

Food and Nutrition Needs in Emergencies



UNHCR



UNICEF



WFP



WHO



FOREWORD

UNHCR, UNICEF, WFP and WHO have jointly developed these guidelines as a practical tool for assessing, estimating and monitoring the food and nutrition needs of populations in emergencies.

Major food shortages can be a primary feature of an emergency, as in droughts or floods that lead to famine, or they may be a consequence of war, economic disaster, or population displacement. The often serious protein-energy malnutrition and micronutrient deficiencies that inevitably follow such shortages add greatly to the burden of disease and mortality, slow - or even impede altogether - socioeconomic recovery, and make intense additional demands on scarce resources.

The guidelines are aimed at field staff involved in planning and delivering a basic general food ration for emergency-affected populations. Their overall aim is to promote timely, coordinated and effective action through improved understanding of food and nutrition needs during emergencies.

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LIST OF ABBREVIATIONS

BMI	body mass index	HDR	humanitarian daily ration
BMR	basal metabolic rate	HEM	high-energy milk
BMS	breast milk substitute	IBFAN	International Baby Food Action Network
CMR	crude mortality rate	MoU	Memorandum of Understanding
DSM	dried skim milk	MRE	meals ready to eat
DWM	dried whole milk	NGO	Non-Governmental Organisation
ENN	Emergency Nutrition Network	PAL	physical activity level
FBM	food basket monitoring	TM	therapeutic milk
GIFA	Geneva Infant Feeding Association		

PREFACE

According to the Universal Declaration of Human Rights (UDHR) Article 25(1), “everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food...”. In emergency contexts, it is important to reaffirm the fundamental right of everyone to have access to adequate and safe food. The Humanitarian Charter and the Minimum Standards (1998)¹ aim to quantify people’s requirements for water and sanitation, food and nutrition, shelter and health care. Taken together, the Humanitarian Charter and the Minimum Standards contribute to an operational framework for accountability in diverse humanitarian assistance efforts.

Food supply should be adequate to cover the overall nutritional needs of all population groups in terms of quantity, quality and safety. In emergency situations, where populations are dependent on food assistance, an “adequate food ration” meets the population’s minimum energy, protein and fat requirements for survival and light physical activity. An adequate food ration is also nutritionally balanced, diversified, culturally acceptable, fit for human consumption and suitable for all sub-groups of the population.

Because micronutrient deficiencies are common worldwide—and endemic in many developing countries—rations should provide adequate micronutrients (vitamins and minerals), where possible, particularly for populations entirely dependent on food aid.

For planning purposes, the World Health Organization (WHO) and the U.S. Committee on International Nutrition recommend that an average of 2,100 kcal per person/per day be used as an initial planning figure. This estimate covers the energy needs of a typical population in a developing country, assuming a standard population distribution, body size, ambient temperature, pre-emergency nutritional status and light physical activity level (PAL).² Since implementation of revised Memoranda of Understanding (MoUs) (UNHCR/WFP, July 2002; WFP/UNICEF, February 1998), the three agencies have adopted 2,100 kcal as their initial planning figure for calculating energy requirements and designing food rations.

The process of tailoring food requirements for a specific population requires a number of considerations. The initial planning figure for energy should be adjusted according to environment, demographic and physiological criteria specific to the affected population. Food commodities are then selected to meet basic nutritional requirements. Finally, other factors are considered to ensure that the ration is appropriate to all population sub-groups, such as infants and young children, pregnant and lactating women and the older persons. Food-management aspects and the underlying preconditions for ensuring adequate nutrition (such as the social and health situation or environmental issues) are also considered when estimating food and nutritional needs in emergencies.

¹ Humanitarian Charter and Minimum Standards in Disaster Response. The Sphere Project. Geneva, 1998.

² Light PAL defined as 55 percent above the basal metabolic rate (BMR) for males and 56 percent above the BMR for females.

CONTEXT AND PURPOSE

Close collaboration between the agencies of the United Nations is essential for an effective emergency response. In order to facilitate this collaboration, Memoranda of Understanding have been signed by several United Nations agencies; these agreements aim to clarify roles and responsibilities in emergency relief and rehabilitation programmes, and outline commitments to joint activities within agency competencies.

The purpose of these guidelines is to provide practical tools for estimating food and nutritional needs of populations in emergency situations. In particular, these goals include to:

- provide practical operational guidelines for United Nations³ and other agency staff involved in planning a basic general food ration for emergency situations;
- estimate the food and nutritional needs for vulnerable groups;
- provide a clear outline of the main factors to take into consideration when planning an adequate ration; and
- provide a framework for training activities and/or supporting ongoing training activities related to planning food assistance.

³ The guidelines are based on the recommendations of the relevant technical United Nations agencies, specifically WHO and the Food and Agriculture Organization (FAO).

OVERVIEW OF APPROACH

Table 1, below, provides an overview of the two characteristic phases⁴ of an emergency response. During the first phase of the emergency (Phase I), the initial planning figure for energy is used and adjusted according to available information at the outset of the emergency as food-management and -monitoring systems are established. Later on, in Phase II, when the situation is stabilized, the initial planning figure

for energy is further revised based on changing circumstances during periodic reassessment exercises. It is during these periodic reassessments that strategies for continued assistance and/or phase-out activities are planned. The “Planning a Ration” section of the guidelines (pages 6-29) summarizes the basic principles for the design of an adequate ration in emergency situations.

Table 1: Emergency Phases and Planning

PHASE I OF THE EMERGENCY

From the outset and during initial stages of the emergency (i.e. during initial rapid assessments)

- ⇒ Adopt 2,100 kcal/person as a reference figure.
- ⇒ Adjust the 2,100 kcal figure based on information available immediately, using the factors outlined in Section II (pages 7-8).
- ⇒ Ensure that food ration is adequate to address the protein, fat and micronutrient requirements of the population.
- ⇒ Ensure that food ration is adequate to address the nutritional needs of all sub-groups of the population.
- ⇒ Outline strategies for collecting information to make further adjustments.
- ⇒ Consider food-management issues.
- ⇒ Consider food-related conditions.
- ⇒ Establish a monitoring system to ensure adequacy of the ration.

PHASE II OF THE EMERGENCY

Situation stabilized

- ⇒ Through periodic reassessment, further revise and adjust the reference figure based on additional information about all the factors affecting energy requirements specific to the situation.
- ⇒ Plan for longer-term assistance or phase-down and phase-out strategies.

⁴ For the purpose of this document, the “phase” of the emergency refers to the context-specific time frame in relation to the emergency response.

BASIC PRINCIPLES

- **A coordinated approach:** Responding to the nutritional needs of an emergency-affected population requires a commitment to a coordinated approach among all the key actors: United Nations agencies, bilateral donors, the Government, NGOs, and the community, women in particular.
- **Context-specific assistance:** Food-assistance programmes that meet the needs of affected populations in emergencies must be based on a clear understanding of the situation. An analysis of the specific context and its nutritional problems and an understanding of the causes and potential risks of malnutrition are required.
- **A general food basket based on providing 2,100 kcal per person per day:** Individual energy requirements are estimated for different population groups according to age, gender, weight and physical activity level. The mean per capita energy requirement for a population has been calculated by taking the weighted-average requirements for each age-sex group (see Annex 1). The mean per capita energy requirement is not specific to any age or sex group and should therefore not be considered as the requirement of a particular individual. The estimate of 2,100 kcal/person/day was also designed to include the needs of pregnant and lactating women within the population.
- **Timely distribution of an adequate, basic ration:** At the onset of an emergency, ensuring an adequate basic ration for the needy population is crucial. The quick provision of an adequate ration not only saves lives, but also reduces the likelihood of later having to introduce more costly and cumbersome interventions such as selective feeding programmes.

- **A standard food ration:** In a general food distribution, a standard food ration⁵ is provided to every beneficiary without distinction. Population sub-groups with obvious additional nutritional requirements (e.g. malnourished children) may require an additional ration over and above the standard basic ration.
- **Community participation:** To meet the food and nutritional needs of the population more effectively, the planning of the food ration should be carried out with the participation of the affected community. Women in particular should be consulted during the process of determining the appropriate food and nutritional needs of the affected population.
- **Monitoring, adjusting and targeting:** Monitoring mechanisms must be in place to assess the adequacy of the established ration, to adjust the ration according to changing circumstances and to target sub-populations at relatively higher risk on the basis of food need and/or vulnerability to food insecurity. A strategy for monitoring the adequacy of a ration requires the use of a number of different quantitative and qualitative tools (e.g. joint food assessment missions, vulnerability analysis and mapping [VAM], household food economy assessments). An understanding of the various mechanisms used by the population to access food, including an analysis of the positive and potentially negative implications of any coping mechanisms, is essential. Understanding such mechanisms improves food and nutritional estimates and may contribute to helping populations achieve self-reliance.

⁵ A food ration that covers the daily per capita energy requirement (2,100 kcal) and is adjusted for the population under consideration.

PLANNING A RATION

The box below is an overview of the process necessary to estimate food and nutritional needs in emergency situations. Following adoption of the initial planning figure of 2,100 kcal/person/day, adjustments are made based on factors such as temperature, health

or nutritional status of the population, demographic distribution of the population and activity levels. These points should be revisited as part of the monitoring process as more information becomes available through assessments.

1. Calculate the energy requirements of the population.

The initial planning figure or energy requirement is 2,100 kcal/person/day.
Adjust this upward or downward based on the following four issues:

TEMPERATURE	If the temperature is below 20° C, adjust energy requirements upward by 100 kcal for every 5° below 20° C (page 7).
HEALTH OR NUTRITIONAL STATUS OF THE POPULATION	If either of these is extremely poor, adjust the energy requirements upwards by 100–200 kcal (page 7).
DEMOGRAPHIC DISTRIBUTION OF THE POPULATION	If the demographic distribution is not normal, there may be a need to adjust the energy requirements upwards or downwards (page 8).
ACTIVITY LEVELS	If the population is engaging in medium to heavy activities, there may be a need to adjust the energy requirements higher (page 8).

2. Select commodities that meet the energy, protein, fat and micronutrient requirements of the population (from page 8).

3. Implement monitoring and follow-up actions, data collection and analysis (from page 30).

4. If necessary, assess the ability of the population to access other food sources and adjust the ration. Monitor the situation following any such adjustments (page 33).

I. THE INITIAL PLANNING FIGURE FOR ENERGY

The average estimated daily per capita energy requirement of 2,100 kcal is used to expedite decisions about the immediate initial provision of food (see Annex 1 for details on calculation of the initial planning figure). It is important that this figure be adjusted when necessary, according to the factors outlined in the next section.

II. ADJUSTING THE INITIAL PLANNING FIGURE FOR ENERGY

Four main factors should be taken into consideration when making decisions to adjust the initial planning figure for energy. These include environmental temperature, and the population's health and nutritional status, demographic characteristics, and physical activity level.

A. Environmental temperature

A cold environment increases an individual's energy expenditure—especially if shelter, clothing and/or heating are inadequate. Current convention uses an average temperature of 20°C as a base, adding an allowance of 100 kcal for every 5° below 20°C as shown in the box below.

Adjustments to energy requirement mean daily temperature	
20° C	—
15° C	+ 1 0 0 k c a l
10° C	+ 2 0 0 k c a l
5° C	+ 3 0 0 k c a l
0° C	+ 4 0 0 k c a l

Source: The management of nutrition in major emergencies. WHO. Geneva, 2000.

Practical examples:

- The average temperature from November to February in Kosovo is 5–10°C. During these winter months, the initial planning figure for energy should be adjusted upwards by 200–300 kcal (i.e. 2,300–2,400 kcal for the whole population).
- The average temperature from December–March in Afghanistan and North Korea is below 0°C. During these winter periods, the initial planning figure for energy should be adjusted upwards by 300–500 kcals.

B. Health and nutritional status

Energy requirements increase during periods of nutritional rehabilitation and recovery from severe illness, requiring an upward revision of the ration level. For example, such a revision would be required for a population that has suffered severe prolonged food shortages that caused high levels of malnutrition. Another example would be a population affected by a widespread epidemic. Provision of 2,100 kcal may be sufficient to permit catch-up growth for children with pre-existing malnutrition, but is inadequate to restore the body weight of a malnourished adolescent or adult. An additional 100–200 kcal should be added to the basic ration in extreme situations, when the nutritional status of the population is extremely poor or when the crude mortality rate (CMR) is significantly elevated. For example, when the prevalence of malnutrition among children under 5 years of age is high (i.e. more than 15 percent <-2 z-score weight-for-height) and the CMR is high (i.e. CMR higher than 2/10,000 per day).⁶

⁶ For more detailed information on measuring malnutrition, z-scores and CMR, please consult "The management of Nutrition in Major Emergencies." WHO, Geneva, 2000 and the "Food and Nutrition Handbook," WFP, 2000.

Practical example:

In a refugee camp, the crude mortality rate (CMR) dramatically increases (from five- to tenfold) above a baseline death rate of 0.7/10,000 persons per day. The prevalence of malnutrition among under-5-year-olds is 24 percent (<-2 z-score weight-for-height). Further epidemic outbreaks are a threat as a result of the overcrowding and extremely poor sanitation conditions in the camps. The provision of at least an additional 100 kcal per day above the initial planning figure for the whole population in combination with other measures is appropriate (i.e. at least 2,200 kcal).

C. Demographic characteristics

The composition of the population affects the average energy requirement. For pragmatic reasons, a standard demographic profile is used, since it can be difficult to obtain accurate demographic information on the emergency-affected population (Annex 1). Later, demographic data on the affected population can be collected through a census or from survey data. Adjustments in energy requirements are made thereafter where there are significant deviations from the reference standard.⁷

Practical example:

In a refugee camp, the affected population comprise predominantly adolescent boys (over 80 percent). The average energy requirement for adolescent boys (10–19 years old) is 2,300–2,700 kcal. Under these circumstances, it is appropriate to adjust the initial planning figure upwards by an amount of 300 kcal per day (i.e. 2,400 kcal for the whole population).

D. Physical activity level

The physical activity level affects energy expenditure. The basal metabolic rate is defined as the amount of energy necessary to maintain normal body functions at rest. The average minimum energy requirement of 2,100 kcal is based on both the BMR and additional energy requirements associated with a “light” PAL. In other words, 2,100 kcal will maintain the health and nutritional status of an individual engaged in light work. In situations where the affected population is engaged in moderate or heavy work, an increase in ration should be considered. Moderate and heavy workloads would include, for example, a population that is walking long a distance to collect water and fire wood or constructing houses.

III. CHOOSING COMMODITIES

With the initial planning figure (2,100 kcal) in mind, food commodities that meet the basic energy, protein, fat and micronutrient requirements of the affected population must first be selected. An acceptable ration also takes into consideration local dietary preferences.

A. Macronutrient (protein and fat) requirements

Energy needs are usually met through a range of commodities with ample protein content (cereal, blended food, pulses). In line with FAO/WHO technical reports, protein should provide at least 10–12 percent of total energy. The requirements of a population can be

⁷ The “adjusted” energy requirement is calculated by substituting the relevant age/sex proportions of the specific population and re-calculating the weighted average.

readily satisfied with mixtures of proteins of plant origin (e.g. cereals and legumes).

At least 17 percent of energy in the ration should be provided in the form of fat. However, with particular reference to supplementary feeding programmes, fat requirement for young children is between 30-40 percent of their energy requirements, and pregnant and lactating women at least 20 percent.

B. Acceptable basic rations

Table 2 presents five examples of rations⁸ that meet minimum energy, fat and protein requirements. The energy, protein, fat, and micronutrient contents of a ration can be readily calculated using the nutritional composition tables in Annexes 3 and 4. An example of how to calculate the energy, protein and fat content of a typical ration is given in Annex 5.

Table 2: Examples of adequate full rations in terms of energy, protein and fat for populations entirely reliant on food assistance

ITEMS	RATIONS (quantity in g)				
	Example 1	Example 2	Example 3	Example 4	Example 5
Cereal	400	450	350	400	400
Pulses*	60	60	100	60	50
Oil (vit. A fortified)	25	25	25	30	30
Fish/meat	-	10	-	30	-
Fortified blended foods	50	40	50	40	45
Sugar	15	-	20	-	25
Iodized salt	5	5	5	5	5
Energy: kcal	2,113	2,075	2,113	2,146	2,100
Protein (in g and in % kcal)	58 g; 11%	71 g; 13%	65 g; 12%	55 g; 10%	65 g; 12%
Fat (in g and in % kcal)	43 g; 18%	43 g; 18%	42 g; 18%	42 g; 17%	39 g; 17%

* Not all types of pulses are acceptable to all populations; therefore, the most familiar type of pulse must be resourced for the population.

⁸ The different types of rations are determined by factors such as the food habits of the population, the acceptability and the availability of commodities.

CHECKLIST

FOR ADJUSTMENTS TO THE INITIAL PLANNING FIGURE OF 2,100 KCAL

- ✓ Are the majority of the population undertaking strenuous physical activities such as carrying heavy loads over long distances?
- ✓ Is the average temperature significantly lower than 20°C?
- ✓ What is the prevalence of malnutrition among the population?
- ✓ Is the CMR significantly higher than normal?
- ✓ Are there significant public health risks for the affected population?
- ✓ Is the demographic profile of the affected population similar to the average for a developing country?
- ✓ Is the population receiving a regular supply of some food from other sources?
- ✓ What is the percentage of energy from protein in the ration?
- ✓ Is the energy obtained from fat at least 17 percent?

C. Refining the ration: Selecting commodities to meet specific considerations

Once the per capita daily nutrient requirements have been established, and basic food commodities identified, the ration is refined to ensure that other specific requirements are covered. The main considerations for the type and quality of foods being provided in the basic rations are:

1. Micronutrient requirements
(potential deficiencies and the need for provision of fortified blended foods)
2. Special nutritional requirements for the more vulnerable: infants and young children, pregnant and lactating women, and older persons
3. Use of exceptional commodities: milk powder and ready-to-eat meals

4. Underlying social and cultural issues affecting food use and food preparation

5. Logistics and food-management practicalities

1. **Addressing micronutrient (vitamin and mineral) requirements**

The adverse effects of micronutrient deficiencies are profound. Micronutrient deficiencies may lead to increased risk of death, morbidity and susceptibility to infection, blindness, adverse birth outcomes, growth stunting, low work capacity, decreased cognitive capacity and mental retardation. In emergency situations, the affected population may have suffered endemic micronutrient deficiencies, often exacerbated by a general deterioration in nutritional status, a limited access to fresh foods, a loss of access to traditional foods and a lack of food diversity.

a. Micronutrient adequacy in a ration

Determining the micronutrient adequacy of a ration requires a straightforward comparison of the population's daily micronutrient requirements with the estimated level of micronutrients in the basic ration.

Table 3 provides a summary of the safe levels of some vitamins and minerals. Intakes below these levels may result in vitamin deficiencies and other nutrition-related problems among the population. A more detailed description of requirements for specific vitamins and minerals by age is found in Annex 2.

The micronutrient content of a ration can be calculated using the nutrient content of the food ration using the nutritional composition data of selected foods shown in Annex 4. The process of determining whether the micronutrient content of a ration may be too low is described in Annex 6.

b. Micronutrient deficiencies

Populations that are highly dependent on food assistance are often at risk of micronutrient-deficiency diseases. Efforts should be made within the context of emergency food assistance programmes to recognize factors that increase the

likelihood of micronutrient-deficiency diseases, including:

- endemic micronutrient deficiencies in the country of origin;
- lack of suitable diversification in rations (e.g. only one or two commodities are provided);
- lack of access to fresh foods;
- rations based on highly refined cereals that may be low in B vitamins, iron, potassium, magnesium and zinc; and
- high rates of infection and/ or diarrhoea in children.

Iron deficiency anaemia, vitamin A deficiency and iodine deficiency are recognized as the three most significant micronutrient-deficiency diseases worldwide. Given the endemic aspect of these diseases in some developing countries, they are to be expected among a food-insecure population unless appropriate action is taken. Other micronutrient-deficiency diseases, including scurvy (vitamin C deficiency), pellagra (niacin deficiency) and beriberi (thiamine deficiency) have re-emerged among emergency-affected populations during the past two decades.

Table 3: Daily requirements of vitamins and minerals for a population needing emergency food aid

VITAMIN/MINERAL	RECOMMENDED DAILY INTAKE
Vitamin A	500 µg retinol equivalents (or 1,666 IU)
Thiamine (B1)	0.9 mg
Riboflavin (B2)	1.4 mg
Niacin	12.0 mg
Folic acid	160 µg
Vitamin C	28.0 mg
Vitamin D	3.8 µg
Iron	22 mg*
Iodine	150 µg

* Assuming low bio availability of iron in the diet (i.e. 5-9%) — Source: The management of nutrition in major emergencies. WHO, Geneva, 2000.

c. Fortification

The inclusion of a fortified blended food—an effective vehicle for a number of micronutrients—is an important part of the basic ration in an emergency situation, particularly for the micronutrient needs of young children, pregnant and lactating women, and the elderly. Blended foods must meet certain criteria in terms of composition and micronutrient fortification (see Annex 7).

Food fortification is the process whereby one or more nutrients (vitamins or minerals) are added to foods during processing. These

micronutrients are essential for human growth, natural immunity and development. Fortification does not greatly increase the cost of food or adversely affect its taste and acceptability.

A single fortified food commodity is not a practical vehicle for the delivery of all essential micronutrients. Rather, different foods should be fortified with the appropriately matched micronutrient(s). For example, the following box shows foods with mandatory fortification requirements:

Vegetable oil	Vitamin A and D
Salt	Iodine
Wheat and maize flour	Vitamin A, thiamine (B1), riboflavin (B2), niacin, folic acid and iron
Blended foods	Vitamin A, thiamine (B1), riboflavin (B2), niacin, folic acid, vitamins C and B12, iron, calcium and zinc

WFP fortification specifications for vegetable oil, salt, wheat and maize flour, and blended foods follow in Table 4.

Table 4: WFP fortification specifications for selected commodities

COMMODITY	VITAMINS AND/OR MINERALS	FORTIFICATION QUANTITY
Vegetable Oil	Vitamin A	30,000 IU/kg oil or 9,000 µg RE Vitamin A /kg oil
	Vitamin D	3,000 IU per kg oil or 75 µg Vitamin D per kg oil
Salt	Iodine	20–40 mg of iodine /kg salt or 33–66 mg of potassium iodinate per kg salt
Wheat and maize flour*	Vitamin A	10,000 IU per kg flour
	Thiamine (B1)	4.4 mg per kg flour
	Riboflavin (B2)	2.6 mg per kg flour
	Niacin	35 mg per kg flour
	Folic Acid	0.4 mg per kg flour
	Iron	29 mg per kg flour
Blended foods	See Annex 8 for recommendations	See Annex 8 for recommendations

* Fortification levels may be adjusted according to national requirements.

d. Strategies to prevent micronutrient deficiencies

Providing fortified blended food is one strategy to correct or prevent micronutrient deficiencies in an emergency situation. It is described along with several other strategies in Table 5.

e. Health measures and micronutrients

Combining the above nutritional interventions with other complementary

public health measures is frequently necessary to eliminate (or prevent) a specific micronutrient deficiency. Two examples of public health measures are: deworming interventions in combination with distribution of iron supplements to control iron deficiency anaemia, and distribution of vitamin A capsules through routine supplementation to control vitamin A deficiency and to reduce overall morbidity and mortality.

Table 5: Response options to address micronutrient needs

STRATEGY	STRENGTHS	WEAKNESSES	REMARKS/ EXAMPLES
1. Inclusion of fortified food items in the general ration	<ul style="list-style-type: none"> - Reaches a large number of recipients. - Interventions can be implemented rapidly. - Cost effective. 	<ul style="list-style-type: none"> - Limited to food-aid commodities that are suitable vehicles for micronutrients. - Need to be sustained until access to fresh food improves. 	<ul style="list-style-type: none"> - Oil with vitamin A, fortified flours. - Requires active participation of the food industry and donor. - Need to ensure fortification specifications are met (quality control).
2. Promoting the production of vegetables and fruit	<ul style="list-style-type: none"> - Supports self-reliance. - Provides fresh foods of preferred choice. 	<ul style="list-style-type: none"> - Requires population to have access to land, water and agricultural inputs. 	<ul style="list-style-type: none"> - Cultivation of homestead gardens or communal garden plots.
3. Promoting beneficial food-preparation practices	<ul style="list-style-type: none"> - May support indigenous food-preparation practices in some situations. 	<ul style="list-style-type: none"> - Introduced practices may be unfamiliar to the population and therefore require substantial communications. 	<ul style="list-style-type: none"> - Fermentation, sprouting grains and pulses.
4. Providing fresh food items in general ration (or facilitating access to fresh foods)	<ul style="list-style-type: none"> - Improves palatability and quality of ration. 	<ul style="list-style-type: none"> - Expensive and logistically difficult. - May increase market prices at local or regional level. - Feasibility of providing for whole population unlikely. 	<ul style="list-style-type: none"> - Fresh foods provided must be rich in micronutrient(s).
5. Food diversification: adding to the ration a food rich in a particular vitamin or mineral(e.g. ground nuts, dried fish).	<ul style="list-style-type: none"> - Reaches a large number of recipients. - Interventions can be implemented rapidly. 	<ul style="list-style-type: none"> - Needs to be sustained until access to fresh food improves. - Food safety and quality control can be difficult 	<ul style="list-style-type: none"> - Restricted to foods that the population is familiar with and that contain the relevant micronutrients.
6. Distribution of vitamin/mineral supplements	<ul style="list-style-type: none"> - Can be very effective if linked with immunizations or health programmes (e.g. vitamin A). 	<ul style="list-style-type: none"> - Distribution system needs to be maintained. - May be expensive and time-intensive if relying on an independent distribution system. 	<ul style="list-style-type: none"> - Distribution of some specific micronutrient supplements such as vitamin C may be better suited to treatment rather than preventive measures.

CHECKLIST:

DOES THE FOOD BASKET MEET MICRONUTRIENT REQUIREMENTS?

- ✓ Is the ration likely to be deficient in a specific micronutrient(s)? Why?
- ✓ Was/is there an endemic micronutrient deficiency in the population? If so, can a large-scale preventive intervention be considered through the general ration?
- ✓ Are food-aid commodities in the ration appropriately fortified?
- ✓ Are additional interventions such as home gardens, health promotion and deworming programmes appropriate and feasible?

D. Adjusting the ration according to people's access to food

1. Emergency food needs assessments

There is a variety of methods and analytical frameworks that can be used to assess the ability of populations to access food on their own. While there is currently no universally agreed-upon method for conducting emergency food needs assessments, the broad goal of such assessments is to understand the different ways that people are able to obtain food through their own activities. Information gathering should use qualitative and quantitative methods and should include data from both primary and secondary sources. A number of useful sources on emergency food needs assessments are listed on page 16.

Emergency food needs assessments should be conducted keeping in mind the overall goals and operational objectives of food assistance. These objectives would normally include one or more of the following:

- to save lives;
- to maintain or improve health/nutritional status with special attention to pregnant and lactating women and other groups at high risk;
- to preserve productive assets;
- to prevent mass migration;
- to ensure access to a adequate diet for all population groups;
- to establish conditions for and promote rehabilitation and the restoration of self-reliance; and
- to minimize damage to food-production and -marketing systems due to the emergency situation.

2. Calculating food requirements based on access to food

At the onset of sudden emergencies, such as refugee influxes, floods and hurricanes, populations typically have no access to food other than that provided through relief programmes. In these types of situations, it is generally appropriate to estimate the food requirements for humanitarian assistance based on the adjusted energy requirements for the population (i.e. provide a full ration calculated using the adjusted planning figure).

In situations where an emergency food needs assessment has determined that a population is able to obtain food through activities⁹, it may be appropriate to adjust the food requirements for a population to reflect this fact. In practice, this must be done with extreme caution, as most estimates of the ability of people to provide for their own food needs are fairly crude. Typically, the proportion of energy requirements that the population can provide is estimated to the nearest increment of 25 percent (i.e. 25 percent, 50 percent, 75 percent). For example, if the energy requirements for a given population have been calculated at 2,100 kcals, and an assessment has determined that the population has the capability to provide about 25 percent of their daily energy requirements (about 500 kcals), the food assistance should be calculated to provide 1,600 kcals. It is important to continue to monitor indicators of nutritional status, food security and coping strategies after adjustment of rations to ensure that the ration reduction is not having adverse effects. Reducing the ration across

the board may mean that a significant proportion of the population receives insufficient food to meet its needs.

Sources of information:

The information that is required to make decisions about the ration should be based on a demonstrated understanding of the situation. It is usually collected from the following sources:

- **background information on the country (e.g. demographics and climate);**
- **formal assessments and primary data from quantitative surveys and qualitative sources;**
- **the community and other key informants (e.g. village leaders, community representatives and women); and**
- **secondary sources of information (e.g. country profiles and project/programme reports).**

⁹ Such a decision should also weigh whether the activities are damaging or unsustainable.

E. Meeting the special nutritional needs of the most vulnerable persons

1. Infants and young children¹⁰

Experience has shown that infant and child morbidity and mortality rates often dramatically increase during emergencies. Malnutrition during the early years of life has a negative impact on cognitive, motor-skill, physical, social and emotional development. As part of estimating food and nutritional needs, specific interventions are required during emergencies to protect and promote optimal infant- and child-feeding practices. These interventions should be routinely included in any relief response and should be sustained throughout the period of response.

a. Breastfeeding

Breast milk is the ideal food for healthy growth and development of infants and young children. The availability of nutrients from breast milk exceeds that from any other substitute. Breast milk not only provides all the nutrient requirements for infants but also protects children from infection. The practice of exclusive breastfeeding for the first six months of life can also provide a contraceptive effect for the mother, who is spared the depleting effects of closely spaced pregnancies. In addition, breastfeeding enhances bonding between mother and child, providing crucial physical and emotional support for the child.

In most emergencies, breastfeeding becomes even more important for infant nutrition and health. The resources needed for safe artificial feeding—such as water, fuel and adequate quantities of infant formula—are usually scarce

in emergencies. Artificial feeding in these circumstances increases the risk of diarrhoeal diseases and malnutrition, which in turn substantially increases the risk of infant death. If absolutely required, infant formula should only be used when all other options (e.g. wet-nursing) have been exhausted¹¹. For these reasons, infant formula should only be purchased and distributed based on needs assessments carried out by adequately trained nutrition and health workers. Strategies should also be developed to promote best practices in situations where formula is used. If used, infant formula should have generic labelling as well as reconstitution instructions in the local language. See box on the next page on guiding principles for feeding infants during emergencies.

Supplementary feeding may be an important intervention for protecting the nutritional status of the lactating mother and maintaining the nutritional quality of the breast milk. Support and encouragement may also be required to maintain and enhance breastfeeding in individuals affected by high levels of psychological stress.

UNHCR, UNICEF, WFP and WHO comply with the international guidelines on the protection and promotion of breastfeeding. All staff involved in the planning of food and nutritional needs should be familiar with these policy statements and guidelines, in particular:

- (1) UNHCR's policy statement on distribution of milk products in emergencies (Annex 9a); and

¹⁰ According to WHO, infants are defined as those individuals less than 12 months old. Young children are defined as those individuals between 12 and 36 months.

¹¹ A list of criteria for situations in which an alternative to breastfeeding may be considered can be found in the "GIFA/IBFAN/UNICEF/UNHCR/WFP/WHO Infant and Young Feeding in Emergencies. Operational Guidance for Emergency Relief Staff and Programme Managers. Interagency Working Group on Infant and Young Child Feeding in Emergencies." ENN, November 2001.

- (2) Ten Steps to Successful Breastfeeding (WHO/UNICEF) (Annex 9b).
- (3) GIFA/IBFAN/UNICEF/UNHCR/WFP/WHO Infant and Young Child Feeding in Emergencies. Operational Guidance for Emergency Relief Staff and Programme Managers. Interagency Working Group on Infant and Young Child Feeding in Emergencies. ENN, November 2001. Recommendations for practical action to ensure appropriate infant and young child feeding in emergencies are outlined in Annex 9c.

b. Breast-feeding and HIV

For mothers who are HIV-infected, recommended breastfeeding practices can sometimes differ, as HIV can be transmitted through breast milk. Globally, the risk of mother-to-child HIV transmission (MTCT) through breastfeeding ranges between 10 percent and 20 percent if the infant is breast-fed for 18 to 24 months. On the other hand, infants who are not breast-fed may be exposed to higher risk of morbidity and mortality associated with malnutrition and infectious diseases other than HIV.

Guiding principles for feeding infants (0-6 months) during emergencies

1. ALL INFANTS, INCLUDING THOSE BORN INTO POPULATIONS AFFECTED BY EMERGENCIES SHOULD NORMALLY BE EXCLUSIVELY BREAST-FED FOR THE FIRST SIX MONTHS AS RECOMMENDED BY WHO.

- The beneficial effects of colostrum in breast milk are especially important; infants should be breast-fed on demand from birth.
- Every effort should be made to identify ways to breast-feed infants whose mothers are absent or incapacitated.
- Re-lactation should be attempted before the use of infant formula is considered.

2. EVERY EFFORT SHOULD BE MADE TO CREATE AND SUSTAIN AN ENVIRONMENT THAT ENCOURAGES EXCLUSIVE BREASTFEEDING FOR THE FIRST SIX MONTHS, AND CONTINUED FREQUENT BREASTFEEDING THEREAFTER FOR UP TO TWO YEARS.

3. THE QUANTITY, DISTRIBUTION AND USE OF BREAST MILK SUBSTITUTE E.G. INFANT FORMULA AT EMERGENCY SITES SHOULD BE STRICTLY CONTROLLED, USING THE FOLLOWING GUIDELINES:

- Nutritionally adequate infant formula, fed by cup, should be available for infants who do not have access to breast milk.
- Those responsible for feeding infant formula should be adequately trained and equipped to ensure its safe preparation and use.
- Feeding infant formula to a minority of children should in no way interfere with protecting and promoting breastfeeding for the majority.
- The use of infant feeding bottles and artificial teats in emergency settings should be actively discouraged and cup feeding promoted instead, as cups are much easier to keep clean.

Adapted from Guiding Principles for Feeding Infants and Young Children during Emergencies (WHO, in press).

In a typical emergency, the majority of women do not know their HIV status. For women to be able to make appropriate informed choices on infant feeding, availability of voluntary counseling and testing (VCT) is crucial.

Current policies on breastfeeding and infant feeding by HIV-infected women are these (WHO, 2001, Inter-agency Taskforce. Report No. WHO/RHR/01/01.28):

1. Exclusive breastfeeding should be protected, promoted, and supported for six months. This applies to women who are known not to be infected with HIV and for women whose infection status is unknown.
2. When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of breastfeeding by HIV-infected mothers is recommended; otherwise, exclusive breastfeeding is recommended during the first months of life.
3. To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding (including infections other than HIV and malnutrition).
4. HIV-infected women should have access to information, follow-up clinical care and support, including family planning services and nutritional support.

It is important to ensure that replacement feeding, advised as one option for feeding infants of HIV-infected women, does not "spill over" to the general population as being the best option for all children.

2. Complementary feeding for older infants and young children¹²

At 6 months of age, infants should start to receive complementary foods in addition to breast milk. These should be safely prepared from locally available foods that are rich in energy and micronutrients to meet the infants' changing nutritional requirements. This can be a significant challenge during emergencies, since constraints often exist. Available foods may be difficult to prepare into a soft, semi-solid form. Environmental conditions may hinder safe food preparation and feeding. Traditional ingredients that were normally used to prepare weaning foods may not be available. Furthermore, basic food-aid commodities—cereals, pulses and oil—do not by themselves readily meet the nutritional needs of young children.

During the complementary feeding period, older infants and young children require foods that are easily digestible. Equally important, complementary foods used during this period should provide adequate amounts of fats and oils (30–40 percent of energy should come from fat). The period from ages 6 to 24 months is the most critical for a young child because of rapid growth and an increasing reliance on complementary food. Therefore, energy derived from

¹² "Older infants" refers to infants between 6 and 12 months of age; "young children" refers to children between 12 and 36 months.

protein should be at least 12 percent. And these young children must have access to foods rich in micronutrients for sufficient growth and development. During the second 6 months of life, breast milk normally continues to provide about 50 percent of the nutritional needs of the infant.

During the second year, it can provide 35-40 percent of total energy needs.

In emergency situations, there are a number of foods that can be used for the preparation of suitable complementary foods (see Table 6 below and Annex 10).

Table 6: Options for addressing nutritional needs of older infants and young children

SOURCE OF FOOD	EXAMPLES OF FOODS	REMARKS
1. Basic food-aid commodities from general ration with supplements of inexpensive locally available foods	<ul style="list-style-type: none"> - Cereals, pulses, oil and sugar combined together with a variety of vegetables and fruit (cereals and pulses must be prepared using ground or milled forms) 	<ul style="list-style-type: none"> - Combinations of cereals and pulses with added oil and sugar, suitable for complementary foods are described in Annex 10. - Recipes can be developed using local foods with input from nutrition and/or health expertise. - Traditional complementary feeding practices must be observed and understood.
2. Blended foods (as part of general ration/ blanket or supplementary)	<ul style="list-style-type: none"> - Corn-Soya Blend (CSB), Wheat-Soya Blend (WSB) - Varieties of locally produced blended foods such as FAMIX in Ethiopia or UNIMIX in Kenya 	<ul style="list-style-type: none"> - Blended foods processed by roasting or extrusion to improve digestibility. - Usually additional oil required in preparation; DSM can be added as an additional protein source and for palatability. - For growth and development, blended foods are usually fortified with zinc and iron and other micronutrients (see Annex 8).
3. Additional foods in supplementary feeding programmes	<ul style="list-style-type: none"> - Fruit, vegetables, fish, eggs or other suitable locally available foods 	<ul style="list-style-type: none"> -Valuable source of vitamins and minerals

There are a number of other considerations to take into account when planning food rations to address the nutritional needs of older infants and younger children. These are summarised in Table 7.

Table 7: Challenges and implications for planning food needs for older infants and young children

ISSUE	IMPLICATIONS FOR PLANNING FOOD NEEDS
<p>Feeding frequency: Due to limited stomach capacity, food needs to be provided frequently.</p>	<ul style="list-style-type: none"> ⇒ Provision of sufficient fuel and cooking pots for households with young children. ⇒ Supply of food-aid commodities is consistent and timely to facilitate appropriate food-preparation practices. ⇒ Recognition of time required by caregiver for food-preparation activities.
<p>Household food security: Household food security may contribute to intra-household food distribution that does not allow nutritional needs of young children to be met.</p>	<ul style="list-style-type: none"> ⇒ Adequate and equitable general ration. ⇒ Household monitoring as part of general monitoring system. ⇒ Community-based surveillance to identify problems related to intra-household distribution.
<p>Safe and appropriate food preparation and caring activities: Lack of access to clean water, poor sanitation, inexperienced caregivers and mothers overburdened with meeting household food needs may contribute to abnormal and inadequate caring practices. Feeding of orphans (particularly in situations where HIV/AIDS prevalence is very high)</p>	<ul style="list-style-type: none"> ⇒ Health-promotion activities for safe food preparation and dissemination of information on nutritional needs of young children. ⇒ Access to adequate amounts of clean water and provision of suitable sanitation facilities. ⇒ Additional resources to create a special and appropriate system to care for those children, preferably in a family environment.

* Intra-household food distribution refers to how the food available to the household is shared between different family members.

3. Pregnant and lactating women

During pregnancy and lactation, women's nutritional needs for energy, protein and micronutrients significantly increase. Pregnant women require an additional 285 kcals/day, and lactating women require an additional 500 kcals/day. Both pregnant and lactating women have increased needs for micronutrients. Adequate intake of iron, folate, vitamin A and iodine are particularly important for the health of both women and their infants. The nutritional requirements of pregnant and lactating women are summarized in Annex 11.

Intra-household food distribution practices in many situations result in pregnant and lactating women consuming less than their minimum requirements. The consequences of poor nutritional status and inadequate nutritional intake for women during pregnancy and lactation not only directly affects the women's health status but may have a negative impact on infant birth-weight and early development. Therefore, to meet the additional requirements of pregnancy and lactation, three important and complementary interventions

—as summarized below in Table 8— may be undertaken in addition to the provision of a basic food ration.

As mentioned earlier in this document, the increased energy requirements of pregnant and lactating women are incorporated in the 2,100-kcal initial

planning figure. However, the increased micronutrient needs of pregnant and lactating women may not be met through provision of a basic ration. Various criteria exist that can be used to determine when a supplementary feeding programme should be implemented—these criteria are described in greater detail in the

Table 8: Complementary interventions to meet the additional needs of pregnant and lactating women

1. FORTIFIED FOOD COMMODITIES*

- Provision of a fortified blended food commodities, designed to provide 10–12 percent (up to 15 percent) of energy from protein and 20–25 percent energy from fat. The blended food must be fortified to meet two-thirds of daily requirements for all micronutrients, particularly iron, folic acid and vitamin A.
- The food commodities can be provided through maternal and child health (MCH) structures (in conjunction with other health services) or through blanket supplementary feeding programmes.

2. MICRONUTRIENT SUPPLEMENT

Pregnant women:

Daily supplements of iron (60 mg/day) and folic acid (400 µg/day)

Lactating women:

Vitamin A: 400 000 IU in 2 doses of 200 000 IU in an interval of at least 24 hours within six weeks after delivery

3. DRINKING WATER

Women are ensured access to sufficient drinking water (extra 1 litre of clean water per day).

4. MALARIA MANAGEMENT IN PREGNANCY

- In areas where malaria is endemic, sulphadoxine-pyrimethamine can be administered through clinics at the beginning of the second and third trimesters.
- Encourage women to use an impregnated bed net during pregnancy.
- Advise women that they must seek immediate medical attention for episodes of fever.

5. PROPHYLAXIS FOR MANAGEMENT OF INTESTINAL PARASITES

Give each affected woman 500 g mebendazole, in the second and the third trimester.

6. NUTRITION/EDUCATION COUNSELLING FOR WOMEN AND COMMUNITIES

* The food should be provided in addition to the basic general ration, either through the same mechanism as the general ration distribution or through MCH facilities as a blanket supplementary feeding ration. The food should be targeted to women in their second and third trimesters of pregnancy and during the first six months of the lactating period (i.e. for a total period of 12 months).

UNHCR/WFP Guidelines for Selective Feeding Programmes in Emergency Situations (1999) and The Management of Nutrition in Major Emergencies (WHO, 2000).

4. Older persons

The energy requirements for older persons (defined by WHO as those over the age of 60) usually decrease in comparison with younger adults as a result of less physical activity and decreased basal metabolism that results from a higher relative loss of muscles mass. The requirements for micronutrients, however, do not decrease. Hence, an adequate diet for older persons must ensure that micronutrient requirements are still met even with reduced energy intakes (i.e. foods must be sufficiently nutrient-dense). Another important consideration for older persons is that sufficient intakes of fluids are

required to prevent dehydration and improve digestion.

Theoretically, a well-planned general ration is usually adequate for older persons. However, in practice, a number of other factors often results in the general ration not actually meeting the nutritional needs of the older persons. Some of these factors include: poor physical access to the ration as a result of marginalization or isolation; poor digestibility, especially of whole-grain cereals; lack of motivation or inability to prepare foods; and poorer access to opportunities for supplementing the ration. In emergency situations, these factors are exacerbated due to a general breakdown in normal family and community-support mechanisms. Table 9 presents a number of strategies that should be considered to ensure that the nutritional and food needs of older persons are better addressed.

Table 9: Considerations to the nutritional and food needs of older persons

1. ACCESS TO EASILY DIGESTIBLE, MICRONUTRIENT-RICH FOODS

- older persons, or families including older persons, should be provided with blended foods. In situations where blended food is not provided to the whole population, under-5-year-olds, pregnant and lactating women and older persons should be prioritized.
- Access to milling facilities in situations where whole-grain cereal is provided.
- older persons (caregivers/families) should be assisted and encouraged in small-scale horticultural activities to increase consumption of fresh foods.

2. FAMILY AND COMMUNITY SUPPORT FOR FOOD PREPARATION

older persons, without family or community support, can be assisted through community-based support programmes. Assistance with tasks such as collection of rations, food preparation and collection of water may be required for older persons.

CHECKLIST:

DOES THE FOOD RATION ADDRESS THE NUTRITIONAL NEEDS OF INFANTS, YOUNG CHILDREN, PREGNANT/ LACTATING WOMEN AND OLDER PERSONS?

- ✓ Is there an established understanding of infant feeding needs and an agreed strategy/framework to address these issues?
- ✓ What actions have been taken to support and promote breastfeeding in the population?
- ✓ What mechanisms are in place to monitor and control the distribution of milk powder and infant formula for those with specific needs?
- ✓ Is blended food being made available in the general ration? If not, is it being effectively targeted to families with older infants, pregnant and lactating women, and older persons?
- ✓ Is the strategy for households to prepare suitable weaning foods using local foods feasible?
- ✓ Is there a need to integrate food (and micronutrient) supplementation into antenatal services?
- ✓ Are health promotion and deworming programmes appropriate and feasible?

F. Use of special commodities:

Milk powder and ready-to-eat-meals

In most situations, certain commodities such as milk powder and ready-to-eat meals are not recommended. However, there are exceptional circumstances where these commodities can play a useful role in meeting specific objectives in emergency situations.

1. Milk Powder

Dried milk powder should NOT be distributed to emergency-affected populations as part of the general ration. There is a danger that it will be used to feed infants. Also, when it is prepared with unclean water or in unsanitary conditions, the risk of high levels of bacterial contamination is significant.

Milk powder can be used safely:

1. for the preparation of high-energy milk (HEM) for consumption under strictly supervised conditions such as well managed supplementary and therapeutic feeding programmes;
2. added to a pre-mix with cereal flour, oil and sugar and targeted to specific sub-groups of the population (above 6 months of age) to be consumed within seven days after mixing; or
3. as an ingredient in the local production of processed foods (e.g. blended foods, noodles and biscuits).

There are two main types of dried milk powders: dried skim milk (DSM) and dried whole milk (DWM). The nutritional value and reconstitution process of HEM used in supplementary feeding and therapeutic feeding is described in UNHCR/WFP's "Guidelines for Selective Feeding

in Emergencies” and “Management of Severe Malnutrition: A Manual for Physicians and Senior Health Workers” (WHO, 1999) respectively.

2. Ready-to-eat meals, emergency rations and high-energy biscuits

In some emergency situations, ready-to-eat meals may serve a useful temporary purpose, though their use should be carefully controlled. Examples of these types of food include high-energy/protein biscuits, humanitarian daily rations (HDRs) and meals ready to eat (MREs). These items should only be used as an immediate response at the outset of the emergency when no other foods/cooking facilities are available (e.g. when a population is in transit or fleeing). See Table 10 on advantages and disadvantages of ready-to-eat meals and humanitarian daily rations.

IV. FACTORS AFFECTING FOOD PROCESSING, PREPARATION AND USE

Other important issues that directly influence the capacity to meet the nutritional needs of the populations should be given consideration when setting a food ration for an emergency situation. Specifically:

A. Local food habits and cultural acceptability

Every effort should be made to ensure that the food-aid commodities are culturally acceptable to the population. The target population should have the knowledge and the means to process and prepare the foods using their usual cooking facilities and fuel whenever possible. For many populations, food is a component of cultural identity and plays a significant social role. The provision of the correct amounts of energy and nutrients is insufficient if the

Table 10: Advantages and disadvantages of ready-to-eat meals and humanitarian daily rations

DISADVANTAGES	ADVANTAGES
<ul style="list-style-type: none"> • Unfamiliar foods for most populations, so culturally inappropriate and rarely popular • Packaging difficult to discard appropriately • Very expensive and supply unsustainable • High-energy biscuits may not be suitable for use in therapeutic feeding programmes due to high protein and high sodium content. • Biscuits have high market value, so are often sold and not consumed. • Water must be taken with high-energy biscuits (moisture content of biscuits is very low). 	<ul style="list-style-type: none"> • Convenient, fast and logistically easy to distribute • May be appropriate for populations who are in transit when cooking facilities not available • Long shelf life (usually vacuum packed) • High-energy biscuits suitable for supplementary feeding on a temporary basis • High-energy biscuits are fortified with vitamins and minerals

foods are unacceptable or even unfamiliar to the population. Emergencies are not a suitable time to introduce new types of food.

Food preparation should remain with the family unit. This encourages food preparation according to local dietary habits and contributes to important social functions such as family cohesion.

Institutional-type preparation and provision of pre-prepared foods should be avoided except in situations where wet-feeding may be an appropriate temporary solution (e.g. transit camps, insecure areas or where the population is extremely weak and cannot cook for themselves).

B. Milling requirements

For practical and nutritional reasons, it is preferable to provide cereal in flour, rather than grain form, particularly in the early stages of emergency. Compared to whole grains, flours have improved palatability and bio-availability of nutrients, can be effectively fortified and require less cooking time (and therefore less fuel). Cereal flours, though, do have a reduced shelf life in comparison to whole-grain cereals.

If whole grains are provided, central or local milling facilities must be available. A number of factors may limit the effective use of local mills, such as insufficient capacity and availability of continuous power supply.

Where whole grain is provided instead of flour, the ration should include compensation for the cost and losses of local milling. An additional 10 to 20 percent of cereal staple or equivalent should be provided in these circumstances.

C. Fuel for food preparation

Access to sufficient fuel for food preparation is a critical issue to consider in emergency situations. Fuel shortages are often a major constraint. This can be summarized as (a) rapid exhaustion of natural resources in the area due to increased demand; (b) a lack of access to fuel due to poor security conditions or risk of mines; (c) foods that require lengthy cooking (e.g. hard beans); and (d) loss of access to normal cooking fuel supplies.

The control and management of the natural resources in the vicinity of the affected population is important for protecting the environment and enabling the population to have sufficient access to fuel resources.

In addition, fuel-saving strategies should be developed. These strategies may include:

(a) using local technology to modify existing types of stoves in order to make them more fuel efficient (e.g. enclosing and insulating the stoves); (b) adapting food-preparation techniques that are fuel-efficient (e.g. soaking beans prior to cooking, using pots with lids and putting fires out after cooking is complete). To be effective, fuel-saving strategies require community involvement in their development and implementation.

D. Non-food items required for food preparation

The availability of adequate supplies of essential non-food items such as water and cooking containers (pots) must be ensured. Iron pots, in particular, may be selected as a way of providing dietary iron.

V. MANAGEMENT OF FOOD-RELATED ISSUES

A. Temporary substitution of food items

Unavailable food commodities can be replaced by another food in order to maintain the energy and/or protein level of the food basket. These substitutions should only be considered as a temporary measure and should not be implemented for longer than one month. While the substitutions maintain energy/protein levels, they do not maintain equal levels of other nutrients.

The temporary substitution ratios for common food items are shown in the box below:

Blended food for beans	1 : 1
Sugar for oil	2 : 1
Cereal for beans	2 : 1
Cereal for oil (but not oil for cereal)	3 : 1

Inappropriate substitutions—such as the provision of unfamiliar foods, the use of unsolicited donations of expired foods or the use of highly processed commercial foods¹³—should be avoided. In all situations where temporary substitutions are necessary, efforts should be made to inform the population of the temporary substitution arrangement and its expected duration.

Practical example:

The daily rations for cereals and beans are 420 g and 50 g respectively. Beans become temporarily unavailable and an appropriate substitution is required. Efforts are made to secure an alternative high-protein food. Although dried fish can be procured regionally, only a small minority of the population eats fish. Groundnuts are familiar to the population, but cannot be procured locally in sufficient quantities. Therefore, a cereal substitution is adopted, and an additional 100 g per day of cereal is provided. A new total of 520 g of cereal is provided daily in the ration for one month while arrangements are made to procure sufficient quantities of beans or groundnuts.

Note: Where maize is the staple cereal, the additional cereal should be fortified blended food. Maize has limited bioavailable niacin, so overdependence creates the risk of pellagra.

¹³ Some examples of inappropriate foods include sweetened processed foods for young children and pre-prepared emergency rations such as Humanitarian Daily Rations (HDRs), which often contain unfamiliar foods.

B. Packaging of food-aid commodities

Proper food packaging is necessary to preserve and protect the quality of commodities. Proper labelling of food-aid commodities provides vital information to field staff. Packaging should be environmentally friendly and, if possible, serve as an additional resource to the population as shown in the box below.

C. Exchange and trade of rations

The practice of exchange, bartering or re-sale of food-aid commodities in emergency situations may facilitate diversification of food and enable access to a number of foods that are not provided in the ration (e.g. fresh fruit, vegetables, meat, fish or eggs). The sale of food in the marketplace does not necessarily indicate a food surplus. The rationale for trading food may simply be to diversify the diet and to improve its palatability and quality.

Even when there is no evidence of a large-scale diversion of food, the situation should be carefully monitored to determine the reasons why food is being sold or exchanged. Monitoring mechanisms should be

FOOD-PACKAGING CONSIDERATIONS:

- | | |
|---|--|
| <ul style="list-style-type: none">• Protection potential | <ul style="list-style-type: none">• Strength/water-resistant capacity• Appropriate packaging can help retain micronutrients in the food commodity (e.g. iodine in salt, vitamins and minerals in blended foods).• The right packaging units facilitate easy distribution (kg/package). |
| <ul style="list-style-type: none">• Labelling on packaging | <ul style="list-style-type: none">• Foods should be clearly labelled with production date, nutritive value and composition and date of expiry.• Where applicable, instructions for food preparation should be given in a language that is understood by the population. |
| <ul style="list-style-type: none">• Disposal and environmental considerations | <ul style="list-style-type: none">• Discarding packaging should be easy and safe, with resources required for disposal provided if necessary. |
| <ul style="list-style-type: none">• Practical uses of packaging for population | <ul style="list-style-type: none">• Potential for package to be used by population (e.g. cereal sacks woven into mats, oil containers used as water containers, etc.)• Mechanism in place to distribute useful food packaging |

established to ensure that the practice of food trade is not having an overall negative effect on food access at the household level.

D. Quality control

A system of quality control for all commodities must be implemented to ensure that food distributed to refugees is of good quality and safe for human consumption. The acceptability and consumption of food is directly influenced by the quality of the food.

The following quality-control measures are required during storage, transport and distribution:

- Suppliers of food commodities must be carefully scrutinized to ensure that a regular quality-control check is done. Provided commodities must meet standards (official government or Codex Alimentarius standards) with respect to packaging, labelling, shelf-life, etc.
- All food received should have a minimum shelf life of six months (except for fresh foods and maize meal) and be distributed well before date of expiry.
- Adequate storage structures should be in place; storage facilities should be well-managed and should conduct regular checks on the quality of food items.
- Staff should be versed in potential health hazards caused by improper handling, storage and distribution of food.
- Written procedures should be in place for checking the quality of food at the distribution stage.

- Fumigation and food quality control measures should be in place.
- Discarding of spoiled food commodities should be documented and carried out safely, according to local health regulations.

Complaints received from the population on the poor quality of food (or, in some extreme cases, outbreaks of food-borne diseases) may indicate that the foods being provided are of inadequate quality. A failure to provide good-quality foods will be a major constraint towards meeting the nutritional needs of the population.

CHECKLIST:

HAVE CULTURAL HABITS AND FOOD MANAGEMENT BEEN CONSIDERED?

- ✓ Are the foods familiar to the population and generally regarded as “good” foods?
- ✓ If the cereal is received in whole-grain form, are there adequate milling facilities? Have losses for milling costs being compensated for?
- ✓ Do all households have access to fuel and cooking facilities?
- ✓ Is a fuel-saving strategy in place?
- ✓ Are packaging materials being appropriately discarded or distributed for re-use?
- ✓ Are food commodities being exchanged? For what? Is it likely to affect food access?

MONITORING AND FOLLOW-UP

Estimating the food requirements of a population and planning a ration are inadequate strategies on their own to ensure that the needs are being met in an emergency situation. First of all, a monitoring system must be established to ensure that any inadequacies in the ration are discovered in a timely manner. Secondly, a strategy outlining actions to be taken in response to food shortages or inadequate rations should be in place. Thirdly, given that access to food can change dramatically over time, and the opportunities for obtaining food through the population's own means differ significantly between situations, it is essential to make strong links between food aid and the potential for food production from the outset of the emergency.

I. MONITORING MECHANISMS TO ASSESS THE ADEQUACY OF THE RATION

The monitoring of a general food-distribution programme is generally implemented on four different levels:

- 1) **Food pipeline and supply** - at resourcing level, pledges, shipments, delivery to the camps, available stock at the warehouse. This is achieved through reports and record checks (e.g. waybills, logbooks, etc.).
- 2) **Food-distribution process** - Monitor the actual organization of the distribution system: frequency, location of distribution sites, availability of registration and

ration cards, food-basket monitoring.

- 3) **Community level** - Monitor food use, sale and exchange, and their impact on prevalence of protein-energy malnutrition and micronutrient deficiencies. Also link with health monitoring system to assess all causes of malnutrition.
- 4) **Household level** - to determine individuals' access, preparation and consumption of food; infant feeding practices; and women's perception of the quality and value of the food commodities

Monitoring at the community and household level is particularly crucial in determining the adequacy of the general ration and its nutritional impact.

II. MONITORING TOOLS

Providing details on the methods for these monitoring tools is beyond the scope of these guidelines. There is no single monitoring tool that can meet all information requirements in all circumstances. Some examples of monitoring tools that are most often used are described in Table 11. The selection of specific tools to use in a given situation will be determined by the objectives of the emergency intervention, the resources available and local conditions.

Information gathered through monitoring should be used on an ongoing basis to review

Table 11: Tools and types of information required for monitoring adequacy of ration

METHODOLOGY	PURPOSE AND TYPE OF INFORMATION COLLECTED
Food Basket Monitoring (FBM)	<ul style="list-style-type: none"> To determine the actual quantity of the ration that is received by the population in relation to the intended or theoretical amounts pledged or programmed. At a short distance from the distribution site and/or at the household level, a systematic sample of households is selected. Each of their food items is weighed to determine the amount of food received per person per day. <p>Reference: <i>Nutrition Guidelines. Medecins Sans Frontieres. 1995. UNHCR Commodity Distribution: A Practical Guide for Field staff. UNHCR. 1997.</i></p>
Qualitative methodologies (rapid assessments)	<ul style="list-style-type: none"> To provide an understanding of the population's beliefs, opinions and perceptions and give information on the reasons, causes and relative differences of quantitative findings. Some examples of methods include focus group discussions, direct observation, transect walks and semi-structured interviews. <p>Reference: <i>WFP. Food and Nutrition Handbook. 2000.</i></p>
Household surveys (quantitative)	<ul style="list-style-type: none"> To assess demographic information, mortality data, morbidity, food stocks and food use. Household questionnaires are collected from a representative sample of households. Results are analyzed statistically at a central level. Assessment of use of infant formula, caring capacity and infant and young child feeding practices.
Anthropometric and micronutrient-deficiency disease surveys	<ul style="list-style-type: none"> To assess and estimate prevalence of malnutrition, including micronutrient deficiencies, and to identify underlying causes and risk factors of malnutrition. Collection of anthropometric data on children (and other groups) using a random representative sample to determine prevalence of acute malnutrition. Assessment of (i) visible clinical signs of micronutrient deficiencies (e.g. goitre); and (ii) sub-clinical deficiencies through biochemical assessment (e.g. serum retinol, hemoglobin or urinary iodine). <p>Reference: <i>The Management of Nutrition in Major Emergencies. WHO, UNHCR, IFRC, WFP. Geneva, World Health Organisation. 2000.</i></p>
Household Food Economy Assessments	<ul style="list-style-type: none"> To quantify household capacity to access and produce food and to estimate household food shortages between different socio-economic groups. Population divided up into discrete groups on the basis of wealth to determine differences in access for each group. Information collected is specific, quantified information concerning the food sources, income and expenditures of what would be a "typical" household for each group. <p>(Note: This method is based on purposive sampling and grounded in nutritional principles; requires sound understanding of context and involves rigorous cross-checking processes.)</p> <p>Reference: <i>The Household Economy Approach: A Resource Manual for Practitioners, Save the Children (UK). 2000.</i></p>
Food and Livelihood Security Assessment	<ul style="list-style-type: none"> To analyze and understand basic causes and processes of food and livelihood security at national, regional and community levels and to identify areas of relative food insecurity. Based on combination of quantitative and qualitative approaches. Focuses on the context (social, political, economic and environmental); peoples' resources (material and natural resources and skills); access to food and livelihood strategies (food production, employment); institutional processes and structures (informal and formal). <p>Reference: <i>UNICEF, Conceptual Framework, Annex 12.</i></p>

and further refine nutritional needs estimates of affected populations. These revisions are particularly important where a specific event may negatively affect food access or in stable situations where the population's own means of production is gradually improving. Examples of strategies to address some of the problems identified by monitoring are listed in Table 12.

III. FOLLOW-UP TO MONITORING

In emergency situations, a number of constraints may exist that limit the potential for delivering a ration that is adequate in quantity and quality. It is paramount, therefore, that appropriate corrective measures are implemented in the event of a shortfall in order to prevent any negative consequences among the target population. In all circumstances, the population should be informed of expected or actual shortfalls.

Table 12: Examples of strategies to address problems documented by monitoring

PROBLEM	POTENTIAL RESPONSE AND ACTION
Food inadequacy (low in overall energy)	<ul style="list-style-type: none"> • Investigate and document the population's capacity to cope with the food deficit and the implications thereof. • Advocate for additional food to meet requirements. • Attempt to get an accurate estimate of population numbers. • Establish contingency plan (e.g. blanket feeding to meet needs of the most vulnerable, including the elderly, the chronically ill, under-5-year-olds). • Reduce ration amount for whole population while maintaining a safety net programme of full distribution to separate subgroups such as identified vulnerable members.
Inequitable distribution (through results of FBM)	<ul style="list-style-type: none"> • Identify which groups are receiving lesser rations and the possible reasons. • Identify with community, authorities and food-distribution team how to resolve problem. • Monitor vulnerable groups carefully and continue FBM.
Missing commodities	<ul style="list-style-type: none"> • Implement a substitution strategy, noting risks involved (e.g. loss of micronutrients). • Ensure distribution of normal ration is resumed after one month.
Missing micronutrients	<ul style="list-style-type: none"> • Provide fortified blended food. • Identify specific micronutrient(s) that are likely to be in deficit, then identify the appropriate food(s) that can be fortified, or the foods that are a rich source of these micronutrient(s). Iron pots should be considered as a way of providing dietary iron.
Transport difficulties	<ul style="list-style-type: none"> • Prioritize foods that provide the bulk of the ration (e.g. cereals and pulses) as a short-term strategy. • Investigate feasibility of alternative mechanism of transport for delivery.

Source: Jaspars, S. and Young, H. General Food Distribution in Emergencies: From Nutritional Needs to Political Priorities. RRN Good Practice Review #3, Dec 1995

IV. ACCESS TO OTHER SOURCES OF FOOD IN POST-EMERGENCY PHASE

A. Assessing food and nutritional needs in post-emergencies

The provision of assistance to emergency-affected populations on the basis of need is a well-established principle. It is during the initial phase of the emergency that populations are most likely to be entirely reliant on food aid. However, with time,

many affected populations may become less dependent. Consequently, the objectives of food assistance may change. In protracted situations, food assistance will usually aim to support livelihoods. Food assistance in these contexts will therefore aim to complement the food that the population is able to obtain for themselves. Estimating food and nutritional needs in post-emergency phase is thus more complex, since it requires an analysis of the extent to which populations are able to meet their food needs through their own means.

Table 13: Principles for estimating food and nutritional needs in post-emergencies

1. ADOPTION OF A HOLISTIC “FOOD SECURITY” APPROACH THAT EXAMINES HOW ALL GROUPS WITHIN A POPULATION ACTUALLY ACCESS FOOD.

This requires taking into account basic needs other than food (and the possible trade-off between food and other basic needs), different types of livelihood systems and the effects and desirability of the various coping mechanisms adopted by the affected population.

2. THE UNDERLYING CAUSES, APART FROM FOOD AVAILABILITY, THAT INFLUENCE FOOD CONSUMPTION AND NUTRITIONAL STATUS HAVE TO BE UNDERSTOOD.

This requires taking into account health determinants, including access to health services; and caring capacity and social behaviours, including capacity for breastfeeding and adequate complementary feeding practices for infants and young children.

3. UNDERSTANDING OF THE SOCIAL AND POLITICAL CONTEXT OF THE AFFECTED POPULATION.

This is essential for identifying the reasons for certain groups being particularly food insecure.

4. ONGOING MONITORING OF THE FOOD-SECURITY SITUATION, NUTRITIONAL STATUS AND THE FACTORS THAT INFLUENCE ACCESS TO FOOD.

The need is for surveillance with occasional ad hoc assessments.

5. ADOPTING PARTICIPATORY APPROACHES AND MAINTAINING ONGOING DIALOGUE BETWEEN AGENCIES AND THE AFFECTED POPULATION.

Allows for more in-depth understanding of the reasons for food insecurity.

Source: Food Security Assessments, Self-reliance, Targeting and Phasing out in Ongoing refugee situations. Summary Report of an Inter-Agency Workshop, WFP, UNHCR and ENN, Nov 1999.

B. Supporting recovery

During the initial stage of the emergency, in collaboration with the host-country government, a strategy should be developed to support and strengthen the affected population's opportunities to access food through their own means in the medium and longer-term. Strategies to improve the availability, access and utilization of food resources should be formulated at the same time as food distributions begin in order to support recovery of food-production capability and recovery of health status, and to encourage income-generating activities.

Food and nutritional needs during the post-emergency phase (Table 13) will be linked to (i) the extent to which the affected population can engage in the local economy, and (ii) the effectiveness of activities implemented to support livelihood strategies. Such activities may include: rehabilitation of local trade and markets; distribution of appropriate seed varieties and agricultural tools; distribution of fishing equipment; income-generating activities; and distribution of non-food items.

V. SELF-RELIANCE AND EXIT STRATEGIES¹⁴

Self-reliance relates not only to food (in)security but also to other basic needs. People are self-reliant when they can cover all their basic needs without external support. An accurate understanding of levels of self-reliance—and of coping strategies more generally—of different sub-groups within the population is necessary to design and adjust assistance interventions.

Supporting self-reliance is important to enhance the capacities and self-esteem of the affected population and may contribute to reducing dependence on food aid. It can also facilitate the eventual reintegration, or resettlement, of populations.

In some emergency situations, especially closed camps, opportunities for self-reliance may be limited. In all situations, a number of factors and considerations should be taken into account when examining the potential of self-reliance activities. Specifically:

- Impact of existing and potential self-reliance activities on the local population, the environment, gender roles and responsibilities, and caring practices, including infant- and young child-feeding practices;
- Long-term sustainability of self-reliance activities and of the expected production/income; and

¹⁴ Adapted from: Food Security Assessments, Self-reliance, Targeting and Phasing Out in Ongoing refugee situations. Summary Report of an Inter-Agency Workshop, WFP, UNHCR and ENN, Nov 1999.

- Discouragement of activities that may be illegal or socially undesirable or that are regarded as “survival” activities and carry negative consequences (e.g. prostitution).

The interpretation of any improvement in nutritional data (e.g. decrease in prevalence of acute malnutrition) should always be interpreted in the context of food-security information. An improvement in nutritional status may indicate an effective food and/or health intervention. However, it does not necessarily mean that the population has access to food from their own production.

This needs to be demonstrated independently from investigations into the population’s capacity to access food through their own means. A careful analysis of the findings will then assist in determining the extent to which external food assistance is still required.

CHECKLIST:

HAVE LONGER-TERM PLANNING AND MONITORING MECHANISMS BEEN TAKEN INTO CONSIDERATION?

- ✓ What monitoring activities have been established to assess the adequacy of the ration?
- ✓ In the case of an inadequate ration, what action has been taken to correct the inadequacy?
- ✓ Is the food-aid programme addressing recovery of the population?
- ✓ Is there a strategy in place to support self-reliance activities?
- ✓ What contingency plan is in place to address any deterioration?
- ✓ Does information being collected on an ongoing basis verify that food aid adequately complements food obtained by the population?

FURTHER READING

The following is a list of practical reference material on estimating food and nutritional needs.

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9. UNHCR. Handbook for Emergencies. Second Edition. UNHCR. 1999.
10. UNHCR/UNICEF. Memorandum of Understanding. March 1996.
11. UNHCR/WFP. Memorandum of Understanding on the Joint Working Arrangements for Refugee, Returnee and Internally Displaced Persons. July 2002.
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13. UNHCR/WHO. Scurvy and its prevention and control in major emergencies. WHO/NHD/99.11
14. UNHCR/WHO. Thiamine deficiency and its prevention and control in major emergencies. WHO/NHD/99.13.
15. UNHCR/WHO. Pellagra and its prevention and control in major emergencies. WHO/NHD/00.10.

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19. WHO. Complementary Feeding. Family foods for breast-fed children. WHO/NHD/00.1
20. WHO. Infant Feeding in Emergencies; A guide for mothers. WHO Regional Office for Europe. 1997. Copenhagen.
21. WHO. The Management of Nutrition in Major Emergencies. 2000. Geneva.
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23. WFP. Emergency Needs Assessment Guidelines. WFP. 1999. Rome.
24. WFP. Participatory Techniques and Tools - A WFP Guide. WFP. 2000. Rome.
25. WFP. Food and Nutrition Handbook. WFP. 2000. Rome.
26. WFP. Emergency Pocket Book. WFP. 2002. Rome.
27. WFP/UNESCO/WHO. School Feeding Handbook. 1999. Rome.
28. WFP/UNICEF. Memorandum of Understanding in Emergency and Rehabilitation Interventions. February 1998.
29. Young, H. & Jaspars, S. Nutrition Matters; People, Food and Famine. Intermediate Technology Publications. 1995.
30. Young H., Jaspars S., Brown R., Frize J. & Khogali H. Food Security and Assessments in Emergencies: A Livelihoods Approach. Humanitarian Practice Network, Overseas Development Institute. 2001. London.

ANNEXES

ANNEX 1: Energy requirements for emergency-affected populations

Developing country profile (demography and anthropometry); Kilocalories per day

Age/sex group (years)	Male ^a		Female ^a		Male & Female ^a	
	% of total population	Energy requirement per caput	% of total population	Energy requirement per caput	% of total population	Energy requirement per caput
0	1.31	850	1.27	780	2.59	820
1 ^b	1.26	1,250	1.20	1,190	2.46	1,220
2 ^b	1.25	1,430	1.20	1,330	2.45	1,380
3 ^b	1.25	1,560	1.19	1,440	2.44	1,500
4 ^b	1.24	1,690	1.18	1,540	2.43	1,620
0–4	6.32	1,320	6.05	1250	12.37	1,290
5–9	6.00	1,980	5.69	1730	11.69	1,860
10–14	5.39	2,370	5.13	2040	10.53	2,210
15–19	4.89	2,700	4.64	2120	9.54	2,420
20–59 ^c	24.80	2,460	23.82	1990	48.63	2,230
60+ ^c	3.42	2,010	3.82	1780	7.24	1,890
Pregnant			2.4	285 (extra)	2.4	285 (extra)
Lactating			2.6	500 (extra)	2.6	500 (extra)
Whole Population	50.84	2,250	49.16	1910		2,080

Source: WHO. The management of nutrition in major emergencies. Geneva, 2000.

a: Adult weight: male 60 kg, female 52 kg.

b: Population estimates for years 1, 2, 3 and 4 are not available from UN. Estimates for these years were made by interpolation between the figures given by UN for 0 year and 5 years.

c: The figures given here apply for "light" activity level (1.55 x BMR for men, 1.56 x BMR for women). (The BMR [basal metabolic rate] is the rate of energy expenditure of the body when at complete rest [e.g. sleeping]. It is estimated at 1,355 kcal/person/day.)

ANNEX 2: Vitamin and Mineral requirements—Safe levels of intake (summary)^a

Age/Sex Group (years)	Vitamin A (mg retinol equivalents RE ^b)	Vitamin D (µg calciferol)	Thiamine (mg) ^c	Riboflavin (mg) ^c	Niacin equivalents (mg) ^c	Folic acid (µg)	Vitamin B12 (µg)	Vitamin C (mg)	Iron (mg): ^d Low (5-9%)	Iodine (µg)
0	350	10.0	0.3	0.5	4.2	24	0.1	20	13	50-90 ^e
1	400	10.0	0.5	0.8	6.4	50	0.45	20	8	90
2	400	10.0	0.55	0.9	7.5	50	0.53	20	8	90
3	400	10.0	0.60	1.0	8.2	50	0.61	20	9	90
4	400	10.0	0.65	1.1	8.9	50	0.69	20	9	90
0-4	390	10.0	0.5	0.8	7.1	45	0.50	20	9	90
5-9	400	2.5	0.75	1.2	10.3	80	0.82	20	16	110
10-14 M	550	2.5	0.95	1.6	13.1	150	1.0	25	24	140
10-14 F	550	2.5	0.8	1.35	11.3	130	1.0	25	27	140
10-14 M & F	550	2.5	0.9	1.5	12.2	140	1.0	25	26	140
15-19 M	600	2.5	1.1	1.8	15.3	200	1.0	30	15	150
15-19 F	500	2.5	0.9	1.4	11.9	170	1.0	30	32	150
15-19 M & F	550	2.5	1.0	1.6	13.6	185	1.0	30	24	150
20-59 M	600	2.5	1.0	1.7	14.5	200	1.0	30	15	150
20-59 F	500	2.5	0.8	1.4	11.5	170	1.0	30	32	150
20-59 M & F	570	2.5	0.9	1.55	12.9	185	1.0	30	23	150
Pregnant	+100	+ 7.5	+ 0.1	+0.1	+1.1	+ 250	+ 0.4	+ 20	+ 60-120	+ 50
Lactating	+350	+ 7.5	+ 0.2	+0.3	+2.7	+ 100	+ 0.3	+ 20	17	+ 50
60+ M	600	3.2	0.9	1.4	11.9	200	1.0	30	15	150
60+ F	500	3.2	0.75	1.2	10.3	170	1.0	30	15	150
60+ M & F	540	3.2	0.8	1.3	10.9	185	1.0	30	15	150
Whole Population	500	3.2 - 3.8 ^f	0.9	1.4	12.0	160	0.9	28	22	150

a. Adapted from: The management of nutrition in major emergencies. WHO, 2000.

b. Vitamin A requirements may be met by absorption of vitamin A itself (retinol) or provitamin A carotenoids, which have varying equivalence in terms of vitamin A activity. The requirement is expressed in terms of the retinol equivalent (RE), which is defined by the following relationships:
1 µg retinol = 1.0 mg RE; 1 mg beta-carotene = 0.167 g RE; 1 µg other provitamin A carotenoids = 0.084 mg RE

c. B-vitamin requirements are proportional to energy intake and are calculated: Thiamine: 0.4 mg per 1,000 kilocalories ingested; riboflavin: 0.6 mg per 1,000 kilocalories; niacin equivalents: 6.6 mg per 1,000 kilocalories.

d. Basis of calculation of iron requirements = 7.5% (diet as in developing countries)

e. The lower figure is for breast-fed infants, the higher for infants fed on breast-milk substitutes.

f. The higher figure is used for developing countries because of the larger proportion of children under 5 years whose requirement is greater.

ANNEX 3:**Nutritional value of commonly used food-aid commodities**

	Nutritional value/100 g		
	Energy (kcal)	Protein (g)	Fat (g)
Cereals			
Wheat	330	12.3	1.5
Rice	360	7.0	0.5
Sorghum/millet	335	11.0	3.0
Maize	350	10.0	4.0
Processed Cereals			
Maize meal	360	9.0	3.5
Wheat flour	350	11.5	1.5
Bulgur wheat	350	11.0	1.5
Blended Foods			
Corn-soya blend (CSB)	380	18.0	6.0
Corn-soya milk (CSM)	380	20.0	6.0
Wheat-soya blend (WSB)	370	20.0	6.0
Soya-fortified bulgur wheat	350	17.0	1.5
Soya-fortified maize meal	390	13.0	1.5
Soya-fortified wheat flour	360	16.0	1.3
Soya-fortified sorghum grits	360	16.0	1.0
Dairy Products			
Dried skim milk (enriched) (DSM)	360	36.0	1.0
Dried skim milk (plain) (DSM)	360	36.0	1.0
Dried whole milk (DWM)	500	25.0	27.0
Canned cheese	355	22.5	28.0
Therapeutic milk (TM)	540	14.7	31.5
Meat & Fish			
Canned meat	220	21.0	15.0
Dried salted fish	270	47.0	7.5
Canned fish	305	22.0	24.0
Oil & Fats			
Vegetable oil	885	-	100.0
Butter oil	860	-	98.0
Edible fat	900	-	100.0
Pulses			
Beans	335	20.0	1.2
Peas	335	22.0	1.4
Lentils	340	20.0	0.6
Miscellaneous			
Sugar	400	-	-
Dried fruit	270	4.0	0.5
Dates	245	2.0	0.5
Tea (black)	-	-	-
Iodized salt	-	-	-

Source: WFP. Food and Nutrition Handbook. 2000.

ANNEX 4:**Micronutrient Content of Selected Food-Aid Commodities**

	Micronutrients per 100 g edible portion							
	Calcium (mg)	Iron (mg)	Vitamin A (µg)	Thiamine B1 (mg)	Riboflavin B2 (mg)	Niacin B3 (mg)	Folate (µg)	Vitamin C (mg)
Cereals								
Wheat	36	4.0	0	0.3	0.07	5.0	51	0
Rice (parboiled)	7	1.2	0	0.2	0.08	2.6	11	0
Sorghum	26	4.5	0	0.34	0.15	3.3	U	0
Maize whole yellow	13	4.9	0	0.32	0.12	1.7	U	0
Wheat flour	15	1.5	0	0.10	0.03	0.7	22	0
Processed Cereals								
Maize flour	10	2.5	0	0.3	0.10	1.8	U	0
Wheat flour*	29	3.7	0	0.28	0.14	4.5	U	0
Bulgur wheat	23	7.8	0	0.30	0.10	5.5	38	0
Blended Foods								
Corn-soya blend (CSB)	513	18.5	500	0.65	0.5	6.8	U	40
Wheat-soya blend (WSB)	750	20.8	498	1.50	0.6	9.1	U	40
Soya-fortified bulgur wheat	54	4.7	0	0.25	0.13	4.2	74	0
Soya-fortified maize meal	178	4.8	228	0.70	0.3	3.1	U	0
Soya-fortified wheat flour	211	4.8	265	0.66	0.36	4.6	U	0
Soya-fortified sorghum grits	40	2.0	-	0.2	0.10	1.7	50	0
Dairy Products								
Dried skim milk (DSM)	1257	1.0	1,500	0.42	1.55	1.0	50	0
Dried whole milk (DWM)	912	0.5	280	0.28	1.21	0.6	37	0
Canned cheese	630	0.2	120	0.03	0.45	0.2	U	0
Meat & Fish								
Canned meat	14	4.1	0	0.20	0.23	3.2	2	0
Dried salted fish	343	2.8	0	0.07	0.11	8.6	U	0
Canned fish	330	2.7	0	0.40	0.30	6.5	16	0
Oil & Fats								
Vegetable oil	0	0	0	0	0	0	0	0
Butter oil	0	0	0	0	0	0	0	0
Pulses								
Bean (kidney-dry)	143	8.2	0	0.5	0.22	2.1	180	0
Peas	130	5.2	0	0.6	0.19	3.0	100	0
Lentils	51	9.0	0	0.5	0.25	2.6	U	0
Miscellaneous								
Sugar	0	0	0	0	0	0	0	0
Dates	32	1.2	0	0.09	0.10	2.2	13	0

U: unknown

*: medium extraction

Adapted from Food and Nutrition in the Management of Group Feeding (Revision 1) FAO, Rome 1993 (Annex 1, p. 149-54)

ANNEX 5:

Example of How to Calculate the Percentage Energy of Protein and Fat in a Ration

Refer to the table in Annex 3 showing nutritional value of commonly used food-aid commodities.

Using the following ration as an example:

Food item	Quantity in g per day per person
Wheat flour	420
Pulses	50
Oil	25
Canned fish	20
Blended food	40
Salt	5

As shown in the table below:

- Step 1** ⇨ Determine the energy, fat and protein content for 100 g of food from the table.
Step 2 ⇨ Calculate the amounts for the quantities given in the ration.
Step 3 ⇨ Sum the total amounts for each for the ration.

Commodity (quantity)	For 100 g of food item (step 1)			For quantity of food item in ration (step 2)		
	Energy (kcal)	Protein (g)	Fat (g)	Energy (kcal)	Protein (g)	Fat (g)
Maize flour (420 g)	360	9.0	3.5	1,512	37.8	14.7
Pulses/beans (50 g)	335	20.0	1.2	168	10	0.6
Oil (25 g)	885	-	100	221	-	25
Canned fish (20 g)	305	22.0	24.0	61	4.4	4.8
Blended food (40 g)	380	18.0	6.0	152	7.2	2.4
Salt (5 g)	-	-	-	-	-	-
Total (step 3)				2,114	59.4	47.5

To calculate percentage energy from protein and fat:

For calculation of percentage energy from fat and protein:

- ⇨ 1 g of protein provides 4 kcal of energy
 ⇨ 1 g of fat provides 9 kcal of energy

Step 4 ⇨ **Calculate percentage energy from protein**
 (Total g of protein) x (4 kcal): $59.4 \times 4 = 237.6$
 (Total energy from protein)/(Total energy in ration) x 100%: $237.6/2114 \times 100\%$
 = **11.2%**

Step 5 ⇨ **Calculate percentage energy from fat**
 (Total g of fat) x (9 kcal): $47.5 \times 9 = 427.5$
 (Total energy from fat)/(Total energy in ration) x 100%: $427.5/2114 \times 100\%$
 = **20.0%**

ANNEX 6:

Example of How to Calculate the Micronutrient Content of a Ration

Refer to the table in Annex 4 showing micronutrient content of commonly used food-aid commodities.

Using the following ration as an example:

Food item	Quantity in g per day per person
Maize flour	400
Pulses	60
Oil	25
Blended food	50
Sugar	15
Salt	5

As shown in the table below:

- Step 1** ⇨ Determine the micronutrient content for 100 g of food using the information from the table.
Step 2 ⇨ Calculate the amounts of the micronutrients provided by the amount of ration provided.
Step 3 ⇨ Sum the total amounts for each micronutrient in the ration.

For example, the above ration contains the following amounts of micronutrients:

	Iron (mg)	Vitamin A (µg)	Vitamin B1 Thiamine (mg)	Vitamin B2 Riboflavin (mg)	Vitamin B3 Niacin (mg)	Folate (µg)	Vitamin C (mg)	Iodine (µg)
Quantities in ration (above)	25.3	500	2.3	0.8	13.0	108.0	20	150

- Step 4** ⇨ Calculate the percentage of micronutrients provided by the ration in comparison to the requirements.

	Iron (mg)	Vitamin A (µg)	Vitamin B1 Thiamine (mg)	Vitamin B2 Riboflavin (mg)	Vitamin B3 Niacin (mg)	Folate (µg)	Vitamin C (mg)	Iodine (µg)
Amounts in ration	25.3	500	2.3	0.8	13.0	108.0	20	150
Recommended daily intakes*	22.0	500	0.9	1.4	12.0	160	28.0	150
Percentage of requirements	115%	100%	250%	57%*	108%	67%*	71%*	100%

* mean per capita requirements

- Step 5** ⇨ Identify which vitamins are deficient and choose appropriate strategies and action to correct this.

The amounts of Vitamin B2 (Riboflavin), Folate and Vitamin C (Vitamin C) are lower than the required amounts for the whole population.

Note: The figures do not take into account the actual micronutrient status of the population concerned and therefore the actual micronutrient needs of the population concerned (there might be population groups that have higher needs).

ANNEX 7:

Blended foods: Requirements and specifications

Blended foods are a mixture of milled cereals and other ingredients such as pulses, dried skimmed milk and possibly sugar and oil. Blended foods are produced by:

- Dry blending of milled ingredients
- Toasting or roasting and milling of ingredients
- Extrusion cooking, which results in a “pre-cooked” food
- The final product is milled into a fine powder and fortified with mineral and vitamin premix.

A range of blended foods is available, such as:

- Corn-Soya Blend (produced in the USA)
- Locally produced blended foods, e.g. Likuni Phala (Malawi), UNIMIX (East Africa) and Famix (Ethiopia)
- Supplementary and therapeutic blended foods, which are used for the rehabilitation of the moderately and severely malnourished.

Blended foods should be **produced in accordance** with:

- Guidelines on Formulated Supplementary Foods for infants and young children, FAO Codex Alimentarius Commission (1991)
- Code of Hygienic Practice for foods for Infants and children and Code of Sound Manufacturing Practices; of the Codex Alimentarius

The **composition** of blended foods should include the following ingredients:

- Cereal (sorghum, maize, wheat, millet or a combination)
- Pulses (soya beans or chickpeas)
- Oil seeds (groundnuts, sunflower, sesame) or stabilized vegetable oil
- Vitamin and mineral supplement
- Sugar (optional, up to 10 percent, replaces equivalent amount of cereal)

Blended food should be **processed**, using the following methods:

- **Extrusion:** Cereals and pulses mixed, gritted and pre-cooked through extrusion, milled and oil/vitamins/minerals added
- **Roasting/Milling:** Cereals and pulses roasted, cooled, mixed and milled, then oil/vitamins and minerals added.
- The blended food should be **fortified** on the following basis:
1MT of finished product fortified with 1 kg vitamin premix and 3 kg mineral mix
Vitamin and mineral mix obtained from BASF or La Roche (Ltd), Switzerland, or its local authorized dealer.

Blended foods should meet the following requirements:

PROPERTY	REQUIREMENT
Palatability and taste	Have a pleasant smell and be food that children enjoy
Shelf life	Retain above qualities for six months from date of manufacture
Preparation	Be easily prepared by adding boiling water (and oil/sugar/milk if desired) and cooked in 5–10 minutes
Moisture and fibre content	Have moisture content that does not exceed 10 percent; fibre content should not exceed 5 percent
Nutritional value (per 100 g) and energy density	400 kcal, 15 percent energy from protein and 6 percent energy from fat (see later note on vitamin/mineral specifications) When prepared as gruel, have not less than 100 kcal/100 ml
Packaging and labelling	Packaged in laminated woven polypropylene outer bags (double-stitched), with polyethylene inner bags (heat sealed) of 25 kg contents Bags should be clearly labelled with manufacture date and date of expiry

ANNEX 8:**Examples of Blended Foods with Characteristic Preparations and Micronutrient Contents (per 100 g)**

	Minimum fortification levels (FAO/WFP recommendations)	Corn-soya blend (CSB) (USA)	Indiamix (India)	Famix (Ethiopia)	Tenamix (Tanzania)
Ingredients	Cereal, pulse, oil and vitamin/mineral premix	Maize, soya flour, soya oil, vitamin/mineral premix	75% wheat and 25% soy; or 55% wheat, 25% soy and 20% sugar	Maize pre-cooked, soya flour, sugar, vitamin/mineral mix	Pre-cooked maize, soya, chickpea, sugar, vitamin/mineral premix
Nutritional value (per 100g)	400 kcal, 15 g protein, 3 g fat	380 kcal, 18 g protein, 6 g fat	390 kcal, 15 g protein, 6 g fat	402 kcal, 14.7 g protein, 7 g fat	380 kcal, 13.3 g protein, 7.4 g fat
Vitamin A	492 µg RE 1,640 I.U.	510 µg RE 1 700 I.U.	456 µg RE 1 521 I.U.	390 µg RE 1 300 I.U.	450 µg RE 1 500 I.U.
Vitamin B1 (mg) (thiamine)	0.128	0.7	0.6	0.1	0.3
Vitamin B2 (mg) (riboflavin)	0.45	0.5	0.6	0.4	0.5
Vitamin B3 (niacin) (mg)	4.8	8.0	8.0	5.0	-
Folate (µg)	60	-	92	50	60
Vitamin C (mg)	48	40	30	30	20
Vitamin B12 (µg)	1.2	4.0	1.0	1.0	0.3
Iron (mg)	8.0	18	13	8.0	12
Calcium (mg)	100 (calcium carbonate)	800	171	100	200
Zinc (mg)	5.0 (zinc sulphate)	3.0	-	5.0	10
Vitamin B6	-	0.7	-	-	0.4
Iodine (µg)	-	50	-	-	50
Magnesium (mg)	-	100	-	-	20
Selenium (µg)	-	-	-	-	25
Potassium (mg)	-	700	-	-	164

Adapted from Food and Nutrition Handbook. WFP, 2000.

ANNEX 9:

Policies and Guidelines to Protect, Support and Promote Breastfeeding and Good Infant Feeding Practices

ANNEX 9a:

Policy for Acceptance, Distribution and Use of Milk Products in Refugee Operations (UNHCR, 1989)

The policy of the UNHCR related to the acceptance, distribution and use of milk powders in refugee settings was developed in co-operation with WHO.

1. UNHCR will accept, supply and distribute milk products only if they can be used under strict control and hygienic conditions (e.g. in a supervised environment for on-the-spot consumption).
2. UNHCR will accept supply and distribute milk products only when received in dry form. UNHCR will not accept liquid or seem-liquid products, including evaporated or condensed milks.
3. UNHCR will accept, supply and distribute dried skim milk (DSM) only if it has been fortified with vitamin A.
4. UNHCR supports the principle that, in general ration programmes, protein sources such as pulses, meat or fish are preferred to DSM. UNHCR notes that DSM pre-mixed centrally with cereal flour and sugar is useful for feeding young children, especially if prepared with oil.
5. UNHCR will advocate the distribution of dried milk only if it has been previously mixed with suitable cereal flour and when culturally acceptable. The sole exception to this may be where milk forms an essential part of the traditional diet (e.g. among nomadic populations) and can be used safely.
6. UNHCR will support the policy of WHO concerning safe and appropriate infant and young child feeding, in particular by protecting, promoting and supporting breastfeeding, and encouraging the timely and correct use of complementary food in refugee settings.
7. UNHCR will discourage the distribution and use of breast-milk substitutes in refugee settings. When substitutes are absolutely necessary, they will be provided with clear instructions for safe mixing, and for feeding with a cup and spoon.
8. UNHCR will take all possible steps to actively discourage the distribution and use of infant feeding bottles and artificial teats in refugee settings.
9. UNHCR will advocate that when donations of DSM are supplied to the refugee programmes, the specific donors will be approached for cash contributions to be specifically earmarked for operational costs of projects to ensure the safe use of this commodity.

ANNEX 9b:

Baby- Friendly Hospital Initiative: Ten Steps to Successful Breastfeeding (WHO/UNICEF, 1989)

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health staff.
2. Train all health-care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breast-feed and how to maintain lactation even if they should be from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in, allowing mothers and infants to remain together 24 hours a day.

8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital and clinic.

ANNEX 9c:

Practical Steps to Ensure Appropriate Infant and Young Child Feeding in Emergencies (ENN, 2001)

1. Ensure that action is based on an adequate understanding of the factors affecting infant feeding practices in the specific situation.

- A rapid assessment should be carried out immediately at the onset of the emergency, including information on pre-crisis infant feeding practices and the impact of prevailing conditions on infants and on the ability of mothers to breast-feed and care for children. Where possible, information should be accessed on demographics and numbers of infants, orphans, etc.
- A second-stage emergency assessment should be carried out in conjunction with implementation of early relief activities. It should include mobilization of the affected population to participate in problem identification, solution and support; assess resource requirements; and identify mechanisms to actively involve local and international partners. The prevalence of malnutrition among infants younger than 6 months should be assessed by their inclusion in nutrition surveys.

2. Create a mechanism for coordinating and monitoring infant feeding activities.

- A lead agency should be nominated to manage infant feeding issues. A framework for action should be agreed upon.
- Representatives of national and international agencies involved in food aid, social services and health/nutrition should meet regularly in a specific forum to address infant feeding issues.
- Monitoring of interventions includes: (1) mortality/morbidity of infants; (2) provision of infant feeding support; (3) procurement, distribution and end use of breast-milk substitutes or complementary foods; and (4) quality of infant foods supplied and or/used by the affected population.
- Include infant feeding issues in initial screening for new arrivals. Information collection on number of infants and unaccompanied infants and infant feeding practices.

3. Eliminate practices that undermine breastfeeding.

- Donations of infant formula and other breast-milk substitutes (BMS) should be systematically refused (i.e. any requirements for BMS should be met by purchasing of supplies).
- Dried milk powder should NEVER be distributed as part of a general ration programme because of the risk that it will be used as a BMS. Rather, it should be mixed with other food (such as blended foods) or provided under strictly supervised wet-feeding conditions.
- Bottles and teats are should never be accepted or distributed; cups should be used instead.
- Where UHT (long-life milk) is distributed, it should be clearly labelled with an appropriate health message.

4. Recognize the special needs of women feeding infants.

- Effective referral systems (e.g. registration, nutrition/health services) should be established at the outset.
- Where appropriate, provide secluded shelter areas for breastfeeding, including rest areas in transit centres.
- Where appropriate, facilitate and prioritize access to food aid, water, etc., for women with infants and young children.
- Provide additional fortified-food supplement for pregnant and lactating women and young children.
- Integrate support services for breastfeeding and infant feeding issues into health services, growth-monitoring services, unaccompanied children centres and nutrition rehabilitation centres (supplementary and therapeutic).

5. Minimize the dangers in feeding to infants and their families.

Certain criteria are met where BMS is provided:

- Infant is assessed by a qualified nutrition or health worker to verify need.
- BMS is distributed and targeted only to infants who have an established requirement.
- The supply is continued as long as the child needs it*.
- The labels must be in a language that the mother understands and must adhere to specific labelling requirements of the International Code of Marketing of Breastmilk Substitutes. This can be achieved by re-labelling brand products or purchasing generically labelled products that display no company logos or advertisements.
- The delivery of BMS to the mother is accompanied by practical information on how to safely prepare the milk (e.g. how to cup feed, how to sterilize).
- There is no display of brand-name products.
- BMS are prepared in accordance with the relevant Codex Alimentarius standards.
- Any facility supporting mothers who are unable to breast-feed should provide separate facilities for mothers who are breastfeeding and those who are using BMS.
- Procurement of small amounts of generic BMS (by designated agency) should be made available for specific cases in need.

6. Increase awareness and knowledge about the benefits of breastfeeding among all stakeholders in the emergency situation.

- Expertise should be available as resource for emergency agency staff to gain better understanding good practice in infant feeding and to assist agencies in developing strategies to develop good practice.
- Ensure that expertise (preferably national) is available to train health workers and community-based staff in breastfeeding and infant feeding issues to ensure that consistent and well-informed advice is given.
- Breastfeeding promotion via health workers and via radio and other media.

* An infant's nutritional needs will be met during the first six months of life with an average daily ration of approximately 110 g or 3.3 kg per month, of a bona fide infant formula.

Source: Adapted from GIFA/IBFAN/UNICEF/UNHCR/WFP/WHO Infant and Young Child Feeding in Emergencies. Operational Guidance for Emergency Relief Staff and Programme Managers. Interagency Working Group on Infant and Young Child Feeding in Emergencies. ENN. November 2001.

ANNEX 10:

Calculated Amounts of Basic Mixes of Staples and Protein-Rich Foods for Complementary Foods

The purpose of the table is to provide guidelines for the preparation of suitable complementary foods for older infants (> 6 months) and young children (<than 2 years old) using food-aid commodities in combination with locally available foods. The procurement of commercially available foods should be actively discouraged.

Complementary foods should be prepared using four basic ingredients, including:

(1) cereals or tubers; (2) protein supplement; (3) vitamin and mineral supplement; and (4) energy supplement.

- The basic mixes have been calculated to give the best possible protein value. The least amount of protein food is used to supplement the staple to provide the basis of a meal for a child of about 2 years of age.
- To each of these mixes (shown in table below), add 10 g of oil or 5 g of oil and 10 g of sugar. OR 20 g of sugar should be added as the energy supplement.
- Each mix provides about 350 kcal (approximately one-third of the daily needs of a 2-year-old child).
- To each of these mixes (shown in table below), 20–30 g of fresh vegetables/fruit should be added as a mineral and vitamin supplement.
- The volumes of most of the basic mixes are between 200–300 ml when the water absorbed by the food is taken into account.

Protein Supplement (g) Denoted by lower figure	Staples (g) - denoted by upper figure										
	Oats	Wheat (flour)	Rice	Sorghum millet (flour)	Maize (flour)	Potato	Sweet potato	Yam	Banana	Plantain	Cassava flour
Legumes (e.g. lentils)	75	80	65	75	55	320	125	165	105	85	40
	5	10	25	10	35	20	50	40	55	55	55
Soybeans	60	60	55	55	50	250	150	175	140	115	50
	10	15	20	15	25	20	25	20	25	30	30
Dried skim milk	65	65	60	60	60	280	175	190	165	150	60
	5	10	15	15	15	15	20	15	20	20	20
Dried whole milk	55	55	45	45	40	220	100	115	100	90	35
	10	15	25	25	25	20	30	30	30	30	30
Chicken/ meat	65	65	65	65	65	300	180	210	185	160	70
	10	20	25	25	35	25	35	35	40	45	45
Fish (fresh)	65	70	70	70	70	310	210	240	210	180	75
	15	30	25	25	20	25	35	35	40	45	50
Egg	65	65	60	60	65	300	180	220	190	150	60
	10	25	30	30	25	25	35	25	30	45	50

Source: Adapted from Cameron, M. & Hofvander, Y. Manual on Feeding Infants and Young Children, Third Edition.

ANNEX 11: Nutritional requirements for Pregnant and Lactating Women in Developing Countries

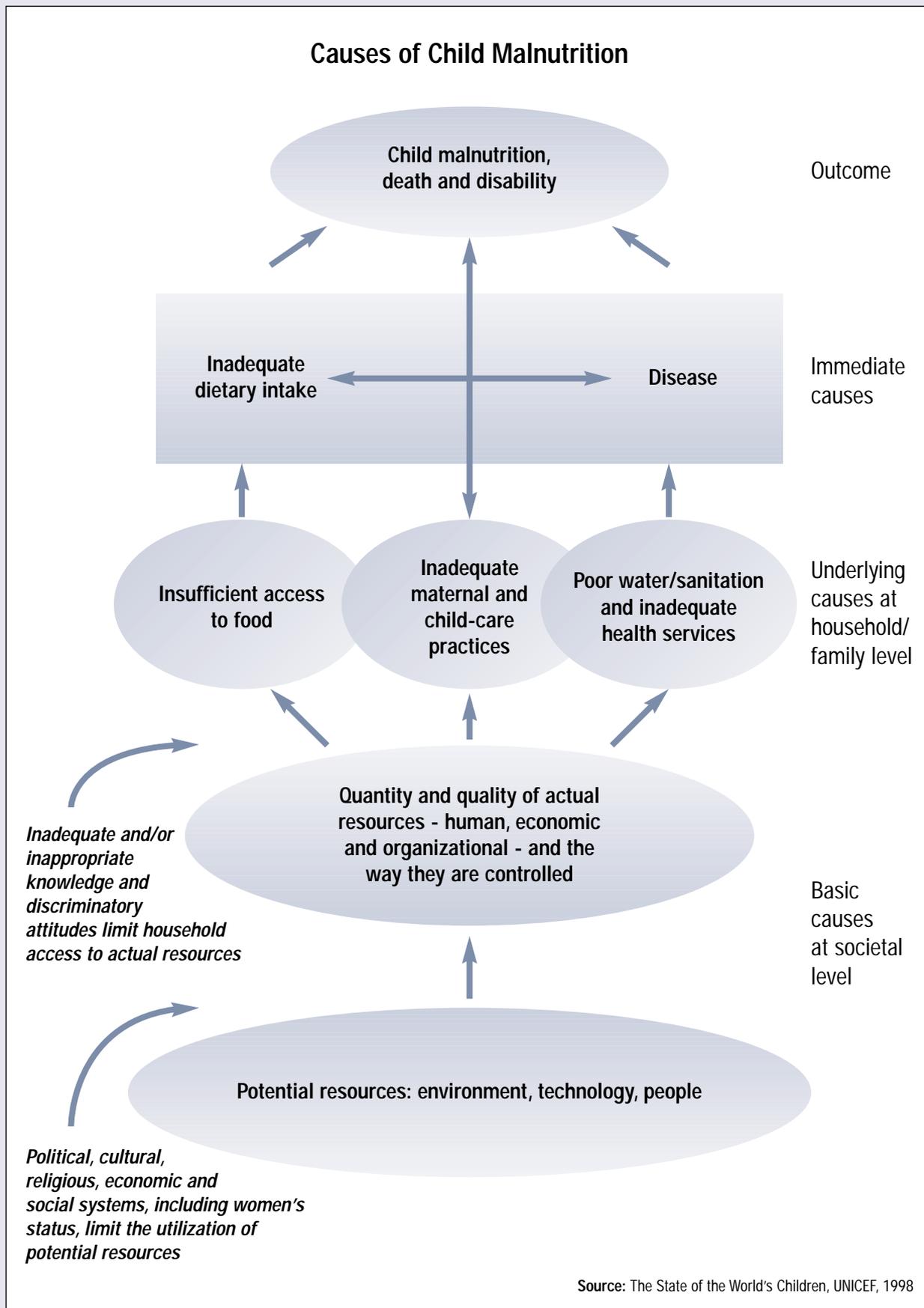
	Additional requirements (per day)	
	Pregnant women	Lactating mothers
Total energy ^a (kcal)	285 kcal	500 kcal
Macronutrients		
Protein ^a (g) Mixed cereal/pulse diet	7.1 g	18.9 g (for first six months)
Energy from fat ^b (%)	At least 20 percent (20-25 percent) of energy should be derived from fats.	
	Additional requirements of fats development throughout nine months for fat storage and foetal. Of most importance is the provision of linoleic acid for the foetal development.	The overall energy of breast milk may be supplied by any source, but the essential fatty acid component is fully dependent on fat in the diet and maternal stores.
Micronutrients^c		
Vitamin A (µg RE)	100	350
Vitamin D (µg)	7.5	7.5
Vitamin B1/thiamine (mg)	0.1	0.2
Vitamin B2/riboflavin (mg)	0.1	0.3
Niacin (mg)	1.1	2.7
Folic acid (µg)	250	100
Vitamin B12 (µg)	0.4	0.3
Ascorbic acid (mg)	20	20
Calcium (g)	0.6-0.7	0.6-0.7
Iron: low 5-9% (mg)	60-120	17
Iodine (µg)	50	50

a: Adapted from Energy and Protein Requirements. Report of a Joint FAO/WHO/UNU Expert Consultation. Geneva, WHO, 1985 (Technical Report Series, No. 724).

b: Adapted from Fats and oils in Human Nutrition. Report of a Joint FAO/WHO Expert Consultation. Rome FAO, 1994 (FAO Food and Nutrition Paper 57).

c: Adapted from Tables A1.6 and A1.7, pages 146–147 in "The management of nutrition in major emergencies." WHO, UNHCR, IFRC, WFP. Geneva, WHO, 2000.

**ANNEX 12:
Conceptual Framework**





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