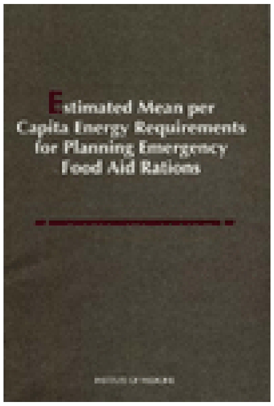

Estimated Mean per Capita Energy Requirements for Planning Emergency Food Aid Rations

Committee on International Nutrition, Food and Nutrition Board,Board on International Health

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INSTITUTE OF MEDICINE

Lindsay H. Allen and Christopher P. Howson, *Editors*

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Preface

Over the past 2 years, there has been growing awareness of the potential value for the U.S. Agency for International Development (USAID) to have a standing capability in the Institute of Medicine (IOM) for a more flexible, less costly response to agency needs for advice in the areas of nutrition, food, and health science policy. With support from USAID, the IOM responded in October 1993 by establishing the Committee on International Nutrition (CIN) under the aegis of the Food and Nutrition Board (FNB) and the Board on International Health (BIH).

The CIN's mandate is to answer questions of interest and concern, evaluate current nutrition activities undertaken by the agency, and make recommendations for future activities based on this review. Topics are chosen through systematic consultation with the Office of Nutrition in USAID's Bureau for Research and Development. Representing the areas of human nutrition, maternal and child health, epidemiology, economics, and program design and evaluation, the committee's six members will convene three times to produce brief reports that review specific programs, research projects, or project designs. With an initial project life of 18 months, the CIN is designed to be flexible (e.g., capable of responding to specific nutrition concerns that arise abruptly) and to provide quick turnaround, with the time from meeting date to document availability being 2 months.

This report is the result of the second meeting of the CIN, which was held on 6–7 October 1994. The report topic was requested by USAID's Bureau for Humanitarian Response (BHR).

CHARGE TO THE COMMITTEE

The charge to the committee by USAID was as follows: "Based on the scientific and technical knowledge of individual members and the background information [provided by USAID], the Committee is requested to make a recommendation as to a mean per capita daily energy requirement for emergency situations (citing and defining the scientific and technical information which supports this mean value)." (For further background information and details on USAID's request to the CIN, see the memoranda to the committee from Samuel Kahn, USAID Office of Health and Nutrition, and Thomas Marchione, Nutrition Advisor, USAID BHR, in the Appendix).

During the 2-day meeting, the CIN reviewed the following background information provided it by USAID: a description of the United Nations High Commissioner Emergency Training Program-Nutrition; a draft copy of the "Supplement on Emergency Rations" to be added to the Commodities Reference Guide published by USAID's Office of Food for Peace; and background correspondence among agencies relevant to the topic under study. The committee gathered the following additional information for consideration at the meeting: the 1992 CDC report entitled Famine-Affected, Refugee, and Displaced Populations: Recommendations for Public Health Issues (CDC, 1992); a 1992 letter to the journal *Lancet* on "Misconceptions on Nutrition of Refugees" (Mason et al., 1992); the 1985 report of the Joint FAO/WHO/UNU Expert Consultation on Energy and Protein Requirements; "Methodological Basis for Estimating the Mean per Capita Daily Energy Requirements for a Typical Refugee Camp Population" (Clugston, 1993); a paper commissioned by the United Nations' Administrative Committee on Coordination/Subcommittee on Nutrition on "Evaluating the Energy Adequacy of Rations Presented to Refugees and Displaced Persons" (Schofield, 1994); and miscellaneous personal correspondence among agencies.

USAID representatives were invited to attend the first day of the meeting to answer questions related to the committee's charge and to provide additional background as needed. The following USAID representatives attended: Eunyong Chung and Samuel G. Kahn, Office of Nutrition and Maternal Health, and Rita Hudson, Office of Food for Peace. The CIN thanks these individuals for their important contributions to its review.

On the second day of the meeting, the CIN met in executive session to review the previous day's discussions and to begin drafting the report.

ORGANIZATION OF THE REPORT

The report contains three chapters and one appendix. Chapter 1 describes the project scope and its rationale. Chapter 2 provides a historical view of energy recommendations for refugee populations and describes the methods of estimating energy requirements of individuals and of populations of refugees and dis placed persons. The committee describes the calculation of an estimated mean per capita energy requirement for use in planning the food energy needs of populations of refugees and displaced persons, and the assumptions underlying the estimate. The effects of varying the population distribution and of assuming different body sizes, physical activity levels, and proportions of breastfed infants are presented. The impact on the estimate of considering the energy requirements for catch-up growth and for cold environmental conditions is also reviewed. Chapter 3 provides a brief summary of the report and presents the committee's recommendations. The Appendix contains the two USAID memoranda outlining the specific charge for this second CIN meeting.

ACKNOWLEDGMENTS

The committee gives special thanks to the USAID staff who graciously made themselves available for questions during the open session on 6 October. The committee would also like to express its appreciation to the IOM staff who facilitated the work of the CIN: Christopher P. Howson, study director; Susan M. Wyatt, financial associate; Michael Edington, managing editor; Claudia Carl, administrative associate; and Gail Spears, administrative assistant. The committee especially thanks Susan M. Knasiak, project assistant, for her help in conducting the second meeting and for her valuable editorial advice in preparing the report draft. Finally, the committee thanks Richard G. Seifman, formerly at USAID; Polly Harrison, IOM; and Catherine Woteki, formerly of the FNB, for their vision and hard work in realizing this project and Allison A. Yates, FNB, for her useful editorial advice and support of the CIN's activities.

Lindsay H. Allen, *Chair*
Committee on International Nutrition

Contents

1

Background

PROJECT DESCRIPTION AND SCOPE

The Committee on International Nutrition (CIN) was asked by the U.S. Agency for International Development (USAID) to recommend an estimated mean per capita energy requirement (termed EMPCER by the CIN) for populations of refugees and displaced persons that could be used to expedite food relief in situations in which nothing is known except the approximate number of people to be fed. The stated intention of USAID is to be use this value to calculate the amount of food required to meet all of the energy needs of such populations. In this report, the committee shows how the EMPCER can be calculated and presents a reasonable single estimate for a wide range of equally justifiable EMPCERs.

It is important to note that the committee was not asked to review the many other factors that must be taken into consideration when translating energy needs into food recommendations. These factors have been described elsewhere, most recently in the guidelines prepared by USAID (1993) and the U.S. Centers for Disease Control and Prevention (CDC, 1992). They include: the proportion of energy to be supplied as protein and fat, the risk of bacterial contamination, ease of preparation and storage, the micronutrient content of the foods and dietary diversity, the acceptability of the food to the population, and special foods for infants and children.

In addition, the committee was not asked to address how the quantity of food aid that would be needed to account for biological requirements might have to be adjusted for other factors such as selling or bartering of relief foods to acquire locally available foods to improve the range and quality of the diet or cooking fuel and other necessities for living. These issues vary by situation and can be used to adjust the committee's EMPCER when such information becomes available.

MOTIVATION FOR THE SCOPE CHOSEN

The request to the committee was to recommend a single value that meets the average energy requirement of populations. That value would be used when making decisions about the immediate purchasing and shipping of food for use as emergency rations when all one knows is the number of persons affected. In such a case, one need only multiply the the average energy requirement (the EMPCER) by the number of persons to be fed to derive the total energy needs of the target population.

The true mean per capita energy requirement can vary widely under different circumstances because it is affected substantially by local factors, the most important of which are ascertainable but often not known to those who must make decisions concerning purchasing and shipping of food. Thus, the committee understands that having a single universally agreed-upon EMPCER could expedite relief activities because there would be no delay involved in justifying this figure (and no time lost in clarifying the justification) for each new request for emergency food.

As knowledge about a local situation becomes clearer, the original estimated per capita energy need must be modified. Thus, the committee does not expect its EMPCER to be used to calculate food needs in subsequent requests for longer-term food aid for a population. Collecting the kinds of information that can be used to adjust the per capita energy requirement through an efficient monitoring system is an important component of food relief (CDC, 1992).

It is also important to note that the committee's EMPCER may not be the correct figure for use with refugee and displaced persons in situations in which some foods may be available locally. In such cases, the estimated energy requirement may need to be adjusted downwards to avoid the unnecessary distribution of food and the resulting reduction of relief resources possibly available for other emergency situations.

Whatever number is used to estimate per capita energy need, it should be the same across all agencies and governments in order to expedite food relief. It is also important that this figure be compatible with the scientific knowledge of human biology and behavior. However, the reasonable range of scientifically justified figures for mean per capita energy needs is approximately 1,900 to 2,500 kcal (7.9 to 10.5 MJ)/d (see pages 5–17). Within this range, the usefulness of having a single figure to expedite relief operations may outweigh the subtleties of selecting among various scientifically plausible assumptions that underlie the calculation of this range of EMPCER values. We present the different assumptions that are the basis for the committee's EMPCER, and we illustrate the magnitude of change in that figure as specific assumptions are modified. This is, in part, intended to permit those involved in negotiating an internationally agreed-upon figure to concentrate discussion on those factors that affect the estimate most strongly, such as physical activity level (PAL). Equally important, some data that are easily collected in early assessments (e.g., likely physical activity level or impending cold weather) could be used to adjust even the initial estimates of food requirements. The figures used for these initial adjustments must also be agreed upon worldwide.

Finally, and importantly, actual experience needs to be taken into account in future use of different EMPCER values. For instance, it might turn out that there is almost always some supply of locally available food that cannot be ascertained in advance. Such a supply would decrease emergency food needs below the level indicated by the EMPCER. The current use of 1,900 kcal seems to be based as much on past anecdotal reports in which food relief was believed to meet population food needs adequately as on the kinds of calculations performed by the committee and presented below. The committee had no information about past experiences with different single estimates and no objective evidence that these resulted in adequate provisioning of food. It is important to obtain such information in the future.

At present, no single number has been agreed upon internationally. However, a consensus algorithm is being developed that takes into account many of the points discussed in this report (John Mason, Technical Secretary, United Nations' Administrative Committee on Coordination/Subcommittee on Nutrition, personal communication, 1994; Schofield, 1994). The committee feels strongly that nothing in this report should interfere with the international development of a universally agreed-upon algorithm or figure for estimating food needs of populations of refugees and displaced persons.

2

Estimating Energy Requirements of Refugee and Other Populations Requiring Food Aid

HISTORICAL VIEW OF ENERGY RECOMMENDATIONS

In the past several decades numerous examples of famine and forced dislocations have required the implementation of massive food aid programs. In large feeding programs such as refugee feeding, planning for food procurement and distribution is critical. Estimates of initial food needs are essential to begin the process of procurement. The most critical factors in arriving at these initial estimates are the size of the population to be fed and an estimate of the average daily energy need. Clearly, nutrients other than energy are important considerations, but for planning purposes energy need is accepted as the principal concern.

There has been considerable debate regarding the appropriate estimated energy value to be used in planning initial food needs. Prior to 1988, the value of 1,500 kcal (6.3 MJ) per capita was used. This value was recognized to be less than the actual energy requirement, but was deemed to be adequate to support survival. In 1989, the World Health Organization (WHO) convened a meeting on "Nutrition in Times of Disaster" at which it was suggested that, for planning purposes, a value of 1,900 kcal per person per day be used for longer term feeding situations and that 1,500 kcal per day be employed in acute survival situations. The values were derived for a typical population using estimated basal metabolic rate (BMR) and assumed activity levels of 7 percent above BMR (i.e., BMR × 1.07) for the 1,500 kcal per day estimate and 45 percent above (BMR × 1.45) for the 1,900 kcal estimate. The value of 1,900 kcal was generally accepted as the benchmark for initial planning purposes until very recently (Rivers and Seaman, 1989).

In 1993, Dr. Graeme Clugston of WHO presented a rationale for using a value of 2,100 kcal (8.8 MJ) rather than the benchmark value of 1,900 kcal (Clugston, 1993). The increase of 200 kcal (837 kJ) per day was accounted for largely by (1) an increase in the activity increment to 55 percent above BMR (from 40 percent), assuming that a physical activity level (PAL) of 1.4 was incompatible with long-term health; (2) some adjustments to the population's composition; and (3) an increase in the proportion of pregnant and lactating women in the population. While 200 kcal per day represents only a 10 to 11 percent increase, it has significant implications for the amount of food required to support food aid programs.

As will also be evident in this report, the major variable influencing estimates of the mean energy “requirement” for planning purposes is the activity increment. It is difficult, and in many cases impossible, to initially establish the activity level of a population. Therefore, not surprisingly, the various estimates of the mean per capita requirement are not well supported by detailed studies. This acknowledgment reinforces the need to develop and rapidly apply a standardized protocol to monitor physical activity levels in order to refine initial estimates of food needs.

ESTIMATING ENERGY REQUIREMENTS OF INDIVIDUALS

The underlying assumptions and the methods available for estimating the energy needs of individuals, classes of people, and of populations are described in the FAO/WHO/UNU report, “Energy and Protein Requirements” (1985). As defined in that report:

> the energy requirement of an individual is the level of energy intake from food that will balance energy expenditure when the individual has a size and body composition, and level of physical activity, consistent with long-term good health; and that will allow for the maintenance of economically necessary and socially desirable physical activity. In children and pregnant or lactating women the energy requirement includes the energy needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health (p. 12).

There is only one level of intake that balances the energy requirement of an individual. If energy intake is below this requirement, there will be a reduction in body weight and fat, and in lean body mass and activity if the deficit is sufficiently severe or prolonged. If intake is more than required, the individual will gain primarily fat. When sufficient food energy is available, physiological mechanisms control appetite so that individuals can regulate their intake to maintain energy balance. While energy balance and health can be maintained over a range of body weights for the same individual, severe or prolonged weight loss will have adverse effects on human function (such as ability to sustain physical activity) and health. There is little evidence of an increase in the efficiency of energy utilization in individuals deprived of dietary energy; a reduction in basal metabolic rate in this situation primarily reflects a loss of lean body mass.

The CIN recognizes that for a given class of individuals, or population group, there will be a distribution of energy requirements among those in the group. As suggested by FAO/WHO/UNU (1985), however, the appropriate single descriptor of the energy needs for a defined group of individuals is "the *average* of the individual requirements, without specific provision for the known individual variation in requirement" (p. 14). Hence, for the present purposes it is entirely justifiable to derive an estimated mean per capita energy requirement (EMPCER), as described below. While there will be individuals for whom this value is insufficient, there will also be individuals for whom it is in excess, and it is assumed for the present that the prevailing circumstances will permit individuals to make selections according to whether their needs either exceed or fall below the EMPCER. It is the CIN's view that, in reference to emergency situations, it is not an appropriate strategy to add into the values, derived below, an additional safety factor to cover the needs for persons with an above-average requirement, since this would result in food wastage and unavailability in other instances. Also, any further discussion of this issue would need to involve a large number of considerations that are more appropriately programmatic in nature and, thus, beyond the scope of the committee's charge.

Determinants of Energy Requirements

The two main determinants of energy requirements are basal metabolic rate (comprising about 60 percent of the total) and physical activity (almost all of the remainder, which also includes 5–10 percent expended in dietary-induced thermogenesis).

Basal Metabolic Rate

The BMR is the energy cost of metabolism in an individual who is completely at rest, in a thermoneutral environment, and fasting. Because this measurement is impractical in most situations, equations have been developed from which BMR can be estimated from the sex, age category, and weight of an individual (FAO/WHO/UNU, 1985, p. 171). For example, for a man age 30–60 years, energy requirements (in kcal/d) for BMR are $11.6 \times$ body weight (kg) + 879. The inclusion of data on height in addition to weight does not significantly improve the reliability of the BMR estimate.

These equations were developed from data on well-nourished, Western individuals and are theoretically valid only for individuals who fall within the "desirable" weight range for their height. Information is available on the lower, average and upper limits of this desirable weight range, for an individual of a specified height (FAO/WHO/UNU, 1985, p. 183). To estimate the BMR of an individual who is underweight for their height, either their actual weight or the mean desirable weight for their height, can be used in the estimation equations. In the latter situation height must be measured, or can be estimated using locally available or published data (James and Schofield, 1990, pp. 106–115) for the region or location. If the decision is made to use desirable weights, estimated energy requirements for BMR will be slightly higher for the underweight individual than if actual weights had been used. Using the higher value will allow for some recovery of body weight although this would be very slow given that a gain of 1 kg will require about 5,000 kcal (20.9 MJ) of additional energy. As discussed below, a substantial energy increment would be needed to achieve a reasonably rapid recovery of weight lost by a population that now has a low BMI.

Physical Activity

Because energy expended in physical activity is the most variable component of total energy requirements, it is important to make reasonable estimates of usual activity levels. For practical purposes, in the nonpregnant, nonlactating individual, energy requirements can be calculated from:

total energy requirements = BMR × PAL,

where PAL is the physical activity level. The PAL values are expressed as multiples of BMR, setting the value of BMR as 1; in this way a correction for age and sex is already incorporated into the BMR. Published values are available for a wide variety of activities (FAO/WHO/UNU, 1985; James and Schofield, 1990).

Rough estimates of habitual energy expenditure can be obtained by classifying the activity level of an individual or group as light, moderate, or heavy (see Table 2-1). Examples of the mean PAL for different types of activities are provided in Table 2-2 and Table 2-3. PAL figures for these categories have been proposed by FAO/WHO/UNU, assuming that detailed information on activity is not available (1985, p. 78). These PAL values were derived primarily from indirect calorimetry, and may be revised in the future based on new information obtained by the doubly-labeled water method of measuring energy expenditure (Schulz and Schoeller, 1994; Torun et al., 1994).

The PAL values in Table 2-1 differ for men and women, especially at moderate and high levels of activity, based on the assumption that they are engaged in different activities. They should be adjusted for specific situations if information is available, or can be deduced, about how people are actually spending their time.

Estimating Activity Levels of Refugees and Displaced Persons

The 1988 WHO calculations that arrived at a mean value of 1,900 calories assumed an average PAL of approximately 1.4 for adult males and females (Rivers and Seaman, 1989). An energy expenditure of 1.4 times the BMR is considered to be the minimum for individuals who are not engaged in any occupational or discretionary activities (FAO/WHO/UNU, 1985, p. 73). It is only slightly above the PAL of 1.27 established as a "survival requirement" of practical value only in conditions of crisis, for estimating the short-term needs of "totally inactive, dependent people" (FAO/WHO/UNU, 1985, p. 73). A PAL of 1.27 allows for minimal movement, is incompatible with long-term health, and allows no energy expenditure in food preparation.

The committee was not aware of any empirical studies of activity patterns among refugee and other populations requiring food aid. However, based on minimal information, such as the fact that the majority of food is distributed as dry rations, which must be carried and prepared by household members, the committee examined the appropriateness of using the 1985 FAO/WHO/UNU PALs for light activity (1.55 for males; 1.56 for females), rather than the PAL of 1.4 used as a basis of the 1,900 kcal per day "survival requirement." To accomplish this, the committee estimated a daily activity pattern for adult males and females in refugee camp situations; these estimates are presented in Table 2-2 and Table 2-3.*

TABLE 2-1 Multiples of Basal Metabolic Rate (Physical Activity Levels) for Usual Activity Levels

	Usual Level of Activity		
	Light	Moderate	Heavy
Men	1.55	1.78	2.10
Women	1.56	1.64	1.82

SOURCE: FAO/WHO/UNU (1985).

* The World Health Organization Technical Report Series #724, Energy and Protein Requirements, 1985, was used as a basis for preparing these tables. Annex 5, Gross Energy Expenditure in Specified Activities, was used for PAL estimates. Time spent on different activities was modified based on Table 10, Energy Requirement of a Subsistence Farmer, and Table 14, Energy Requirement of a Rural Woman in a Developing Country (FAO/WHO/UNU, 1985).

Assumptions for Female Activity Levels Time use studies of rural women in developing countries find that, on average, women work 10 to 12 hours per day, about evenly divided between household maintenance activities and agricultural or income-generating work (see Leslie, 1989, and Leslie et al., 1988). The committee assumed that women do not continue their agricultural/income-generating work in a refugee situation, but that they do continue many of their household maintenance tasks such as cooking, carrying (e.g., fetching water or fuel, carrying dry rations) and child care. For the balance of their nonsleeping time, the committee estimated a very sedentary activity level (e.g., lying or sitting quietly), except for 2 hours of more active discretionary activities such as socializing or strolling around. Making these assumptions, the committee estimated an average PAL of 1.53 for adult women in refugee camp situations (Table 2-2).

The estimates of activity level in Table 2-2 may be conservative. The inclusion of 8 hours a day of sitting or lying quietly is probably an outside limit of the amount of time a person who is awake, even in a refugee camp situation, would spend essentially not moving. If later research or field observations suggest that women are spending a considerable amount of time each day walking, or in more energy intensive household maintenance activities such as washing clothes, pounding grain, etc., or in any agricultural activities, assumptions about average PAL should be increased. For example, the substitution of 4 hours of agricultural work at a PAL of 2.8 for 4 hours of lying or sitting quietly, would increase the average PAL for women to 1.8.

Assumptions for Male Activity Levels Time use studies of rural men in developing countries find more variability in total work time and in the energy intensity of activities than is the case for rural women, but on average total work hours for rural men are usually found to be slightly lower than total work hours

TABLE 2-2 Hypothetical Time Expenditure and Physical Activity Levels (PALs) of Adult Women in Emergency Feeding Situations

Activity	Hours	PAL
Sleeping	8	1.0
Cooking/food preparation	2	1.8
Child care	2	2.2
Walking with a load	1	4.0
Light cleaning	1	2.7
Sedentary recreation	1	2.1
Walking around/strolling	1	2.4
Sitting/lying quietly	8	1.2

NOTE: Weighted average PAL = 1.53.

for rural women (see Leslie, 1988, and Leslie et al., 1989). The committee assumed that this would continue to be the case in a refugee camp situation, and in particular, that men would not be engaged in the seasonal, high-energy-expenditure agricultural activities that are typical of subsistence farmers. Therefore, the committee assumed only 3 hours a day of “work,” 1 hour of which is carrying loads (e.g., fuel, water, dry rations, and household goods), and 2 hours of which are sitting tasks, which might include carving, helping with cooking, and sharpening tools. As for women, the committee estimated that 8 hours a day of standing and sitting quietly is a maximum, and that the rest of the men's waking time would be spent in sedentary recreation or in walking around or strolling. Making these assumptions, the committee estimated an average PAL of 1.53 for adult males in refugee camp situations (Table 2-3), the same value as for adult females.

The estimates of activity level in Table 2-3, like those in Table 2-2, may be conservative. If information indicates that men are significantly more active than is suggested by the time expenditure pattern in Table 2-3, for example, because they have long distances to walk, or are assigned manual labor in the camps or agricultural work, then adjustments should be made in the average physical activity level. As an example, if 4 hours of energy-intensive agricultural work or manual labor at a PAL of 3.5 is substituted for 4 hours of lying or sitting quietly, this would increase the average PAL for men to 1.9.

Based on the PAL estimates in Table 2-2 and Table 2-3, the committee concluded that a PAL of 1.4 probably underestimates the activity levels of adult males and females in refugee situations and that it is reasonable to apply the FAO/WHO/UNU PALs for light activity (1.55 for males and 1.56 for females) to populations in these situations. Therefore, most subsequent analyses in this report use the FAO/WHO/UNU PAL values. Populations in other emergency situations such as earthquakes, floods, or sieges may have higher levels of

TABLE 2-3 Hypothetical Time Expenditure and Physical Activity Levels (PALs) of Adult Men in Emergency Feeding Situations

Activity	Hours	PAL
Sleeping	8	1.0
Walking with a load	1	3.5
Sitting tasks	2	2.0
Sedentary recreation	2.5	2.2
Walking around/strolling	2.5	2.5
Sitting/lying quietly	8	1.2

NOTE: Weighted average PAL = 1.53.

activity, so that the committee also provides examples of how the mean per capita energy requirement would be altered in situations of this type.

Energy Requirements for Growth, Pregnancy, and Lactation

For children, there is an additional energy requirement for growth. For all practical purposes, this is a very small percentage of total requirements after the first few months of life. Recommended increments throughout pregnancy are 285 kcal (1.2 MJ)/d (FAO/WHO/UNU, 1985). It has been suggested that future pregnancy allowances should be based on: (1) the BMR of the nonpregnant, nonlactating woman (i.e., on prepregnancy weight) multiplied by an average PAL appropriate to her usual activity level (using the same PAL values for each type of activity as for the nonpregnant woman), and (2) a daily increment throughout all three trimesters of pregnancy that averages about 250 kcal (1.0 MJ)/d (Prentice et al., 1994). Estimates based on this newer approach are only slightly lower than the 285 kcal/d increment proposed by FAO/WHO/UNU (1985). Even though there appear to be adaptive mechanisms that reduce the usual pregnancy BMR increment in undernourished women, these are not considered to be a desirable means of meeting the energy costs of reproduction (Prentice et al., 1994).

The additional energy requirements for lactation were set by FAO/WHO/UNU at 500 kcal (2.1 MJ)/d, assuming that in addition to this, 200 kcal are available from maternal fat stored during pregnancy. Even in well-nourished women little of this fat seems to be used during breastfeeding because appetite is increased, and in populations where dietary energy is inadequate, it is not appropriate to assume that the use of fat stores for lactation is feasible or desirable. As for pregnancy, it has been proposed that future estimates of the energy requirements for lactation should be based on the BMR of the nonpregnant, nonlactating woman, times a PAL that depends on the duration and type of activities performed, plus an increment for lactation that does not assume maternal fat loss and that falls in the second 6 months, assuming that breastmilk is not the sole source of food for the infant (Prentice et al., 1994).

ESTIMATING ENERGY REQUIREMENTS OF POPULATIONS

Theoretical Approach: Calculating the Estimated Mean per Capita Energy Requirement

Individual energy requirements can be used to plan the food energy needs of a population, using the following three sets of information: (1) the proportion of individuals in the total population that belong to specific subclasses defined in terms of age and physiological status (i.e., whether pregnant or lactating); (2) the average actual, or average desirable, body size (hence BMR) of the people in each subclass; and (3) the population's average level of physical activity. If this information is not available for a specific country, certain assumptions can be made, as described below. As noted earlier, to expedite decisions about the immediate purchasing and shipping of emergency food rations to refugee and other populations requiring food aid, the population's energy needs can be expressed as a single value: the EMPCER. The EMPCER is calculated as the weighted average of the energy needs of each subgroup of the population. It can be modified, as necessary, to allow for special factors affecting a particular population. As discussed below, it may be desirable to increase the amount of energy allotted to adjust for rehabilitation of preexisting undernutrition or cold environmental conditions.

Calculation of the Committee's EMPCER for Use in Emergency Situations

The first EMPCER calculated by the committee—**2,076 kcal (8.7 MJ)/d**—estimates the energy needs of a "typical" population in a developing country (see Table 2-4). The numbers presented in Table 2-4 are based on the following assumptions: (1) the population is distributed as indicated in the World Population Profile 1994 report (Jamison and Hobbs, 1994) for developing countries; (2) the average height of adult males is 170 cm and of adult females is 155 cm, which are the approximate heights of average males and females in sub-Saharan Africa and slightly greater than those of adults in South and Southeast Asia (James and Schofield, 1990); (3) the weights of these adults are at the median for U.S. adults of the stated heights (FAO/WHO/UNU, 1985); and (4) the total energy expenditure of the adults is 1.55 and 1.56 times the BMR for both males and females, respectively. The median weight-for-height of U.S. males was chosen because there is no international reference for adult weight-for-height, and the choice of the U.S. population would make for a conservative estimate of the EMPCER for populations in most developing countries. The PALs are those suggested for a light level of physical activity by FAO/WHO/UNU (1985), which were found by the CIN to be the minimum reasonable for both men and women in emergency feeding situations (Table 2-2 and 2-3), and which will need to be increased where individuals are not confined or are engaged in nonsurvival activities.

For individuals below 18 years of age, the values in Table 2-4 are based on data from affluent populations. Although the individuals from whom these data were derived are larger (and therefore have a greater BMR) than many children and adolescents from low-income countries, this "extra" allotment for children in developing countries is deemed appropriate because they could presumably benefit from the additional food for compensatory growth. The increments in

TABLE 2-4 Calculation of Mean per Capita Estimated Energy Requirement (EMPCER), by Age Group[a]

Age Group (yr)	Males % of Pop.	Males BMR (kcal/d)	Males PAL	Males Total (kcal/d)	Females % of Pop.	Females BMR (kcal/d)	Females PAL	Females Total (kcal/d)	Wgtd. Avg. Energy Req. of Age Group (kcal/d)	Total % of Pop.	TER[b] (kcal/d)
0.0–0.9	1.2			800	1.3			800	800	2.5	2,000
1.0–3.9	3.7			1,400	3.8			1,300	1,349	7.5	10,120
4.0–6.9	3.5			1,800	3.5			1,600	1,700	7.0	11,900
7.0–9.9	3.3			2,100	3.4			1,800	1,948	6.7	13,050
10.0–17.9	8.5	1,522	1.55	2,359	8.5	1,317	1.56	2,055	2,207	17.0	37,516
18.0–59.9	26.2	1,647	1.55	2,553	21.8	1,240	1.56	1,934	2,272	48.0	109,055
≥ 60	3.4	1,405	1.55	2,178	3.5	1,145	1.56	1,786	1,979	6.9	13,656
Pregnant					1.9			2,219		1.9	4,217
Lactating					2.5			2,434		2.5	6,086
EMPCER											**2,076**

NOTE: BMR: basal metabolic rate; PAL: physical activity level.

[a] Population distribution as per Jamison and Hobbs (1994), for developing countries. Body size for sub-Saharan Africa: males, 170 cm; females, 155 cm. Body weight as expected for height according to U.S. data: males, 63.5 kg; females, 50 kg. BMR of adults and energy requirements of children as per FAO/WHO/UNU (1985). PAL light, as per FAO/WHO/UNU (1985): males, 1.55; females, 1.56.

[b] TER: Total energy requirements of age group per 100 persons in the population. Calculated as (weighted average energy requirement of age group) × (number of people in age group per 100 individuals in population).

energy requirements for pregnant and lactating women were assumed to be 285 and 500 kcal per day (FAO/WHO/UNU, 1985).

Impact of Changing Underlying Assumptions for Adjustment of the EMPCER

To examine how different assumptions might influence the committee's EMPCER, we explored the effects of using varied population distributions, different assumed body sizes, four distinct levels of physical activity, and different proportions of infants who are breastfeeding. The impact of each of these assumptions on the EMPCER is discussed below.

Demographic Distribution

The effect of different population distributions was studied by substituting the usual demographic distribution of industrialized countries for that of developing countries (Jamison and Hobbs, 1994; see Table 2-5). All other assumptions regarding adult body size and level of physical activity were held constant as described for Table 2-4. As indicated in Table 2-5, this change in demographic distribution had relatively little effect on the EMPCER, **changing the estimate from 2,076 kcal/d to 2,105 kcal (8.8 MJ)/d.**

The committee further examined how the EMPCER might change with unusual population distributions, such as might occur in a situation in which women and children migrate, but most men do not. For this exercise, the committee assumed that 50 percent of the males aged 10–17 years and 75 percent of the males from 18–59 years from the original population distribution for developing countries were no longer present in the index population (a situation that might conceivably occur in certain refugee situations). As indicated in Table 2-5, this modification in the assumed demographic distribution **reduced the EMPCER to 1,936 kcal (8.1 MJ)/d.** Because population distribution had a

TABLE 2-5 Estimated Mean per Capita Energy Requirement by Assumed Population Distribution

WPP94 Developing Countries	WPP94 Developed Countries	WPP94 Developing Countries, but Predominantly Women and Children
2,076	2,105	1,936

NOTE: WPP94 = World Population Profile 1994.

minor impact on the EMPCER (except in the case of unusual migration patterns), the decision was made by the committee to use the typical demographic distribution of developing countries in all subsequent analyses. When information is available on unusual demographic distributions due to differential migration of subclasses in a population, however, the committee suggests that the EMPCER be revised accordingly.

Body Size

We next examined the effects of different body sizes on the average BMR of adults and on the population's EMPCER. For these analyses, the average heights (James and Schofield, 1990) of three sets of men and women from the following areas were compared: South and Southeast Asia, sub-Saharan Africa, and the United States of America. The average heights of each set of individuals and the U.S. mean weight for those heights (FAO/WHO/UNU, 1985) are shown in Table 2-6. The table also presents the EMPCER for each of these hypothetical populations. Although there was relatively little difference in the EMPCERs calculated for the two developing country populations, the estimated population requirement for individuals in the United States was approximately 120–150 kcal/d greater. Thus, when the body size of the recipient population is close to that in developed countries, the EMPCER will be about 100 kcal/d higher, or **closer to 2,200 kcal (9.2 MJ)/d**.

Physical Activity Level

The next analyses compared the effects of different assumed physical activity levels (PALs). The typical population distribution of developing countries and the reported average heights of adults in these settings were used, as described in the foregoing paragraphs.

As indicated in Table 2-7, the level of assumed physical activity had a relatively marked impact on the EMPCER, which ranged from **1,908 kcal (8.0 MJ)/d in populations with a minimal ("survival") level** of total energy

TABLE 2-6 Estimated Mean per Capita Energy Requirement (EMPCER) by Body Size of Adults*

	Sub-Saharan Africa	South and Southeast Asia	United States
Male height, weight	170 cm, 63.5 kg	165 cm, 60.1 kg	180.4 cm, 78.1 kg
Female height, weight	155 cm, 50.0 kg	153 cm, 49.0 kg	163.7 cm, 55.3 kg
EMPCER	2,076	2,045	2,194

*Population distribution per Jamison and Hobbs (1994), Developing Countries.

expenditure of 1.40 BMR, to **2,535 kcal (10.6 MJ)/d in populations with a high level** of energy expenditure (1.96 BMR). Because it is difficult to predict the true level of physical activity without specific information from the field, the committee decided that it would be appropriate to use the FAO/WHO/UNU PAL values for light activity, i.e., 1.55 for males and 1.56 for females until further field data in a given situation become available.

TABLE 2-7 Estimated Mean Per Capita Energy Requirement (EMPCER) by Physical Activity Level (PAL)*

	Level of Physical Activity			
	"Survival"	Light	Moderate	Heavy
PAL (M,F)	1.4	1.55, 1.56	1.70, 1.64	2.10, 1.82
EMPCER	1,908	2,076	2,205	2,535

*PALs from FAO/WHO/UNU (1985). Population distribution as per Jamison and Hobbs (1994), Developing Countries: Body Size for Sub-Saharan Males, as in Table 2-4.

Adjustment for Breastfeeding

A possible refinement of the original analysis presented in Table 2-4 is the separate consideration of energy needs for young infants who are breastfeeding. Because these infants have a reduced need for energy supplied from food sources, it may be desirable to take into account the proportion of infants who are breastfeeding. The calculations in Table 2-8 assume that all children from birth to 6 months of age are predominantly breastfeeding and that they will have no additional energy needs. This analysis further assumes that half the infants from 6–11 months of age are still breastfeeding and that breastmilk will provide half their energy needs. Although these corrections are theoretically appropriate to avoid "double counting" of the energy needs of these children, **the impact on the EMPCER is minimal, reducing the EMPCER from 2,076 to 2,061 kcal (8.6 MJ)/d**. Therefore, the committee felt that no special correction for rates of breastfeeding was necessary.

Although the EMPCER for the total population does not need to be adjusted for breastfeeding, it should be recognized that special foods, such as breastmilk substitutes or processed complementary foods, may be required for children less than 2 years of age in situations where either (1) their mothers are unable or unavailable to breastfeed or (2) the relief foods that are provided for older children and adults cannot be prepared in a form easily consumed by young children. In these cases, the population EMPCER must be calculated separately for the specific subgroups of young children to determine the amounts of these special

TABLE 2-8 Estimated Mean per Capita Energy Requirement (EMPCER), Considering Proportion of Breastfed Infantsa

	Males				Females							
Age Group (yr)	% of Pop.	BMR (kcal/d)	PAL	Total (kcal/d)	% of Pop.	BMR (kcal/d)	PAL	Total (kcal/d)	Wtd. Avg. Energy Req. of Age Group (kcal/d)	Proport. Non-brstfed	Corrected Req. (kcal/d)	TER[b] (kcal/d)
0.0–0.5	0.6			800	0.7			800	800	0	0	0
0.5–1.0	0.6			800	0.6			800	800	0.5	600	480
1.0–3.9	3.7			1,400	3.8			1,300	1,349	1.0	1,349	10,120
4.0–6.9	3.5			1,800	3.5			1,600	1,700	1.0	1,700	11,900
7.0–9.9	3.3			2,100	3.4			1,800	1,948	1.0	1,948	13,050
10.0–17.9	8.5	1,522	1.55	2,359	8.5	1,317	1.56	2,055	2,207	1.0	2,207	37,516
18.0–59.9	26.2	1,647	1.55	2,553	21.8	1,240	1.56	1,934	2,272	1.0	2,272	109,055
≥ 60	3.4	1,405	1.55	2,178	3.5	1,145	1.56	1,786	1,979	1.0	1,979	13,656
Pregnant					1.9	2,219					2,219	4,217
Lactating					2.5	2,434					2,434	6,086
EMPCER	**2,061**											

NOTE: BMR: basal metabolic rate; PAL: physical activity level.

[a] Population distribution as per Jamison and Hobbs (1994), developing countries. Body size for sub-Saharan Africa: males, 170 cm; females, 155 cm. Body weight as expected for height according to U.S. data: males, 63.5 kg; females, 50 kg. BMR of adults and energy requirements of children as per FAO/WHO/UNU (1985). PAL light, as per FAO/WHO/UNU (1985): males, 1.55; females, 1.56.

[b] TER: Total energy requirements of age group per 100 persons in the population. Calculated as (weighted average energy requirement of age group) × (number of people in age group per 100 individuals in population).

foods that are needed. As with the EMPCER for the general population, the EMPCER for the subgroup(s) would be the product of the number of individuals in the subgroup multiplied by their average total daily energy requirement. In the case of complementary foods, the estimated amount of energy provided by breast milk would be subtracted from the children's average total daily energy requirement.

Adjustment for Recovery from Malnutrition and for Cold Environments

It may be desirable to adjust the committee's EMPCER for such special situations as preexisting level of undernutrition or environmental cold stress. These factors are described below.

Recovery from malnutrition The theoretical energy needs for convalescent feeding of malnourished populations can be calculated from: (1) the magnitude of the observed weight deficit (assuming that the minimum acceptable body mass index [BMI] is 18.5 kg/m^2 [James et al., 1988]), (2) the energy cost of weight gain, and (3) the desired duration of the recovery period. If we assume, for example, that the average BMI of all adults is 17 kg/m^2 for a population that has an average height of 1.62 m, then the existing mean weight deficit is 3.937 kg. The energy cost of tissue synthesis is assumed to be 5 kcal/g (FAO/WHO/UNU, 1985); this is a value calculated for 12-month-old children recovering rapidly from malnutrition, but is probably the best estimate available. Thus, the energy required to replace a 3.937 kg weight deficit would be 3,937 g × 5 kcal/g, or nearly 20,000 kcal (83.7 MJ). To replace this deficit within a period of 30 days, an additional 667 kcal (2.8 MJ)/d would be necessary for each adult. If approximately 60 percent of the population are adults, this would imply a need to increase the EMPCER by 400 kcal (1.7 MJ)/d. Table 2-9 provides estimates of the additional energy theoretically required each day for different degrees of wasting and desired rates of nutritional repletion. In reality it is difficult to recommend an appropriate rate of refeeding. This will depend on factors such as the distribution and extent of weight loss in the population, the availability of limited rations, and the extent to which the additional food would be consumed versus sold or exchanged. In some cases it may be necessary to limit the amount of food intake during the early stages of recovery from severe undernutrition to avoid complications of malabsorption or sodium and fluid overload. When specific infectious or metabolic diseases accompany severe malnutrition, these former conditions often must be treated successfully before nutritional recovery can occur.

The committee also considered the possible need to provide additional food supplements for children with preexisting malnutrition. However, because the energy requirements described above for children were calculated according to the body size of reference children in North America, there is already supplemental energy available for those children in the target population who are undernourished. For example, a 12-month-old child with length-for-age at the 50th percentile (76 cm) and weight-for-length at the 3rdpercentile (8.5 kg) would actually be allotted 125 kcal (523 kJ)/kg body weight/d, because the calculations of the EMPCER allow 1,050 kcal (4.4 MJ)/d for children of this age. This is substantially higher than the recommended intake for this age (101 kcal/kg). Children who are both stunted and wasted, or more wasted than in the foregoing example, would be allotted even more energy on an actual body weight basis. These calculations (and similar ones carried out for older children) indicate that the assumptions used for calculation of the EMPCER already provide sufficient energy for nutritional rehabilitation of undernourished children. Thus, special adjustments for undernourished populations are necessary only when the adults are undernourished. On the other hand, special foods with high energy and nutrient density provided in a liquid or semi-liquid form, may be necessary for the rehabilitation of young children.

TABLE 2-9 Additional Energy Requirement for Each Adult, by Average Adult Height, Initial Body Mass Index (BMI), and Planned Duration of Nutritional Rehabilitation

					Daily Energy Supplement (kcal/d) by Duration of Rehabilitation	
Avg. Ht. (cm)	BMI (kg/m^2)	Actual wt. (kg)	Wt. Deficit[a] (kg)	Energy Deficit[b] (kcal)	30 d	60 d
160	18.0	46.1	1.3	6,400	213	107
	17.0	43.5	3.8	19,200	640	320
	16.0	41.0	6.4	32,000	1,067	533
165	18.0	49.0	1.4	6,806	227	113
	17.0	46.3	4.1	20,419	681	340
	16.0	43.6	6.8	34,031	1,134	567
170	18.0	52.0	1.4	7,225	241	120
	17.0	49.1	4.3	21,675	722	361
	16.0	46.2	7.2	36,125	1,204	602

[a] Assumes minimum adequate BMI of 18.5 kg/m^2.

[b] Assumes 5 kcal required per g of weight gain.

Cold environments Living in a cold environment increases energy requirements for both BMR and physical activity, especially if clothing is inadequate. Women clad in a thin cotton trouser suit expended 7 percent more energy per day in a metabolic chamber maintained at 22° C compared to 28° C; at 22° C they felt cool, chilly at times, had occasional piloerection, but did not shiver (Dauncey, 1981). In another study, even when men could select the clothing they needed to be comfortable, energy requirements in a metabolic chamber averaged about 5 percent higher at 20° than at 28° C (Warwick and Bushy, 1990). A 1 percent increase per degree C below 20° C, with the temperature estimate reduced by 5° C in windy conditions, is recommended by the Centers for Disease Control and Prevention (1992) and the ACC/SCN (Schofield, 1994). Using this recommendation, based on an EMPCER of 2,100 kcal/d, an additional 100 kcal (418 kJ)/d would be needed at 15° C, 200 kcal (837 kJ)/d at 10° C, and 300 kcal (1.3 MJ)/d at 5° C, although the increment should also depend on whether the preeminent needs for clothing and shelter are met.

3

Summary and Recommendations

The CIN was asked to provide an estimated mean per capita energy requirement (EMPCER) that can be used to expedite decisions about the immediate purchasing and shipping of food rations in emergency situations. It is applicable in situations in which nothing is known except the estimate of the total number of people involved, and no other food is available. When the population has access to food from other sources, the amount of food required to meet the EMPCER should be adjusted accordingly.

The committee's EMPCER (calculated at 2,076 kcal [8.7 MJ]/day, and rounded up to 2,100 kcal [8.8 MJ]/day) falls within a wider range of scientifically justifiable EMPCERs, ranging from 1,900 to 2,500 kcal [7.9 to 10.5 MJ]). This range depends on a number of factors that influence the EMPCER. The committee concluded that there would usually be some information about the most important of these, even in the earliest stages of an emergency. This information should be used to modify the EMPCER at the earliest opportunity.

The committee is aware that a number of international agencies also have come to the decision that EMPCERs should be based on algorithms very similar to those proposed by the committee, that consider the most important factors affecting energy requirements. These agencies are currently negotiating among themselves to arrive at a unified process for calculating the EMPCER in different situations. The CIN endorses these efforts to adopt a universally agreed-upon algorithm or value, and urges USAID to assist this process.

There are also situations where a single, universally-agreed-upon number is necessary, for example, in emergency situations in which nothing is known ex cept the estimated number of people involved. The committee urges USAID to assist in developing this number. Negotiating the number must take many biological, epidemiologic, political, and feasibility factors into consideration. Below, we present the biological considerations.

The committee's EMPCER of 2,100 kcal/day would cover the energy needs of a “typical” population requiring emergency food aid in a developing country, assuming: (1) the population is distributed as indicated in the World Population Profile 1994 report for developing countries; (2) the average height of adult males is 170 cm and of adult females is 155 cm, which are the approximate heights of average males and females in sub-Saharan Africa and slightly greater than those of adults in South and Southeast Asia; (3) the weights of these adults are at the median for U.S. adults of the stated heights; and (4) the total energy expenditure of the adults is 1.55 and 1.56 times the BMR for males and females, respectively, which is consistent with a light level of physical activity.

The committee examined the effects of varying these and other factors on its EMPCER. Factors considered included population distribution, assumed body size, physical activity level, proportion of infants who are breastfeeding, prevalence and severity of preexisting malnutrition in adults and children, and ambient temperature.

The relative influence of these factors on the EMPCER is listed below, and recommendations for adjustment made where important:

- The strongest influence on the EMPCER is physical activity; an EMPCER of 2,100 kcal assumes light physical activity, and should be increased by about 100 kcal (418 kJ)/d for moderate activity, and by 400 kcal (1.7 MJ)/d for heavy activity. Thus, the EMPCER will need to be higher for populations walking long distances, or involved in agriculture or other manual labor. In the future, simple information should be gathered on the physical activity levels of populations requiring emergency food aid in different circumstances, in order to better predict the EMPCER increment for physical activity.
- For cold environmental temperatures, the EMPCER should increase by 100 kcal (418 kJ)/d at 15°C, 200 kcal (837 kJ)/d at 10°C, and 300 kcal (1.3 MJ)/d at 5°C. Information on probable environmental temperature is usually available in the initial planning stages.
- Because the CIN's calculations of EMPCER were based on the body size of adults in developing countries, an additional 100 kcal (418 kJ)/d would be needed for populations with a body size similar to that in industrialized countries.
- An EMPCER of 2,100 kcal (8.8 MJ)/d should be sufficient to permit catch-up growth for children with preexisting malnutrition, but not to restore adult body weight. Estimates of the increment to EMPCER necessary to restore weight gain over different periods of time have been provided. Theoretically, in populations who have lost body weight due to recent food shortages, it may

require several months of a substantial increment in energy intake to regain the weight that has been lost. The feasibility of attaining this goal must be balanced against scarce resources, and issues such as how much of the additional food would actually be consumed by the target individuals.

- Substituting a population distribution characteristic of industrialized countries had little effect on the EMPCER. However, unusual migration patterns, for example, where a majority of males would be absent from a population—a situation that might occur in certain refugee situations—were found to have a substantial impact on the EMPCER; thus, where such information is available, the committee suggests that the EMPCER be revised accordingly.
- Altering the proportion of infants who are breastfeeding was found to have little effect on the EMPCER; thus, the committee felt that no special correction for rates of breastfeeding is necessary. Special foods may be required for infants and young children when mothers are unable to breastfeed or suitable complementary foods are unavailable.

The committee recommends that any EMPCER used for the purposes of planning emergency food aid rations be reevaluated as new data are obtained. Specifically, in the future, appropriate information should be collected on the experience and impact of using different EMPCER values. For example, a value of 1,900 kcal (7.9 MJ)/d is used currently by several international agencies. The CIN received some anecdotal information that this level of intake was adequate, but on biological grounds it is difficult to see how 1,900 kcal/d can meet energy requirements. The discrepancy might be explained by factors such as the availability of at least some other food in those populations, or an extremely low level of activity, but this is not known. In addition, it is essential to establish a system for the rapid assessment of the availability of local food in addition to that supplied by rations. This information is often not known until after the emergency situation has stabilized, but in some cases—e.g., droughts, other natural disasters, and sieges—it can be assumed from the onset that other foods will be available.

Finally, the committee recommends that relief programs consider providing an additional amount of food that can be “monetized,” that is, sold for cash to purchase other essentials, such as cooking fuel, complementary foodstuffs, and the like.

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Appendix

USAID's Request to the Committee

MEMORANDUM FROM SAMUEL G. KAHN DATED 7 SEPTEMBER 1994

TO: NAS/IOM/IH, Christopher P. Howson

FROM: USAID/G/PHN/HN, Samuel G. Kahn

SUBJECT: Committee on International Nutrition (CIN)

The second meeting of the CIN is scheduled to take place this October 6 and 7. The topic is “Mean Per Capita Daily Energy Requirement for Emergency Situations.” Accompanying this memorandum are background documents and information which are submitted to assist the Committee in addressing the proposed issue. Included are correspondence on the topic from WFP and CDC, excerpts from FAO and UNHCR emergency monographs, and a USAID draft copy of a reference guide on emergency rations.

Based on the scientific and technical knowledge of individual members and the background information, the Committee is requested to make recommendations as to:

- a mean per capita daily energy requirement for emergency situations (citing and defining the scientific and technical information which supports this mean value).

MEMORANDUM FROM TOM MARCHIONE DATED 7 SEPTEMBER 1994

TO:	National Academy of Sciences/Institute of Medicine
THROUGH:	Sam Kahn, USAID/Global Bureau Office of Population, Health and Nutrition
FROM:	Tom Marchione, Nutrition Advisor, USAID/Bureau for Humanitarian Response
SUBJECT:	USAID Emergency Feeding Guidelines

Background

The U.S. Agency for International Development's (USAID) Bureau for Humanitarian Response (BHR) through its Office of Food for Peace (FFP) provides hundreds of millions of dollars annually in food aid commodities for use in targeted Title II feeding programs around the world. As an aid to co-sponsors of food aid programs using U.S. food aid commodities, the FFP Office published a Commodity Reference Guide in 1988. This guidebook provides information on food commodities and their use as rations for food aid recipients in programs such as school feeding, maternal and child feeding, and food for work programs.

In recent years, emergency feeding programs for refugees, displaced persons, and otherwise disaster affected persons are demanding large amounts of food resources in high profile situations. Consequently, over 2 years ago, BHR commissioned a chapter for emergency feeding programs to be added to the Commodity Reference Guide. The resulting draft guidelines (attached) have been widely reviewed, revised and approved by USAID technical persons, private voluntary organizations that sponsor Title II programs and external experts such as the Centers for Disease Control. However, questions remain on the appropriate energy level that should be advised.

We are fully aware that population daily energy requirements are known to vary by demographic structure, temperature, health/nutrition status, and activity level. However, BHR considers it unrealistic to expect food programmers to obtain accurate data and calculate the requirements based on all of these factors. Consequently, the draft guidelines have tried to develop simpler methods for determining needs for ration planning purposes.

However, the World Food Program—a significant user of USG Title II food resources, as well as food resources from other donors—has questioned the energy needs estimate used for ration planning.

Issue

The issue before us is that the draft guidelines propose the use of 2,200 kcal per person/day as the basis for planning rations, while WFP uses 1,900 kcal per person/day as the basis for planning its rations. It is possible that 1,900 kcal may be inadequate to meet the needs of many populations, but on the other hand an increase to 2,200 kcals would demand that resources for emergencies either be substantially increased or persons reached by emergency feeding programs be drastically decreased.

Request for Professional Determination

In the view of the best scientific information available on daily food energy requirements, and in light of the practical limitations of food aid programs, what is the best average daily energy intake that should be used to plan food aid rations in emergency feeding programs?

Reviewers should bear in mind that any decision that is made will not only have implications for U.S. Government food aid programs, but will also influence the standards that are used by other bilateral donors, NGOs, and multilateral organizations, such as the World Food Program.