortified with Vitamin A. Otherwise vitamin A deficiency and blindness may occur (p.__).

C. Methods for food distribution

The two usual methods of SFP food distribution are:

1. On-the-spot feeding of prepared meals
2. Take-home distribution

1. On-the-spot distribution. This is the most common method and is usually set up during the initial stages of the emergency. The method is the most successful in rehabilitating and maintaining the malnourished among the vulnerable groups. It requires setting up a feeding center (see page ___) and maintaining a small staff, many of whom can be refugees, to operate the program. The food is prepared and eaten by participants in a feeding center.

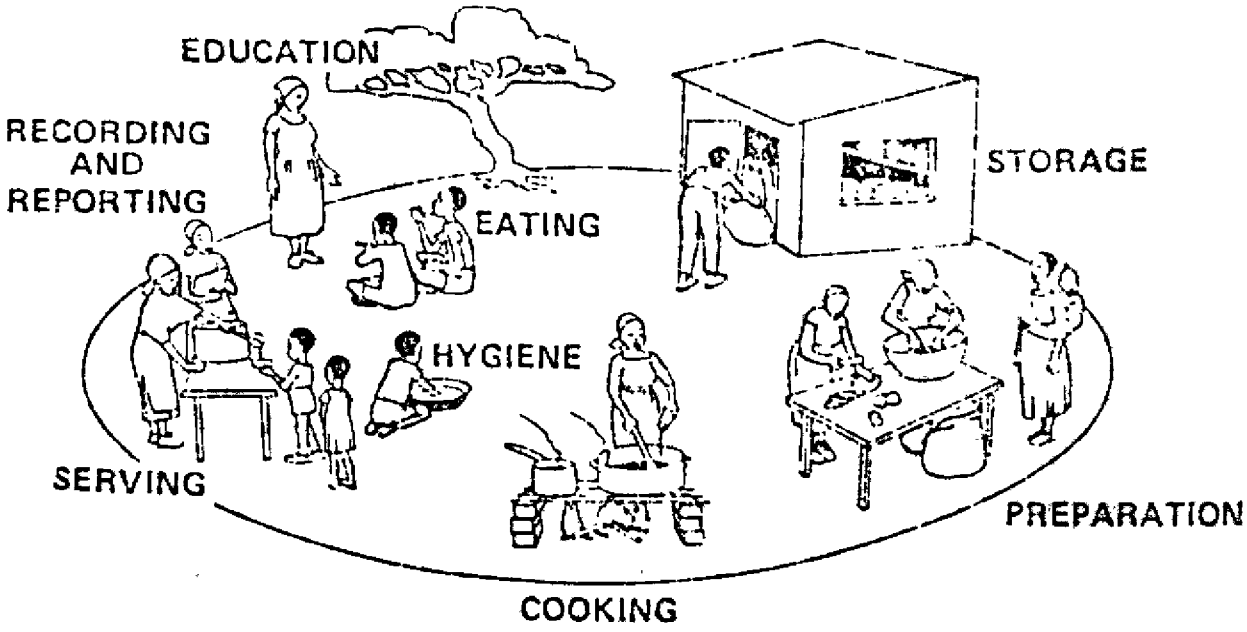
Food Distribution. Daily on-the-spot feeding is preferred since it ensures the direct consumption of food by the selected participants. However, mothers may live too far away, or find it too difficult to carry a heavy toddler to the center or there may be insufficient resources for this to be practical.

The main operations are (figure 1-1):

- transport
- storage
- preparation
- cooking
- serving
- eating
- washing up and waste disposal
- hygiene control
- education and food demonstrations
- recording and reporting.

Figure 1-1

Operations in on the-sport feeding



Where on-the-spot feeding is desirable but difficult it may be possible to prepare a meal and feed it as a demonstration to participants when they come to collect their rations.

2. Take-home distribution is used in supplementary feeding only when supplies of the bulk rations are regular, when overall nutritional status of the vulnerable groups indicates only minimal levels of malnutrition, and authorities are certain that no food diversions will occur. If possible rations should be given out weekly or every two weeks and used to supplement the participant's home diet.

If take-home rations are given every effort must be made to persuade mothers to give all the ration to the person for whom it is intended. In many cultures it may be very difficult for mothers not to share the food among the whole family. Sometimes discussing the problem with fathers, relatives or local leaders, can help overcome this.

Take-home rations can also be used to treat out-patients with diseases like tuberculosis or leprosy. This food distribution should occur through the health authorities and the duration of feeding is about 2 years.

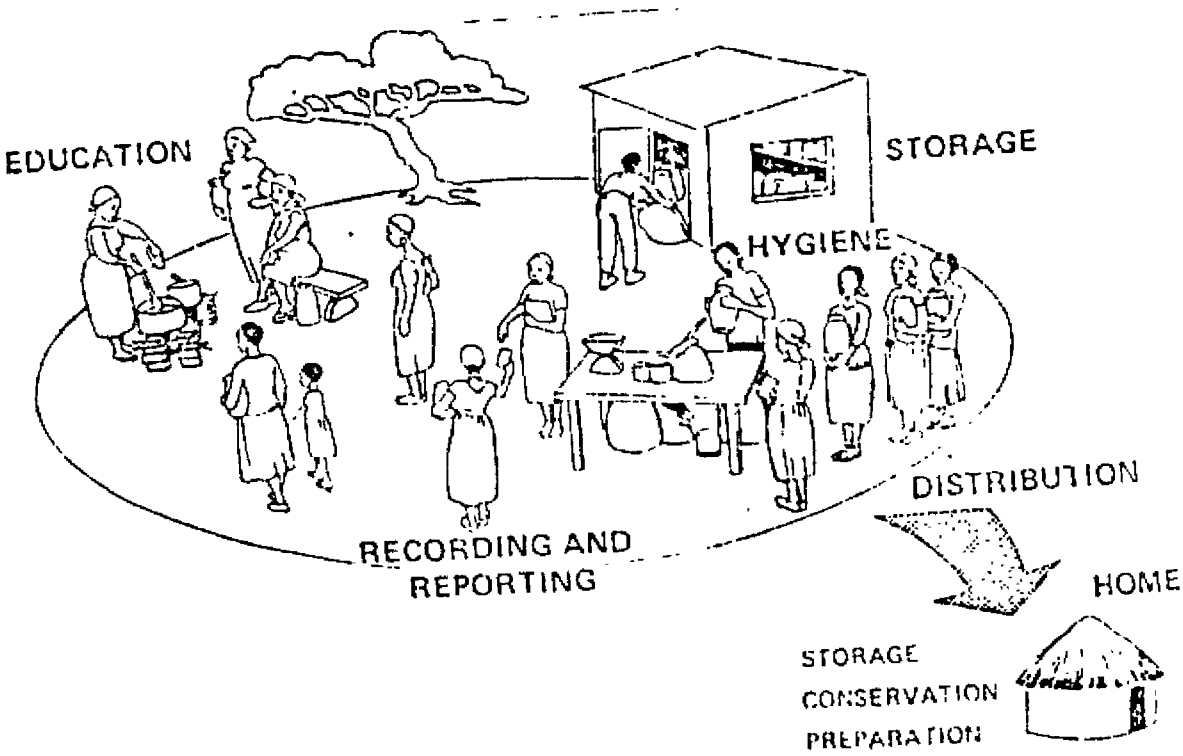
The main operations are (figure 1-2):

- transport

- storage
- distribution
- hygiene control
- education and food demonstrations
- recording and reporting.

Figure 1-2

Operations in Take-home food distribution



Some of the advantages and disadvantages of the two distribution systemns are listed in teble 1-B

Table 1-B

The advantages and disadvantages of methods of food distribution

Characteristic	On-the-spot method	Take-home method
Cost	Higher because more facilities, equipment and staff needed.	Lower because fewer operations required fewer resources
Consumption of food by participant	Participants eat whole ration	No guarantee that participant receives food. Food often shared by whole family. Food may be sold or given to animals. Unfamiliar food may not be used
Education	Mothers can buy and prepare food and feed children under supervision. Problems are quickly identified	Less opportunity. Recipe may be demonstrated but may not be followed correctly at home. Not knowing how to use food or not giving full ration may mar success of SFP
Frequency of ration issue and attendance	Less flexible. Feeding place all weekdays. Mothers may find it difficult to come everyday	Flexible. Rations can be distributed weekly, every two weeks, or monthly
Distance	Center may be too far for daily visits	Distance of participants from center is less critical
Variety of menu	A variety of menus can be planned so food is more likely to be eaten	Up to mother to vary menu by adding foods to family diet
Operation	Once set up, center is easy to run but must be constantly supervised	Distribution easy to run

Characteristic	On-the-spot method	Take-home method
Surveillance	Easy and very accurate. Many problems other than malnutrition can be detected	Difficult to monitor, must rely on spot checks and random surveys
Attendance	Easy to monitor. Alerts staff to changes in participant's health and nutrition status and provides useful information about program effectiveness.	Difficult to monitor progress of those most vulnerable to malnutrition and to verify that they are being fed properly.

PART 2:

LESSON 2

UTILIZING NUTRITION

In order to assess nutrient and food needs and to plan nutritional and educational objectives, a supplementary food program must consider:

- the functions and sources of the important nutrients and human requirements;

- how to recognize the common types of malnutrition found locally;

- the basic causes of the malnutrition and the factors associated with it;

- how to translate nutritional requirements into food rations.

1. Function and sources of nutrients

The human body needs nutrients for energy, growth and the maintenance of body tissues and functions. An adequate diet provides the correct balance of six types of nutrients. These are: carbohydrates, fats, proteins, minerals, vitamins and water. The recommended intake of nutrients for people at different ages and sexes are given in Appendix 7. The functions are illustrated in Figure 2-1.

Energy is needed for physical activity, for maintaining body temperature and for basic body functions such as breathing and digestion. Extra energy is required during periods of growth, pregnancy, lactation and in very heavy work and some diseases. This means that the energy needs of the vulnerable groups are relatively high. That is why it is so important to supply sufficient energy-rich foods in secondary and primary schools' SFPs.

Energy is measured in kilocalories (kcal)1. Carbohydrate and protein supply 4 kcal/g and fat 9 kcal/g.

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1 A new unit of energy is the megajoule (MJ) but it is not yet widely used; 1 MJ = 240 kcal. 1000 kcal = 4.184 MJ.

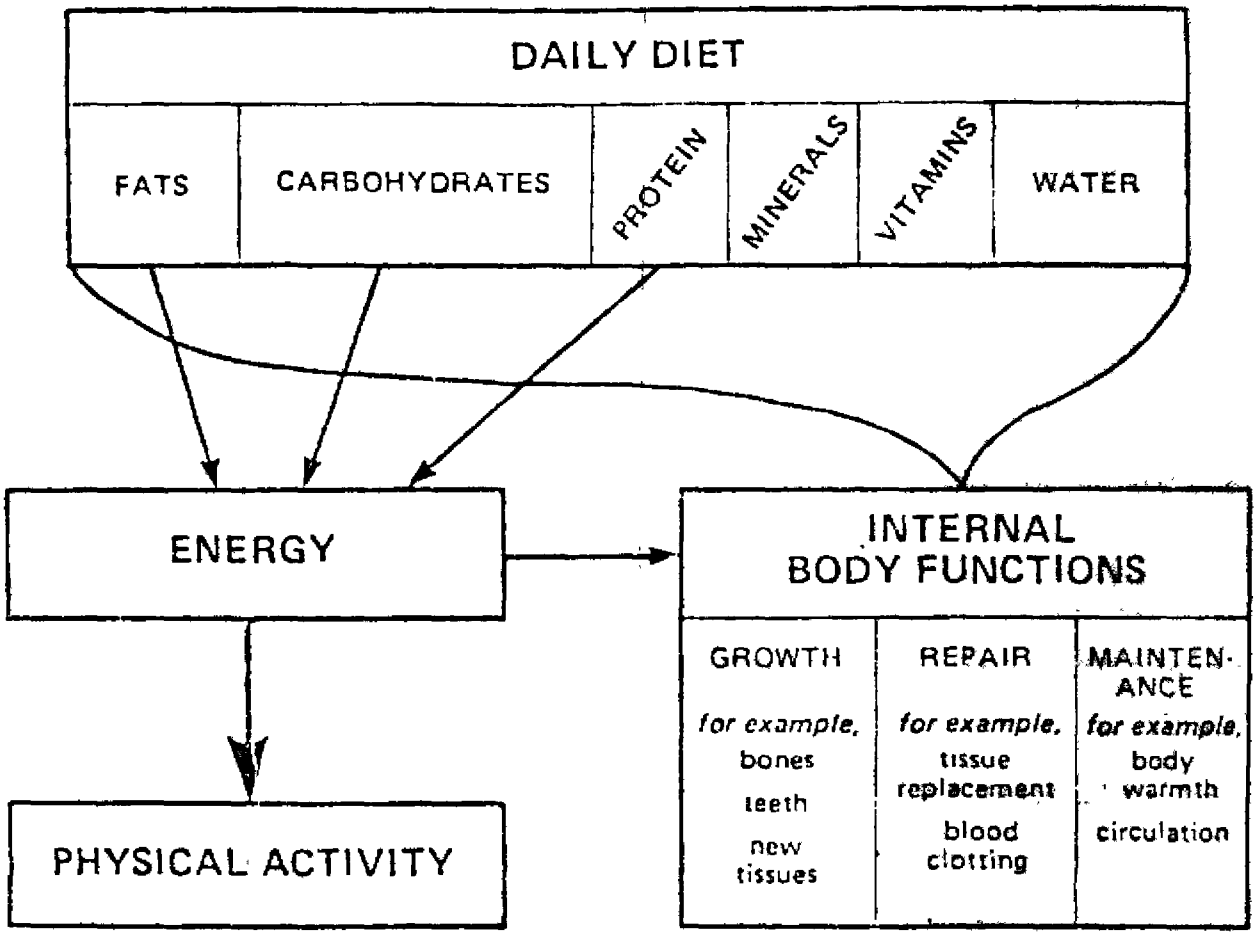
Carbohydrates are the most common form of energy providing the staple food of most diets in relatively poor countries. Carbohydrate-rich foods include cereal (rice, wheat, maize), starchy root (cassava, yam), tuber (potato) and some fruits (plantain). These are mostly starches and sugars of vegetable origin which tend to be bulky. A small child may simply not be able to eat enough of such foods to cover his energy requirements.

Fats and oils are a concentrated source of energy, having more than twice the energy content of carbohydrates and proteins. Fats and oils can be added to recipes to decrease bulk and improve the palatability of other foods.

Some fats and oils (red palm oil, butter) also contain vitamin A. Good sources of fat are vegetable oils, animal fats, fatty meats and fish, coconuts, groundnuts, and other nuts and sunflower seeds. With a great reliance on carbohydrates (especially cereals) which are the cheapest form of energy, fats and oils are often neglected in the diets in poor countries.

Figure 2-1

The functions of nutrients



Protein is vital for growth and for repair of body tissues and fluids. Proteins of animal origin contain all the essential amino acids in adequate amounts and are found in milk, meat, eggs, cheese, fish, and fowl.

Plant proteins, on the other hand, contain limited quantities of some essential amino acids when consumed separately. However, by combining certain vegetable foods, or by adding some animal protein to vegetable sources, mixtures of higher quality protein can be obtained. It is possible for a human being to obtain an adequate quality of protein from

mixed vegetable sources without eating protein from animal sources. Examples of such mixtures are:

- lentils and wheat
- chickpeas and millet
- mung beans and rice
- beans and maize

About 1 part pulse (which contains a high proportion of protein) should be mixed with 3 parts cereal (which contain about 8-12% protein).

Minerals. The minerals most likely to be lacking in the diet of people in a refugee camp are iron, calcium and iodine.

- Iron is required for the formation of hemoglobin (red pigment) in the blood. Iron deficiency is a common cause of anemia (p __) in many countries. This deficiency may occur because little iron-rich foods (liver, red meats, fish and dark green vegetables) is eaten or because the dietary iron is poorly absorbed. Iron may be lost from the body in some parasitic infestations, particularly hookworm. The presence of vitamin C and a little meat, fish or soybean improves the absorption of iron from all the foods eaten at the same meal. Although all milks are low in iron a higher percent is absorbed from breast milk than from cow's milk.

- Calcium is used for making bones and teeth and in the functioning of muscles and the nervous system. Vitamin D is needed for the absorption of calcium.

- Iodine. A lack of iodine causes a swelling in the neck called goiter. In certain areas, particularly mountainous areas, a large proportion of women and school children may have goiter. In such places SFPs should use salt with iodine added (iodized salt) as this is the only practical way of controlling goiter.

Sodium and potassium deficiency is only likely to be seen in individuals with profuse diarrhea (see Lesson __). Several other minerals are essential to the diet, but are not usually critical in emergency situations.

Vitamins are substances which are needed, in small amounts, for many chemical reactions in the body. Vitamins are needed for the adequate functioning of the body. There are two main groups: water-soluble vitamins and fat soluble vitamins. Water-soluble vitamins include the vitamin B-complex--thiamine (B1) and riboflavin (B2) niacin, and vitamin C. Whole cereals, legumes, other vegetables, and animal foods are adequate sources of the B-complex vitamins. Vitamin C is found in raw fruits and vegetables. Fat-soluble vitamins include vitamins A and D and are found in most animal products and significant amounts are stored in the body (liver, etc.). Vitamin A can also be formed in the body from pigments of yellow and green vegetables and fruits (carotenes), and vitamin D can be produced in the skin by exposure to sunlight. The vitamins which may be deficient

their function and sources are listed in Table 2-A. Vitamin A deficiency is the most serious vitamin deficiency in many developing countries (p __)

Water is essential to sustain life. For practical purposes, water requirements may be considered to consist of the amount needed for replacement of the losses in feces, urine, and transpiration (sweating). Young children are extremely vulnerable to dehydration (e.g., through profuse diarrhea, vomiting, sweating).

The average minimum daily requirements of water for healthy children in warm climates are approximately as follows:

- at 1 month 400 ml
- at 4 months 600 ml
- at 12 months 800 ml
- at 3 years 1000 ml

Most infant foods, including milk, provide about 0.3 MJ (70 kc_{al})/100 ml and 95% of their volume is water. When the energy content of food approaches 0.42 MJ (100 kc_{al})/100 ml, the water content is only 90% of the volume of the food.

Table 2-A

Vitamins

Type and function	Good sources	Deficiency condition
vitamin A: vision, skin	dairy produce, liver yellow fruits, green and yellow vegetables, red palm oil	xerophthalmia, blindness (see p __)
thiamine (B1): protein synthesis	home pounded cereals, pulses, pork, fish	beri-beri
riboflavin (B2): cellular energy release	pulses, meat, fish, milk, leafy vegetables	sores at corner of mouth (quite common but not serious)
niacin: synthesis and break-down of sugars	meat, fish groundnuts	pellagra

folic acid: blood formation	liver, dark green leafy vegetables, white fish	anemia
vitamin C: wound healing blood formation	fresh fruit and vegetables, roots and tubers	scurvy
vitamin D: bone formation	sunlight, dairy products	rickets

Energy and protein intakes

The accompanying table shows the recommended energy and protein intakes for individuals of different ages or physiological status. The last column indicates the approximate proportion of the different groups in a developing country.

Table 2-B

RECOMMENDED DAILY ENERGY AND PROTEIN INTAKES[a] FOR HEALTHY INDIVIDUALS

Group	Energy MJ (kcal)/h	Protein/g.[b] mixed diet with some animal protein	Protein/g.[b] cereals possibly with legumes	Approximate proportion of the population in a developing country %
0–1 year	3.4 (820)	14 (breast feeding) plus after six months, weaning foods		3.0
1–3 years	5.7 (1 360)	21	27	9.0
4–6 years	7.7 (1 830)	25	33	8.7
7–9 years	9.2 (2 190)	29	37	8.5
10–14 years				
males	11.7 (2 800)	46	58	6.3
females	10.3 (2 450)	40	50	6.2
Male adult (moderately active)	12.6 (3 000)	48	62	29.2
Female adult (moderately active)	9.2 (2 200)	39	48	26.2
Pregnancy (latter half)	10.7 (2 560)	49	63	1.5
Lactation	11.5 (2 750)	60	77	1.4
Average	9.2 (2 195)	37	47	—

[a] Adapted from *Handbook on human nutritional requirements* Geneva World Health Organization 1974 (Monograph Series No. 61).
[b] Adjusted to take digestibility and quality of protein into account.

An adequate energy intake is the first priority when food is scarce. Protein, carbohydrates, and fat supply energy at the following rate:

1 gram carbohydrate provides approximately	0.017 MJ (4 kcal)
1 gram fat provides approximately	0.038 MJ (9 kcal)
1 gram protein provides approximately	0.017 MJ (4 kcal)

If an adequate energy supply is not provided, some protein will be burnt to provide energy and will not be available for body growth or repair. Under these conditions proteins will be used in the same way as less expensive carbohydrates or fats.

Between 20-40% of the energy requirement should be supplied from fats and oils, which greatly enhance the palatability of the diet, diminish its bulk (important for younger children), and reduce transport requirements.

Energy requirements vary widely among normal individuals and they increase with physical activity. For example, a 65-kg man requires daily:

6.3 MJ (1500 kcal) when resting in bed day and night
11.3 MJ (2700 kcal) if lightly active in the daytime (clerk, office worker)
12.6 MJ (3000 kcal) if moderately active 8 hours/day
14.6 MJ (3500 kcal) if doing heavy work 8 hours/day (laborer)

Much higher intakes are required for the treatment of malnutrition.

Vulnerable groups

The energy and protein requirements of women are increased by pregnancy (+1.5 MJ (350 kcal) and +10-15 g protein/day) and lactation (+2.1 MJ (550 kcal) and +15-20 g protein/day) over and above their normal requirements. This is especially true for pregnant and lactating women who have closely spaced pregnancies. The rapid growth rates of young children also require proportionally more energy and protein for each kg of body weight than adults do:

	MJ (kcal)/kg body weight
infant	0.5 (120)
5 years old	0.4 (90)
11 years old	0.3 (70)
male adult	0.2 (45)

Pregnant women and young children are particularly likely to become malnourished in times of food shortage. Young children are also more vulnerable to malnutrition for the following reasons:

- They require a greater number of feedings per day (3-4) than may be prepared for the rest of the family. Breast milk is often not adequately supplemented by suitable weaning foods for the children aged 6 months to 5 years.

- They require more concentrated sources of energy and protein than may be supplied by available foods.

- Young children (between about 6 months and 5 years) are particularly subject to infections (measles, whooping cough, malaria, diarrhea, etc.) which by reducing appetite and increasing energy expenditure, may precipitate or worsen malnutrition.

- In some cultural contexts, adults are served first and younger children last.

Foods given to sick children must not be reduced or restricted in quantity. On the contrary, sick children should receive additional food, whenever possible. Children age 6-10 who have diarrhea are also highly vulnerable to malnutrition.

2. Foods and diets

Diets in most countries contain adequate amounts of all the nutrients required for good health <u>if enough of the diet is taken to satisfy the individual's energy requirements</u>. This also applies to protein. Even a growing child, whose

protein requirement is the highest (per unit of body weight) of any member of the population, if healthy, requires no more than 10% of his calories to be supplied from protein sources.

Commonly used foods (See Appendix B)

1. Cereal grains (rice, corn, millet, sorghum, oats, and wheat)

These staple foods are the main source of energy (carbohydrates) and contain significant quantities of proteins (8-12%), vitamin B, and iron. Most vitamins (especially thiamine) are lost in the milling process. The whiter the flour, the greater the loss of vitamins, unless the flour is enriched or fortified with vitamins.

2. Legumes and oilseeds (beans, peas, soya, groundnuts, etc.)

Legumes as a group contain about 20% of proteins (soy beans up to 40%), the B-complex vitamins, and iron. Legumes are particularly useful when eaten with cereals, as the proteins complement each other. They provide energy in a compact form but require careful storage because of their vulnerability to insects, rodents, and weevils.

Digestibility can be increased by removing the skin after soaking overnight.

3. Tubers and roots (yams, taro, cassava, sweet potato, potato, etc.)

Tubers and roots are the main sources of carbohydrates and are low in proteins (1-2%). Bulk and low protein content make them unsuitable as staple foods for infant feeding unless supplemented by foods richer in proteins.

4. Vegetables and fruits

Vegetables and fruits are high in water and low in calories. They are often rich in provitamin A or carotenes, vitamins B and C, iron, and calcium, especially dark-green leafy vegetables (young cassava leaves, baobab leaves), which in addition have an appreciable protein content (2-4%).

5. Animal products (meat, fish, milk and dairy products, eggs, etc.)

Of high protein quality, animal products are consumed in very small quantities in most developing countries in normal times and they may become even more scarce during emergencies. Small amounts add considerably to the quality

and palatability of a diet. Local taboos might restrict their use in some groups (e.g., young children, pregnant women).

Milks are rich in protein, sugar, fat, calcium, and vitamins (except vitamins present only in human milk). All milks are poor in iron. Skim milk (non-fat milk) contains no fat-soluble vitamins A and D unless they have been added in the factory. It is important to check this on the label.

6. Oils and fats

Oils and fats offer a compact source of calories. Fats derived from milk are sources of vitamin A and D, while vegetable fats contain no vitamin A and D, except for red palm oil which is extremely rich in carotenes.

7. Human milk

This is the best and safest food for infants and young children (under 2 years). Breast-feeding should be promoted. Supplementary food must be given to the child at 4 months of age.

Bottle-feeding with commercial cow's milk preparations must be discouraged in areas with low standards of hygiene

and maternal education, because of the high risk of fatal diarrheal disease in young infants.

Issues in the provision of milk as a nutrient for infants and children

Although milk has long been considered an ideal food in human nutrition, recent research has seriously challenged the use of milk powder in the Third World. Usage of milk or milk-based formulas in developing countries leads to a special set of problems. Although powdered cows milk or milk-based formulas are acknowledged to be an easily transportable food with good protein and calorie density, it has, in the refugee situation, certain disadvantages. A summary of the issues is a follows:

1. Breast milk

A number of studies over the past 70 years have clearly documented the advantages of breast-feeding. Safe preparation and use of milk powder or milk-based formula requires a clean water supply and refrigeration, two items in short supply.

By contrast, breast milk is safe, clean, requires no preparation and is normally available in adequate amounts.

Breast milk is the uniquely appropriate food for infants, conferring good nutrition assuring adequate growth and a degree of immunity to disease. Breast milk is adequate for the infant's needs until four to six months of age. After that time, liquid and then solid food supplements are required to keep up with the child's nutrient requirements. It is due to the vulnerability of the young child when this supplementation begins, often in unhygienic conditions, that the high risk of infection and possible death results.

2. Lactose intolerance, or lactase deficiency

Lactose is a sugar present in large amounts in cows milk. Persons who lack the enzyme lactase have been identified as being unable to digest this sugar (lactase deficiency). When the lactose passes through the digestive system without being digested, it often causes diarrhea. If the diarrhea is not adequately controlled, in time the condition may lead to dehydration and ultimately death. Certain populations exhibit more lactase deficiency than others; in populations where milk is a common food, lactase deficiency is extremely rare. In populations where milk is not used extensively, as many as 25% of the population (invariably more adults than children) may exhibit lactose intolerance. This suggests that lactase production diminishes with age as the adult becomes unaccustomed to drinking milk. There is evidence to suggest that children

can regain lost lactase production after being reintroduced to drinking milk; only one or two diarrheal episodes may result. However persons who react adversely to milk may not continue to return for subsequent supplementary feedings.

3. Hygiene

The sale and distribution of milk powder has been cited as one of the major contributors to the contemporary high incidence of infant mortality. The use of dried skim milk (DSM) depends on a safe supply of water for mixing the powder, for washing the container, and for serving the milk. It also demands a high standard of hygiene on the part of the feeder. If any one of these is not clean, disease may result. For this reason, several developing countries have banned the sale of DSM.

4. Economics

Families which have become dependent on milk powder or milk-based formulas may, when economically or logistically disabled, over-dilute the formula to increase its supply. This can quickly lead to malnutrition. Dependence on bottle milk for an infant may also interrupt the capacity of the lactating mother to produce breast milk which can not be reversed if the bottle milk is no longer available.

5. Appropriateness

Cows milk may not be part of the traditional local diet.

6. The distribution of tinned milk (infant formula, condensed or evaporated).

All these milks create the problems associated with DSM, especially if they are to be diluted.

3. SPECIAL FOODS

During emergencies relief workers are often sent unfamiliar processed foods. Special foods are convenient to distribute and prepare but should supplement, not replace, the local diet.

Foods prepared locally with local ingredients are preferable to imported special foods and are best adapted to the specific cultural conditions. 2

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2 For recipes, see: CAMERON, M. & HOFVANDER, Y. Manual on Feeding Infants and Young Children. New York, Protein-Calorie Advisory Group of the United Nations System, 1976.

Special imported foods should be replaced as soon as possible by locally grown and prepared supplements of the same nutritional value.

Some foods sent as emergency relief are inappropriate for cultural reasons (religion, food habits, etc). Another problem with processed foods is that they are often in unsuitable packaging. (For example, 95% of the weight of the small bottles of vegetable mash for infants is made up of water and glass). A third problem with processed foods is that they may have low nutritonal value (sweets, luxury foods, etc.). Do not waste fuel and effort in distributing food containing only minute amounts of proteins and calories. Give it away to a local institution. If it is not acceptable, return or destroy it. Always inform your supervisors and the donor's local representative if donated supplies are inappropriate. This will help to improve the quality of later consignments.

Table 2-C

Special Processed Foods

Type of food	Average nutritional values # per 100 g: MJ/kcal$_{th}$	Average nutritional values # per 100 g: Protein (g)	Minimum cooking time (min) after adding to boiling water	Remarks
Blends of cereals, legumes, and dry skim milk				
CSM (Corn-Soy Milk)	1.8/370	20	5-10	CSM and WSM are supplied in 22.5-kg multiwall paper bags (the outer wall is impregnated with insecticides and moderately resistant to moisture), dimensions 51 × 84 × 25.5 cm
Instant CSM	1.6/380	20	Instant CSM is fully precooked (ready to mix)	
WSM (Wheat-Soy Milk)	1.5/360	20	5-10	
Superamine (Algeria only)	1.4/340	20	5-10	Vitamins and minerals added (except in the case of Faffa)
Faffa (Ethiopia only)	1.4/340	20	5-10	
Blends of cereals and legumes				
WSB (Wheat-Soy Blend)	1.5/360	20	5-10	These foods do not contain cow's milk
SF bul (Soy-Fortified bulgur)	1.5/350	17	20 less if soaked over night	Vitamins and minerals added to WSB, SFCM, incaparina, balahar and SMF
SFCM (Soy-Fortified Corn Meal)	1.6/390	13	15	SF bul is not a flour (cracked grains of bulgur wheat)
SFSG (Soy-Fortified Sorghum Grits)	1.5/360	16	15	
SFF 12 % (Soy-Fortified Flour 12 %)	1.5/360	16	15-20	
SFRO (Soy-Fortified Rolled Oats)	1.6/370	21	5	
Incaparina (Central America)	1.6/370	28	5-10	
Balahar (India)	1.5/360	22	5-10	
Other blends				
SEF (supplement enriched food: wheat, FPC, DSM, sugar)	1.7/400	20	5	Keep well for about 9 months
Sempero (cereals, DSM, FPC, oil)	2.0/480	15	Fully precooked	
Milks and fish protein concentrates				
DSM (Dried skim milk)	1.5/350	35		Milks have a high lactose content. DSM contains no vitamins A or D unless this is mentioned on the bag. Milks provided by UNICEF, USA and Canada are usually enriched
DFCM (Dried full cream milk or whole milk)	2.1/500	25		
Sweetened condensed milk	1.3/320	13	Fully precooked	DFCM does not store well once a container has been opened (rancidity)
FPC (fish protein concentrate)				FPC type A does not smell or taste of fish but is more expensive than type B
type A	1.5/360	75		
type B	1.4/340	65		
Cereals				
Bulgur wheat (whole grain)	1.5/350	11	20 (less if soaked overnight)	

Values in MJ rounded to one decimal place on conversion from kcal$_{th}$

Nutrient content of some commonly used foods

The most common of the special foods are the dried milks (skimmed, that is, with no vitamins A-D), the blends

such as Corn-Soy Milk (CSM) and Wheat-Soy Blend (WSB), and the parboiled cereals (bulgur wheat).

In general, 100 g of special food provides approximately 1.5 MJ (360 kcal) and 20 g of protein. Vitamins are often added.

The composition of special foods, as indicated in Table 2-C, varies with the availability and cost of the ingredients. However, the nutrient content remains approximately constant. All cereal-based formulas have a variable protein content, and the values shown are the lowest which occur.

Dried skim milk (DSM) is used as a high-quality protein source in most formulas. When only small amounts of milk (e.g., 50 g of DSM) are given daily, lactose intolerance will not be a significant problem among the general population.

Vitamins and minerals are usually added to most (but not all) processed foods so that 100 g of dry product meet the daily recommended allowance. DSM contains no vitamins A-D unless they have been added during processing (a measure increasingly adopted by supplying countries).

Whole cereals (e.g., bulgur wheat and Soy-Fortified bulgar -- SF bul) retain a high amount of B vitamins (e.g., thiamine).

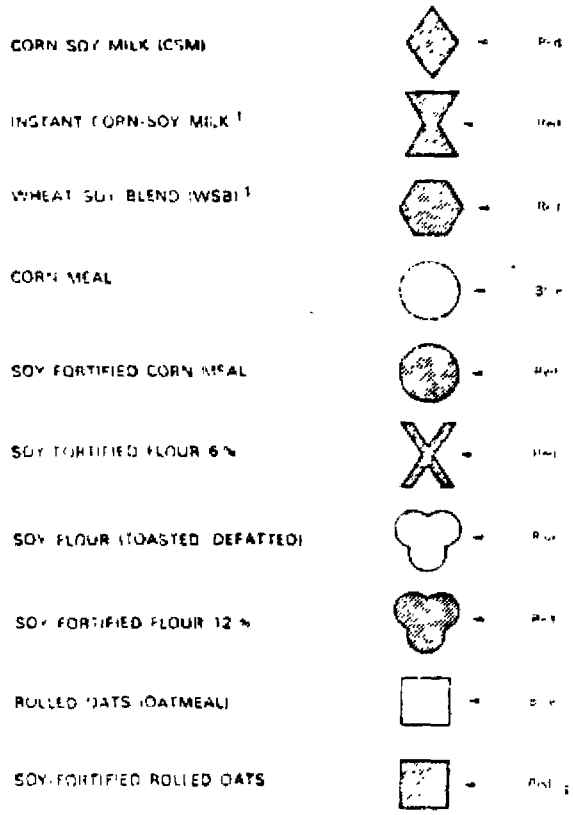
Most processed foods are partially precooked or fully precooked and are called instant or ready-to-mix foods (DSM, DFCM, instant CSM, Semper I, etc.). Fully precooked foods are very convenient (since they can be cold-mixed) but they must be made up freshly each time they are served, especially if they are made up with unboiled water. Germs do multiply very quickly (within one to two hours) in a cold mixture of instant food and water, since there they find everything they need--water, sugar, proteins, etc.--at an ideal temperature. A food mixture contaminated by unsafe water becomes after a while much more dangerous than the water itself.

Instant foods must be:

- prepared just before meal-time with boiled water;
- or added to porridge (gruel, etc.) after its preparation;
- or eaten in a dry form (DSM, FPC, etc.);
- or added to the normal diet (e.g., to soup).

To facilitate identification of the contents of the food bags, once they are piled up in the warehouse,

a special color-code was recently devised. Red is used for soy-fortified foods and blue for other commodities. The most usual symbols (printed on the sides of the bags) are as follows:



[1] Sweetened and flavoured instant CSM and WSB are sometimes donated; they are identified by distinct symbols

Preparing special foods

Always try cooking a small sample yourself to make sure the recipe works. Blended foods may not be familiar to the population. Prepare a demonstration in which all the ingredients are displayed separately. When given without an explanation or a demonstration of how to cook them, they may be thrown away.

Cereals

Bulgur wheat and SF bul are not in powder form but in cracked whole grains, precooked to reduce cooking time and increase storage stability.

- Add sufficient water to cover the grains in the pot.
- Soak for a few hours (overnight).
- Boil the cereals in the same water (B vitamins are present in this water) for 10-15 min (20, if no soaking).
- Do not wash or rinse the grains after cooking.

- If the cereal is not cooked long enough, it is poorly digested by children.

- Pound finely (mash) for young children.

- Proportions are about 1 part bulgur, 2 or 3 parts water. The volume more than doubles in cooking.

The same principles apply to most locally grown cereals.

Special blends (in powder form)

1. First mix one part of CSM or other blends with two parts of water (it is important, always to use cold water). Slowly add the special blend to the water while stirring. If the mixture is lumpy, continue stirring until it is smooth.

To use in porridge form, pour the smooth mixture into an extra part of water. Boil for 8-10 minutes, stirring all the time. The porridge should be thick to provide enough proteins and energy per portion.

To enrich the usual meal, add the smooth mixture. Keep cooking and boiling (while stirring) for 5-8 minutes.

2. CSM and other blends can be used as dry ingredients partially replacing cereal flours in almost every local dish (breads, tortillas, chapatis, etc.). Depending on local cereal availability and acceptability, the proportion can vary from 20% to 50%. Try locally with a sample (mixture time, as well as oil and water content, should sometimes be increased).

3. Instant foods, e.g., instant CSM, can be added to cold boiled water and served immediately without cooking.

4. Whenever possible add 30-40 g of edible oil per 100 g of the dry blend to increase the energy content. Mix and stir thoroughly. The mixture (dry blend plus oil) can be stored for a few days in a dry place. After addition of water and cooking, consume within a few hours.

Dried milks (DSM, DFCM)

Reconstitute milk with one part of dry milk to 4 parts of water.

First take a small amount of cold water (1-2 parts), then slowly add DSM or DFCM and keep stirring until the solution is smooth. Add the remainder of the water (boil for 3-5 minutes if it is contaminated). If the DSM is in

bulk, add milk powder to boiled cold water and whisk until powder is well dissolved.

Dried milk can be added directly to porridge during preparation or before serving. Stir well.

Dried skim milk (6 parts), oil (2 parts) and sugar (1 part) can be mixed together and stored for up to one week; 1 part of the mixture added to 4 parts of water gives a high-energy liquid food with 0.42 MJ (100 kc_{al}) and about 4 g protein per 100 ml (see also Lesson __).

Concentrated or condensed sweetened milk

The milk should be diluted because of the high sugar content (43%). Protein should be added because of the low content after dilution.

Use the tin as a measure. Mix three tins of water to the contents of one tin of concentrated sweetened milk. For a standard size tin (content 400 g) add 30 g of dry skim milk (three full teaspoons) to half a can of water. Mix together and stir well. Boil for 3 minutes if the water is not safe. The final preparation (1350 ml) contains 0.48 MJ (115 kc_{al}), 4.5 g protein, and 2.4 g fat per 100 ml and should be served without delay.

Condensed milk should not be confused with evaporated milk (unsweetened) which can be reconstituted by adding boiled water.

Fish-protein concentrates (FPC)

These can be added to traditional dishes or consumed without any preparation, even by infants. When accepted, they are a high-quality source of protein.