

Supplementary Feeding for Women and Young Children

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This module is one of a series in the World Bank's Nutrition Toolkit which aims to help World Bank staff and their partners design and supervise effective and feasible nutrition projects and project components and to carry out comprehensive analysis of sectoral and policy issues affecting nutrition.

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1.1 Purpose and structure of the module

The chief purpose of this module is to assist World Bank staff and their partners to assess and analyze nutrition situations, to decide whether supplementary feeding has a role in preventing or alleviating malnutrition among women and young children, and to facilitate the design, operationalization, monitoring and evaluation of appropriate supplementary feeding interventions.

Another module in this toolkit, *“Communication for Behavior Change in Nutrition Projects”*, starts by exploding the myth that “if the problem is malnutrition, the solution is making more food available” before going on to state that food supplementation is usually needed for only a small portion of families, while most need enabling to improve their use of existing resources. Taking these statements as its premise, this module seeks to define those situations in which food supplementation does offer potential for combating malnutrition.

“Supplementary feeding” is defined here, following WHO (1997), as *the distribution of food to supplement energy and other nutrients missing from the diet of those who have special nutritional requirements*. The most common purpose of supplementary feeding is to prevent or alleviate malnutrition through reducing the nutrient gap between an individual’s actual consumption and his/her requirement.

Supplementary feeding is at one end of the continuum which encompasses a range of strategies for distributing food, or making it more accessible to certain population groups or sub-groups. At the other end of this continuum lies strategies such as food stamps and food subsidies which have the household as its focal unit, and which are more explicitly geared to poverty alleviation (through using food as an income transfer) than malnutrition reduction. Other modules in this series cover approaches to food stamp provision, school-based feeding and early childhood development feeding.

The module is divided into eight chapters. In this opening chapter, the rationale for a life cycle approach to combating malnutrition is discussed, followed by a summary of the lessons learned concerning the efficacy and effectiveness of supplementary feeding.

The next two chapters provide the basis for deciding whether supplementary feeding is appropriate. In chapter 2, an approach to assessing the problem of malnutrition and analysing its main causes is described, corresponding largely to the Identification stage of the Project Cycle, while Chapter 3 describes how to judge the relevance, feasibility and efficiency, or cost-effectiveness, of supplementary feeding with the ultimate objective of deciding whether it is appropriate in a given context. This corresponds to the Project Preparation stage.

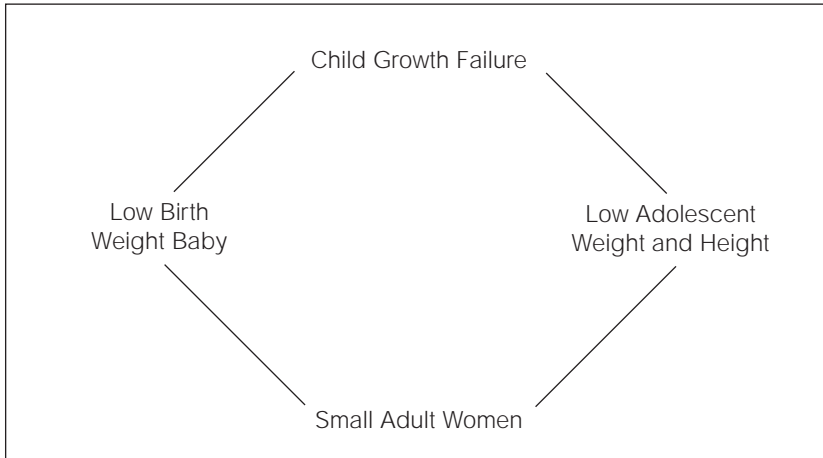
Chapter 4 provides the means for project planning and linking objectives with outcomes, outputs and inputs, while Chapter 5 considers the crucial early step in project design—targeting—and how far this needs to be taken in different contexts. Chapter 6 moves on to consider food distribution strategy design, including issues of nutrient content of supplementary foods, types of foods, delivery systems, timing, frequency, duration etc. Such nuts-and-bolts issues will be discussed during Appraisal.

Supplementary feeding is most cost-effective when integrated with other nutrition-relevant actions that cover the non-food causes of malnutrition. This is discussed in chapter 7, along with the opportunities for forming productive partnerships with other actors. The paramount importance of monitoring and evaluation for keeping track of the performance of the project against its objectives is considered in chapter 8.

1.2 *The inter-generational cycle of malnutrition*

When considering approaches to the prevention or reduction of malnutrition, such as supplementary feeding, it is important in the long-term to adopt a life-cycle approach. Malnutrition is transmitted across genera-

Figure 1. Intergenerational Cycle of Malnutrition



tions, as shown in Figure 1. Small women give birth to small babies who are more likely to become small children, small adolescents and ultimately small adults. While smallness may be genetically inherited, the majority of small individuals in most poor, developing countries are small because they have suffered, or are currently suffering, from malnutrition.

Malnutrition that occurs during childhood, adolescence and pregnancy has an additive negative impact on the birth weight of the newborn. A low birth weight (LBW) baby who has suffered intra-uterine growth retardation as a foetus is effectively born malnourished, and is at higher risk of dying in the neonatal period or later infancy. If s/he survives, s/he is unlikely to significantly catch up this lost growth later and will be more likely to experience a variety of developmental deficits. By age five, s/he is most likely to be stunted—a condition which will probably persist through adolescence and adulthood. The adolescent growth spurt offers a chance to compensate for earlier growth failure, although such potential is limited. The stunted child is likely to become a stunted adolescent

and later a stunted adult. Stunted pregnant women are more likely to give birth to low birth weight babies. And so the cycle turns (Figure 1).

A child has food, health and care needs which must *all* be fulfilled if s/he is to grow well. Most active growth faltering occurs between the ages of 6–24 months, when the child is no longer being protected by exclusive breastfeeding. (In fact, the most critical period is 6–18 months). At this time, the child is becoming more exposed to disease and infection through food or water contamination and is dependent on the mother or caregiver for frequent complementary feeding throughout the day. Growth failure is most preventable and most reversible at this age. From about two years of age, the child is more likely to grow normally for a child of that age, although s/he is unlikely to recover the growth “lost” in the first two years. The facts that:

- growth falters so early in life
- growth failure can usually not be significantly corrected later, and
- the consequences of malnutrition are most serious at this age,

suggest that the priority should be to *prevent* malnutrition from occurring among these 6–24 month old children.

There is now a consensus among the nutrition community that such a preventive emphasis is long overdue. Vicious cycles such as that in Figure 1—based as they are on mutually reinforcing processes—may in the long-term be turned into virtuous cycles. Prevention is more achievable than cure.

1.3 Efficacy of supplementary feeding

The efficacy of supplementary feeding in breaking the inter-generational cycle, or more positively turning it into a virtuous cycle, has been investigated in numerous small-scale experimental trials over the last three decades. The main lessons learned are discussed below for four potential target groups.

1.3.1 Effects on young children

Regarding efficacy, many studies have shown that raising dietary intake through supplementary feeding can have beneficial nutritional consequences, including effects on outcomes such as growth, activity, cognitive development and compensation of energy lost during illness.

The most thorough of these studies was carried out in Guatemala. From 1969 to 1977, the Institute of Nutrition of Central America and Panama (INCAP) carried out a longitudinal study in four Guatemalan villages to investigate the effects of child supplementation. Important effects on growth, physical and mental development were noted in early childhood. The benefits were greater in children with lower socio-economic or nutritional status and higher prevalence of morbidity. Weight gain was most pronounced during the first two years of life, and height gain in the first three years. Gains between 3–7 years were not significant (Schroeder *et al.* 1995).

The long-term effects were later investigated in the Guatemalan Oriente Study 1969–1989 which followed-up the children originally supplemented to assess effects in adolescence. Results show that after 15 years with no additional intervention, the group that received the supplement as young children maintained most of the original gains in height and weight, showed increased physical capacity and had better performance on various cognitive and behavioural tests. (Pollit *et al.*, 1993). The association was three times stronger among girls than boys. Given that pre-pregnancy nutritional status correlates significantly with subsequent birth weight, the long-term benefits are likely to be inter-generational.

As reported in WHO (1997) overall findings regarding short-term growth effects are as variable as the particular study designs. However, many do demonstrate significant growth increments, as shown in the summary table.

Moreover, before effects are manifested anthropometrically, there may be significant increases in voluntary activity by children (Rutishauser and

Summary of selected efficacy trials of complementary foods or dietary advice for young children (from Brown *et al.* (1998))

Author (year)	Martorell, Schroeder 95	Mora (1981) Lutter (1990)	Gershoff (1988)	Walker (1991)
Country	Guatemala	Colombia	Thailand	Jamaica
Type of program	Food suppl to mother during preg. & to children	Food suppl to mother at 3rd trimester & to children after 3 mos	Food suppl to children only	Food suppl to children only
Type of supplement or dietary advice	Incaparina (cereal-legume blend) vs. sugar drink (+vits & some mins)	Milk & Duryea for infants 1 yr; skim milk, oil, bread for older participants	High fat biscuit + vitamins & minerals	Milk formula
Method of distribution & duration of participation	Meals twice daily at field station: pregnancy + 36 mos. ^f	Wkly pick-up of rations at field station: 3rd trimester of preg. + 36 mos	Distributed once daily in day care center:12 mos per age group	Weekly home delivery:12 mos.
No. of subjects/ breastfeeding (BF) status	~330/duration of BF not specified	172/median duration of BF =6.6 mos.	205/BF status not specified	127/non-breastfed
Age range (mos.)	3-36	3- 36	< 36	9-24
Kcals energy offered as suppl. ^a	Unlimited	428-670 ^b	300	750
Energy consumed from suppl. (kcal) ^a	128	363-458 ^c	NA	345
Est. net incsr. in energy consmd kcal) ^a	93 ^d	200 ^d	NA	106 ^d
Difference in weight gain during particip. Period (g or Z-score)	+780g	+476 g	+100 g (NS) ^g	+380 g
Diff. in length gain during particip. (cm or Z-score)	+2.5 cm	+2.2 cm	+0.1 cm (NS)	+1.0 cm

^aEnergy intakes presented either as total energy offered via supplement or as difference in energy provided to intervention and control groups

^bAmounts offered varied by age group

^c 363 kcal/d difference at 18 months, 458 kcal/d difference at 36 months

^dDifference in intake of non-breast milk sources of energy

^eInformation available only for non-breast milk energy consumption at day-care center

^fStudy actually continued in children up to 84 months, but current analyses restricted to first 36 months.

^gNS = not statistically significant ($p > 0.05$)

Husaini (1991)	Simondon (1996)	Simondon (1996)	Simondon (1996)	Simondon (1996)
Indonesia	Congo	Senegal	Bolivia	N.Caledonia
Food suppl to children only	Food suppl to children only	Food suppl to children only	Food suppl to children only	Food suppl to children only
High energy snacks (cereals, tubers, bread, sugar, oil)	Blend of cereals, soybean, milk powder, oil, sugar, vits & mins.	Blend of cereals, soybean, milk powder, oil, sugar, vits & mins.	Blend of cereals, soybean, milk powder, oil, sugar, vits & mins.	Blend of cereals, soybean, milk powder, oil, sugar, vits & mins.
Twice daily at day-care center: 3 mos.	Twice daily, home delivery: 3 mos.	Twice daily, home delivery	Twice daily, home delivery	Twice daily, home delivery 3 mos.
113/BF status not specified	120/BF	110/BF	127/BF	90/47% BF at 7 mos.
6-20	4-7	4-7	4-7	4-7
400	103-205 ^b	103-205 ^b	103-205 ^b	103-205 ^c
NA	189	133	161	160
(~300) ^{d,e}	NA	NA	NA	NA
+0.30 Z	-250 g (NS)	-10 g (NS)	-70 g	+60 g (NS)
+0.04 Z (NS)	-0.15 cm (NS)	+0.48 cm	+0.25 cm (NS)	+0.05 cm (NS)

Whitehead 1972), which promotes cognitive development. A meta-analysis of six field studies concluded that supplementation targeted to 6–24 month old children can prevent developmental delays (Pollitt and Oh 1994).

There are important interactions between dietary intake and health status, with implications for supplementary feeding programs. The so-called “malnutrition-infection complex” has been well documented (Tomkins and Watson 1989). Basically, both ill-health and poor dietary intake can result in malnutrition, but there is an important synergistic interaction whereby the combined effect is usually worse than the sum of the two individual effects. This means that, while it is important to deal with both health and dietary factors, in order to address malnutrition, dealing with one alone (e.g. dietary intake) can effectively remove the interaction effect.

Dietary interventions during and immediately after an infectious disease episode can thus affect the course and effects of the disease, and reduce the extent to which nutritional status deteriorates. Nutrition is thus relevant to disease *management*. Supplementation has been found in studies in Colombia and Guatemala (Lutter *et al.* 1989, Martorell *et al.* 1990) to modify the negative effect of diarrhoea on growth—the more severe the diarrhoea, the greater the protective effect of feeding. Feeding sick children thus mitigates the adverse effect of *interactions* within the malnutrition-infection complex, although this is made more difficult by the anorexia that commonly accompanies infectious disease, and possibly also the raised nutrient requirements e.g. fever.

As well as dietary management, adequate dietary intake is thus preventive in that it bolsters immunity. Indeed, it has been claimed that longer-term trends (over decades) towards improved health in many countries are basically due to the preventive effect of better nutrition (McKeown 1988). As might be expected from such morbidity effects, other studies have directly shown the positive impact of supplementary feeding programs on mortality rates (Rose *et al.* 1993). Finally, the increased atten-

dance which has been shown at clinics where supplementary feeding is undertaken (e.g. Tjon A Ten *et al.* 1990) is another example of a mutually reinforcing benefit due to preventive health.

1.3.2 Effects on adolescent girls

Can malnourished children catch up incomplete childhood growth during adolescence? If so, does supplementary feeding have a potential role?

A recent review of ten relevant studies concluded there was little evidence to suggest that the growth retardation suffered in early childhood can be *significantly* compensated for in adolescence (Gillespie 1997). Of the ten studies, five concerned the effects of adoption i.e. sudden environmental change, four were longitudinal studies and one was cross-sectional.

Moreover, no study examined the effects of a specific intervention e.g. supplementary feeding. A recent WHO publication states there are no known studies to determine whether groups of growth-retarded children respond to nutritional and health interventions with compensatory catch-up growth during adolescence (WHO 1995).

Kurz and Johnson-Welch (1994) list three important questions to be asked before a food intervention is considered for adolescents:

- i) *How much height could be gained?* The only study that comes close to answering this (Torun *et al.* 1995) showed that growth hormones were elevated in pre-menarcheal participants of a food intervention (i.e. the potential for faster growth). Height changes were not measured.
- ii) *Is menarche hastened? If so, what are the implications?* If a food intervention only succeeds in hastening menarche and thus reducing the period of fastest growth (see e.g. Proos 1992, Martorell *et al.* 1994), it

may not increase attained height by much. If, on the other hand, this possibility is avoided by delaying intervention until after menarche, can much extra pelvic growth be achieved in this later period of slower growth? Kanade (1994) suggests not—in her study in India, dietary intake after menarche was not associated with adolescent growth. Even if greater attained height was possible with either of these two options, would it be enough to make a difference either to the woman or future child?

- iii) *How much fat is gained simultaneously?* Raising attained height through a food intervention, if possible, would also increase weight, including fat stores, in the body (Kurz and Johnson-Welch 1994). This would be advantageous to the thin and stunted adolescent, but may lead to overweight among girls who, though stunted, are not thin during adolescence. A series of detailed studies carried out by the International Center for Research on Women (ICRW) taken together suggest caution as, by age 18–19 years, few girls were thin, as assessed by BMI-for-age (see chapter 2)

Existing knowledge therefore suggests that height gain during adolescence may not be a feasible nutrition objective. An International Dietary Energy Consultancy Group (IDECG) workshop on the causes and mechanisms of linear growth retardation in 1993 concluded that there was *“no evidence that intervention at the time of puberty has any special effect on linear growth and in any case it would not be justifiable to delay intervention until such a late stage. The time for intervention is early childhood, when growth is first becoming retarded”* (Golden 1994).

Nevertheless, apart from linear growth, there are other important potential benefits in improving dietary intake, including weight gain among thin adolescent girls, and improved micronutrient status (particularly iron and folate status) which will benefit their well-being in the present as well as their nutritional status during any subsequent pregnancy. Operational research is required in this area.

There may also be particular opportunities for improving adolescent nutritional status. For example, dietary practices may be more mouldable, and not as fixed as among adults; there may be fewer cultural constraints or restrictive taboos; and school enrolment of female adolescents is usually higher than antenatal care coverage, facilitating coverage of any supplementation scheme undertaken.

The one clear area for likely benefits of a nutritional intervention during adolescence is improving iron and folic acid status—in order to improve the current nutritional status of adolescents as well as improving iron stores. Borderline iron stores before conception are the main cause of iron-deficiency anaemia during pregnancy (Brabin and Brabin 1992). It might also be too late to prevent neural tube defects by delaying folic acid supplementation until pregnancy—given the difficulty of early pregnancy identification.

1.3.3 Effects on pregnant women

During pregnancy, the foetus is solely dependent on maternal intake and nutritional stores. Increasing maternal energy intake during pregnancy increases the birth weight of the baby, with the effect being greater the more underweight the woman is prior to pregnancy. Observational studies have shown that three times as much birth weight (i.e. about 100g) may be gained per 100 kcals ingested by underweight women than by well nourished women (Kramer 1987). Tall, thin women have been found to have larger positive birthweight responses to supplementation than short, thin women in a Taiwan study (Adair and Pollitt 1985). This is one further illustration of the detrimental and irreversible effects of early childhood stunting—girls who become stunted will be less responsive as adults to attempts to improve birthweights through maternal supplementation. The inter-generational cycle turns.

If a mother is supplemented continuously through two consecutive pregnancies and the period of lactation in between, the increase in birth

weight for the second child may be three times the gain in the first i.e. up to 300g (Villar and Rivera 1988). A longer *duration* of continuous supplementation (during both pregnancy and lactation) may be more beneficial to foetal growth than short spells of higher-energy supplementation.

In general, the average increase in birth weight achieved by supplementation is modest, about 100g (Villar and Rivera 1988). Greater birth weight gains have been seen when supplementation is timed to coincide with hungry or lean seasons when the mother's workload also tends to peak, and she is likely to be nutritionally more at risk.

The most compelling evidence of beneficial effects of prenatal supplementation comes from a recent five-year prospective randomised controlled trial in 28 rural Gambian villages. High-energy supplementation of chronically undernourished women for the last 20 weeks of gestation through the primary health care system was found to be significantly associated with increased weight gain in pregnancy, increases in birth weights and reductions in the prevalences of stillbirth and early neonatal mortality (Ceesay *et al.* 1997). Mean birth weight gains ranged from 201g in the hungry season to 94g in the harvest season. Complementary earlier studies in the Gambia have clearly linked seasonal reductions in maternal energy intake (where supplementation was not available) during these lean seasons with maternal weight changes and reductions in both mean birth weight and the quantity and quality of breastmilk (Prentice 1980). Pregnant women "cope" to some extent with these extreme seasonal fluctuations by mobilising more body fat, reducing their basal metabolic rate and reducing activity towards the end of pregnancy (Gillespie and McNeill 1992).

There has been much recent discussion about the "fetal origins of adult disease" (e.g. Barker 1993). This has been empirically borne out by an analysis of 1077 deaths in the same Gambian community which has recently shown that being born in the hungry season (with a higher likelihood of being low birth weight) predicts a major excess of premature

adult mortality, with infections and pregnancy-related maternal deaths as the predominant causes (Ceasay et al. 1997).

Prior to the Gambian study, a meta-analysis of controlled clinical trials of the effects of energy and protein supplementation on pregnancy outcomes claimed that only modest increases in foetal growth were possible and that *“these do not appear to confer long-lasting benefits on infant and child survival, health and performance.”* (Kramer 1993). This difference could possibly be explained by three factors: i) many of the clinical trials involved supplementation only in the third trimester when the potential foetal gains are much less, ii) the meta-analysis did not examine the role of micronutrients in food supplementation, and iii) there was no way of knowing whether supplements were truly supplements (i.e. additive to the habitual diet) or whether they were at least partially substituting for it.

The Gambian findings suggest that fetal growth is most sensitive to nutritional deprivation during the last trimester of pregnancy. This concurs with findings from other studies. Data from periods of famine—in Leningrad 1941–43 and in Holland during the 1944–45 “hunger winter”—show that birth weights were most reduced for children whose mothers were exposed to extreme food deprivation in the second half of pregnancy (Stein *et al.* 1975). Exposure to famine only during very early pregnancy did not affect birth weight. An Indian study found that supplementation during the second and third trimesters (with food and iron-folic acid supplements) was found to have double the impact on birth weight as supplementation during the third trimester only (Anderson 1989). Given the difficulty of reaching women in the first half of pregnancy, these findings provide extra justification for attempts to incorporate supplementation to at-risk women in the second half of pregnancy through existing MCH systems.

Micronutrient content of supplements is important. A study in Chile compared three groups of underweight pregnant women i) recipients of a powdered milk supplement, ii) recipients of a powdered milk-based forti-

fied formula, and iii) self-selected non-compliers (Mardones-Santander *et al.* 1988). The birth weights were significantly highest among the second group, and lowest in the third, unsupplemented group. In addition, maternal weight gain and iron status was found to be significantly increased with the fortified supplement.

There are other post-natal effects beyond birth weight. In trials in Indonesia and Colombia, energy supplementation of chronically energy-deficient women during the third trimester was found to be effective in promoting the growth of infants (Kusin *et al.* 1992, Mora *et al.* 1981). Children of supplemented mothers had greater weight and height gains than their counterparts whose mothers had not received supplements.

1.3.4 Effects in lactating women

The energy cost of lactation must be met by fat mobilisation, increased energy intake and/or decreased activity. Many of the issues in supplementing pregnant women addressed above apply to lactating women. There are several reasons for supplementing lactating women:

- to facilitate recuperation, and replenishment of nutrient stores, thus improving maternal nutritional status and well-being, as well as increasing pre-pregnancy weight prior to a subsequent conception.
- to improve maternal micronutrient stores and breast milk micronutrient concentrations thus benefiting both mother and infant.
- to help meet the high nutritional demands of mothers who are both pregnant and lactating concurrently,
- compliance with supplementation may be higher during this time, particularly in cultures where the practice of “eating down” during pregnancy is prevalent.

- supplementing the mother is safer than supplementing the infant e.g. post-partum vitamin A.
- to enable the mother to maintain normal levels of activity rather than reduce them, with consequent benefits to the whole family.

Most studies of maternal supplementation during lactation have not demonstrated improved milk output (volume). Ashworth and Feachem (1985) critically reviewed these interventions and concluded that *“attempts to improve lactation by maternal supplementation have not achieved any sizeable increase in milk output”* although increases in micronutrient breastmilk concentrations were observed which are likely to be important. Milk output effects may in any case be hard to separate from the effects of supplementation during pregnancy as breast milk production depends on the intensity and frequency of suckling by the child which is a function of its birthweight and thus also indirectly supplementation during pregnancy.

In sum, supplementary feeding thus can potentially have both short and long-term benefits for children, particularly undernourished under-tuos, and pregnant and lactating women, even though anthropometry may not be sensitive to all effects.

1.4 Effectiveness of supplementary feeding programs

Beyond efficacy lies the question of effectiveness. How effective have large-scale supplementary feeding programs actually been in the real world beyond small-scale trials?

Despite a paucity of large-scale programmatic evaluations, experience has shown there are several reasons why small-scale efficacy does not

translate readily into large-scale programmatic success, such as the following:

- Irregular or inefficient supply, delivery and/or distribution of food for various reasons, including corruption.
- Inadequacies in institutional capacity, training, supervision, monitoring, evaluation, community involvement
- Leakages due to poor targeting
- Irregular participation of the target group
- Inappropriate timing or duration of supplementary feeding
- Leakages due to intra-household sharing of food with the non-needy, or sale of take-home rations
- Leakages due to the substitution of a portion of the normal diet by the on-site food consumed by the target individual.
- Inadequate quantity or quality of food basket to close nutrient gaps.
- Insufficient calorie density of foods rendering it difficult for the target child to consume enough to meet the nutrient gap
- Types of food culturally inappropriate
- Lack of understanding of beliefs and perceptions underlying intra-household food distribution practices
- Lack of counselling on the need to actually feed supplementary foods to the targeted child.

- Lack of attention paid to combatting other important causes of malnutrition including through communications approaches aimed at improving home-based caring practices

Two reviews in particular are informative. Firstly, the study by Beaton and Ghassemi (1982) in which over 200 reports of past food distribution (take-home or supervised feeding) programs for young children were reviewed. They found that the net increase in the food intake by the target recipients was 45 to 70 per cent of the food distributed. The chance of a detectable weight response was increased if supplementation were targeted on underweight children. Beaton and Ghassemi (1982) concluded that such programs have been rather expensive for the measured benefits but caution: *“we remain unconvinced that the benefit usually measured, physical growth and development, is either the total benefit to the family and community or even the most important benefit. Therefore, we judge that it would be unwise to withdraw such food distribution programs until researchers have had an opportunity to assess their true effects and benefits.”*

Secondly, in a comparison of five supplementation programs in India, Pakistan, Costa Rica, Colombia and Dominican Republic, Kennedy and Alderman (1987) found actual results in terms of measured anthropometric change in children to be discouraging. Rations were insufficient generally to have filled caloric gaps, and many recipients were not very undernourished initially anyway. A number of approaches were suggested to raise the net caloric increments in individual children e.g. designing a program to be perceived as a snack, focusing on the “food as medicine” approach, and incorporating a nutrition education component.

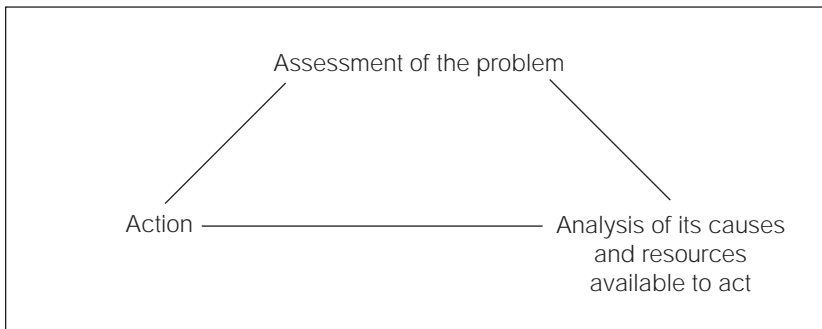
Such factors need particular attention in strategy development and project design, and will be addressed as they apply to each stage of the project cycle below.

2.1 Process

To inform any decision on future action, it is necessary first to assess the nature, dimensions and extent of the problem and second, to carry out a basic analysis of its causes, and the resources that are available to deal with it. The process of problem *assessment*, causal and resource *analysis*, followed by appropriate *action* (the “Triple A Cycle”—see Figure 2) is one which individuals and communities undertake in their daily lives for many different reasons. By clearly articulating each step in the process, appropriately focused action can be undertaken to deal with complex problems such as malnutrition. Institutionalizing the cycle helps avoid premature decisions being made on actions without a clear consensus among stakeholders on the main causes of the problem.

With regard to supplementary feeding, this means investigating whether malnutrition is being caused by food-related factors which may potentially be addressed by supplementary feeding.

Figure 2. The Triple A Cycle



Source: UNICEF (1990)

The Triple A does not stop at “action”. It is an iterative cycle—once the action has been undertaken, the situation is re-assessed to see whether there has been an improvement. Monitoring and evaluation are processes of re-assessment—the former for management purposes and the latter to assess the degree of overall success or failure of the project (see chapter 7).

Another important aspect of this decision-making cycle is that it should be participatory and involve all stakeholders. These include national and local government administration, community organizations, other donors, the Bank, and the intended beneficiaries themselves. It is important to note that perceptions and objectives are likely to differ between stakeholders; interventions need to balance these interests and strive for the best possible consensus.

Community ownership is fundamental to sustainability, but ownership does not only mean a role in implementation—it means a pro-active involvement at all stages in the project cycle (or the Triple A), from problem assessment to monitoring and evaluation.

The essential stages in problem analysis to be undertaken by Bank staff may be broken down into the following four stages:

1. Assessment of the nature, extent, severity and distribution of malnutrition.
2. Analysis of the main causes of malnutrition.

This will clarify whether supplementary feeding is a potentially *relevant* action.

3. Analysis of the resources and institutional capacity for action

This will reveal whether it's *feasible*.

4. Cost-effectiveness analysis, as far as data permit, of supplementary feeding and other alternative relevant and feasible interventions aimed at malnutrition reduction.

This will lead to a decision on whether supplementary feeding is ultimately the most *appropriate* intervention to initiate, given the existing context.

Chapter 2 describes the type of questions to be asked in the first two stages of assessing the problem and analysing its main causes, while Chapter 3 moves on to describe the type of situations in which supplementary feeding might be considered to be a relevant, feasible and cost-effective intervention for combating malnutrition.

2.2 Assessment of malnutrition

In problem assessment, it will be necessary to learn as much as possible about the nature, extent, severity and distribution of malnutrition in the country through addressing questions such as these:

- what types of malnutrition exist?
 - protein-energy malnutrition?
 - low birth weight?
 - underweight, stunting, wasting
 - micronutrient malnutrition (e.g. deficiencies of iron, vitamin A, iodine)?
- what proportion of the population are affected by the above? How severely?
- who are they? (age, sex, socio-economic or occupational status etc)
- where do they live? (geographical location)

- when is the problem most common or severe (is seasonality a factor)?
- is there any information to show whether the problem is worsening or improving (e.g. trend data)?
- what is the local perception of “malnutrition”? How is it recognized?

At this point, the reader is referred to the details on nutritional status assessment provided in the *“Nuts and Bolts”* toolkit module.

Sources of nutritional status data may include national surveys, governmental action plans (e.g. post-ICN), Demographic and Health Surveys (DHS), UNICEF situational analyses, NGO reports, nutrition surveillance systems, etc.

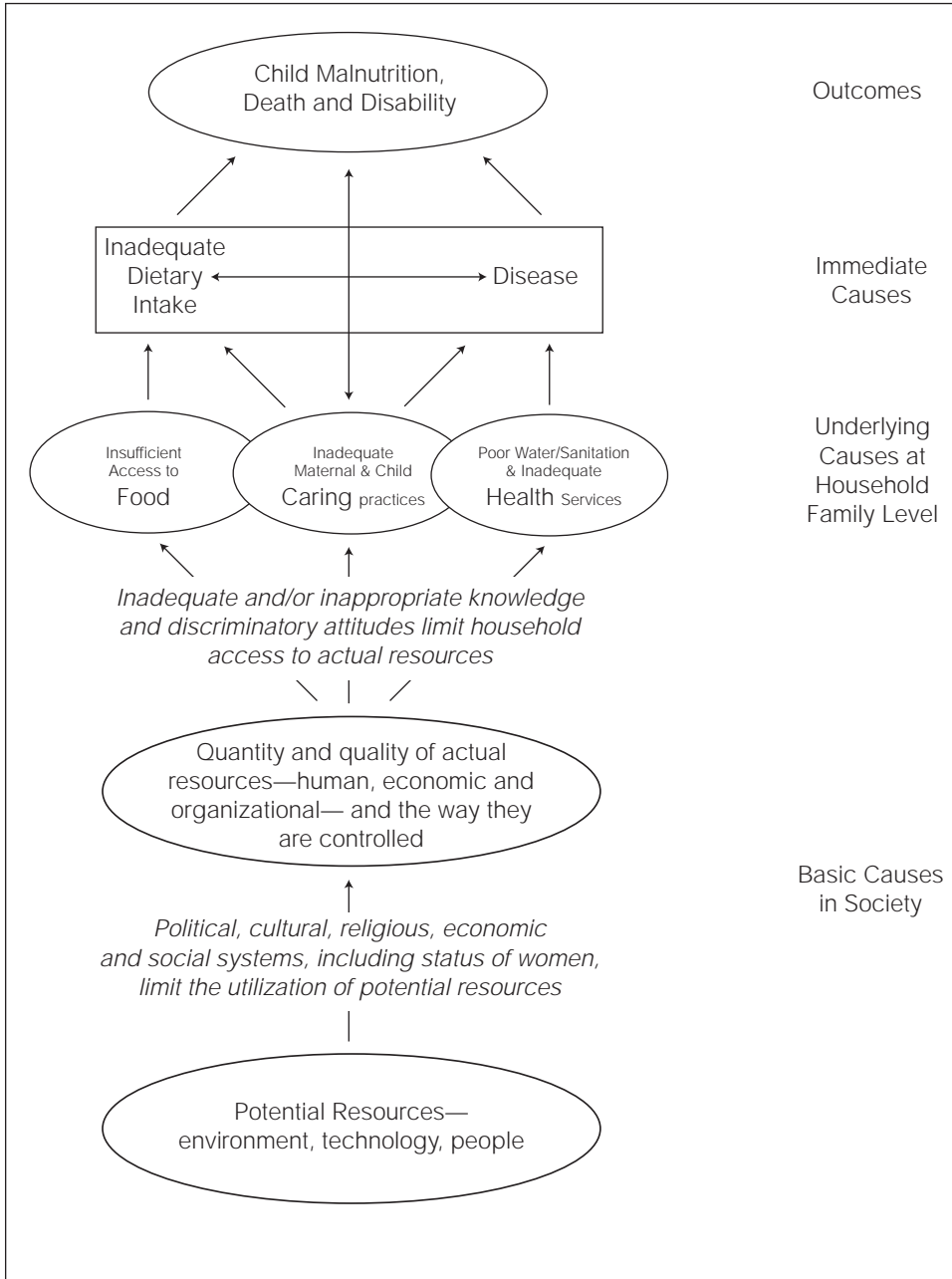
2.3 Causal analysis

Once the problem has been assessed, and we know something about who, what, where and when, we then need to move on to ask the question “why?”.

In investigating causes, how do we know what to look for?

It is helpful to have a simple conceptual framework to serve as an organizing principle or a common language, that facilitates understanding and communication. One widely used framework, developed by UNICEF but now used by many, positions a child’s nutritional status as an outcome of various causes which interact at different levels (see Figure 3). This framework is comprehensive without being too complex, and flexible without being too open-ended. It demonstrates the multidisciplinary nature of the nutrition problem, yet at the same time facilitates appropriate focused action.

Figure 3. Causes of Child Malnutrition



Even though an individual, household, community, government or external agency may only have the means to act on a sub-set of the causes of malnutrition, it will still be necessary to gain a *basic* understanding of the whole picture.

2.3.1 Immediate causes

At the immediate or individual level, the child needs to have an adequate dietary intake and to be free of disease and infection in order to be well nourished. If the child is either sick or not eating enough, his/her growth is likely to be impaired, which may over time lead to malnutrition. Poor diet and disease interact in a synergistic, vicious cycle with each factor exacerbating the other. Inadequate dietary intake in the young child compromises immune function and may lead to disease being more severe and/or more prolonged. Disease reduces appetite and hence intake, as well as reducing absorption and utilisation of ingested nutrients and increasing catabolic losses. This has been referred to as the "malnutrition-infection complex" (Tomkins and Watson 1989). Its very existence shows that malnutrition is not merely a food problem.

2.3.1.1 Dietary intake

The adequacy of a young child's dietary intake relates to:

- the quantity of food consumed,
- the quality of the overall diet with respect to various macro and micro-nutrients,
- its form, including palatability, energy density, bulk, and
- how frequently the food is actually consumed.

The fact that a young child cannot eat unaided but needs to *be fed*, is an important distinction. Child feeding (including breastfeeding and comple-

mentary feeding) is one of several caring practices discussed in section 2.3.2.

Energy density and dietary bulk are crucial concerns to the young growing child. Between 6–24 months in particular, the child has a relatively small stomach when compared to the quantity of food s/he needs. Frequent feeds are therefore required. But also the food must have a high caloric density for a given volume and thus not be too “bulky”. The addition of some fat preferably, or even sugar, to staple cereals will greatly increase energy density in this way. Thus, for a given spoonful of food, more valuable calories are being consumed.

Dietary intake assessment methodologies are described in the *“Nuts and Bolts”* toolkit module

2.3.1.2 Disease and infection

At an immediate level, a child thus becomes malnourished as result of an inadequate dietary intake often compounded by disease and infection. It will be necessary to gain some knowledge of the main types of disease suffered by young children and how common these are—particularly diarrhoeal disease, acute respiratory infections, parasitic infections, measles and malaria. Ideally data should be disaggregated by age, location, and season. Sources include hospital and clinic records, ministry of health statistics, DHS and other donor surveys.

**

Such a causal analysis will thus point to the main likely immediate causes of the malnutrition observed. We will now know the nature and magnitude of malnutrition and the types of diet and disease factors which are most proximally associated with it.

But we will not yet know why dietary intake is inadequate, nor why certain diseases are so common. Some information about the *underlying* causes

will usually be required before appropriate, prioritised action can be decided upon.

2.3.2 Underlying causes

In order to ensure the immediate conditions of an adequate dietary intake and a disease-free, healthy child, there are three main underlying pre-conditions, summarised as:

Food Care Health

These preconditions apply at the household level, referring to a household's access to resources (food, health) and how it uses them (care). "Food" refers to household food security, "care" to adequate care of women and children, and "health" refers to access to health services, water and sanitation (see Figure 3), as described below.

For a child to be adequately nourished throughout her or his life, *all three* of these preconditions need to exist simultaneously.

In any problem analysis, there will be a need to investigate the relative roles of food, health and care factors in the causation of malnutrition—through focusing on the types of questions listed below. Again, this is intended to serve as a checklist which delineates the scope of each causal area. Obviously not all data are available or even required in any one situation. A summary of core indicators is provided in section 2.4.

2.3.2.1 Household food security¹

Does the child come from a household which has the ability to acquire adequate food for all its members throughout the year?

¹A detailed discussion of household food security is provided in the "Nuts and Bolts" toolkit module.

How does household food security relate to individual nutritional status? Household food security can be seen in the framework to be necessary but, of itself, not sufficient to ensure adequate individual nutrition. It clearly may be possible to be malnourished in a food-secure household through the effect of disease, inadequate care or inequitable food allocation. Moreover, while a household may be food-secure in terms of calories, dietary quality will determine the likelihood of micronutrient deficiencies occurring in individuals.

It should also be pointed out that it may be possible for an individual to be well-nourished in a food-insecure household, although not all household members will be able to remain well-nourished in such a household over the long term. For example, young children who are well-nourished in food-insecure households are often referred to as examples of such 'positive deviance'—which usually occurs as a result of the priority allocation of food, health and care resources to growing children in these households. Care factors are usually most influential (see 2.3.2.2).

Assuring food security at the household level is a fundamental first step in assuring adequate individual dietary intakes and ultimately adequate nutritional status.

There is no single measure or indicator of household food security that can be applied universally in the way that anthropometry proxies for malnutrition. The following are some examples of indicators:

- Aggregated household energy consumption compared to aggregated household energy requirements
- Number of meals eaten each day
- Types and frequency of foods actually consumed (through food frequency assessments).
- Percentage of household expenditure that is allocated towards food

purchases. The poor usually spend a high proportion of their income or expenditure on food, and thus income poverty and household food security tend often to be strongly related.

- Dependency ratio of the household i.e. proportion of young (dependent) children to wage-earning adults.
- Number of daily hours required for adult earners to work in order to acquire sufficient food for the entire family.

Other resource-related indicators include household income, number of income sources, asset ownership etc, although these are less specific to household food security.

Data on household food insecurity may be scarce. Household budget surveys on income and expenditure patterns and possibly also food consumption patterns may be available with national statistical units, nutrition institutes, health or agriculture ministries (see *“Nuts and Bolts”*)

2.3.2.2 Care for children and women

Do caregivers in the household and community have enough time, knowledge and appropriate skills to provide adequate care for children and women (particularly during pregnancy and lactation).

Care essentially refers to behaviours and practices—how resources (particularly food and health resources) are actually used within the household. As mentioned, the fact that a young child needs to be actively fed by someone, shows the importance of feeding practices, as distinct from food *per se*.

Caring practices are conditioned by cultural factors, belief systems and capacity factors such as resources like time and knowledge. Indicators

of such a *capacity to care* may include availability of maternal time for child care, the presence of alternate caregivers or community child care facilities, maternity benefits etc.

There are six key types of caring practices with relevance to nutrition: i) feeding practices, ii) care for women, iii) food preparation and processing, iv) hygiene practices, v) home health care, and vi) psycho-social care. For a detailed analysis of the relationship between care factors and nutrition, the reader is referred to a recent UNICEF publication (Engle *et al.* 1997).

i. Feeding practices

These are the most important caring practices with respect to nutrition. *The fundamental means of preventing malnutrition among infants and young children is to ensure optimal home-based feeding.* This simple fact should never be forgotten in discussions of the role of supplementary feeding.

Breastfeeding is the most important nutritional action that can be taken to ensure the adequate growth and development of the newborn child. Breastfeeding should be exclusive for about the first six months of a

Complementary Foods

“Complementary foods” are foods which are required by the child, from six months, in addition to sustained breastfeeding. Breast milk is a complete food but by the age of around six months, the quantitative needs of the infant are greater than what can be provided by breast milk alone. Complementary foods have been referred to as “weaning foods” in the past, though this term is now discouraged, as it has been incorrectly perceived as implying the cessation of breastfeeding.

child's life, after which time semi-solids should be progressively introduced to the diet to complement the continued breastfeeding. If the child is less than six months old, it will be important to know if s/he is being exclusively breastfed, and if not, why not—what are the constraints?

If the child is over six months of age, the following questions are important:

- is the child receiving complementary foods?
- what age were such foods introduced?
- what type of foods?
- how much food?
- how frequently is the child fed?
- how are these foods prepared?
- who feeds the child?
- is the child *actively* fed?
- are these preparations safe, energy-dense, micronutrient-rich, and low in bulk?
- is the child still being breastfed, as well as receiving complementary foods?
- is the child fed adequately during illness?

ii. Care for women

- during pregnancy or lactation, does the woman consume extra food?
- does she reduce her workload?
- does she receive prenatal care (including iron supplements)?

- is she supported in the above practices by her family?
- is she self-confident?
- does she have some control and power (autonomy) in decision-making?

Maternal nutritional status (as measured for example by Body Mass Index (BMI)) is one proxy indicator of care for women, especially during pregnancy and lactation. At a more basic level, care for women encompasses her mental health, self-confidence and degree of power in household decision-making.

iii. Food preparation and processing

- is food stored, processed, prepared, and cooked adequately?
- is food handled hygienically?
- who prepares food for the household?
- how often?
- how much time does this take?

It is important to know how households obtain food, who purchases it, who controls household resources (e.g. income) relating to food? What type of food beliefs, taboos exist? For example, do mothers believe the child can control his/her own intake or does the mother take a more proactive child feeding role? This whole area of intra-household distribution of both food and health resources is a care issue, as it depends on socio-cultural practices and behaviours.

iv. Hygiene practices

- are personal hygiene practices adequate?
 - hand-washing
 - bathing and cleaning the child

- are household hygiene practices adequate?
 - cleaning house and immediate surroundings
 - disposing of child's waste
 - use of sanitary facilities
 - making water safe and choosing safe water

v. *Home health care*

- are measures taken to prevent illness?
- are illnesses diagnosed?
- is home treatment provided e.g. oral rehydration?
- are preventive health services utilised e.g. immunisation?
- are curative health services utilised?

vi. *Psycho-social care*

- is the caregiver responsive to the child's developmental milestones and cues?
- does the child interact positively with the family (touching, holding, talking)?
- is the child confident to play and explore her/his surroundings?

Many relevant data on care aspects will be qualitative and may be available through small-scale participatory appraisals (e.g. PRA). DHS and national surveys do provide important data on feeding, home health care, care for women etc which would point to areas which may need further investigation in selected areas of the country.

2.3.2.3 *Health and environment*

Does the child have access to good quality health services, safe water supplies, and adequate sanitation?

i. Health services

- what kind of health infrastructure, and facilities exist (particularly MCH)?
- what services are performed at these facilities?
- how accessible are facilities to vulnerable populations?
- what is immunisation coverage (a proxy of outreach/access)?
- what is the quality of the facilities?
- what is the quality of trained staff at the facilities?
- are staff always in attendance
- is an adequate supply and availability of essential drugs maintained?
- what types of services are in demand, what ailments trigger utilization?

ii. Water and sanitation

- what type of water supply system exists?
- is safe drinking water accessible?
- what amount is available per person?
- is there access to an adequate sanitation system (e.g. latrine use)
- is there adequate housing?

Data sources include the Ministry of Health, local clinics, water supply boards and interviews with beneficiary households.

2.4 Summary core indicators

OUTCOMES	
Indicator	Source of data
Low birth weight incidence (%)	National surveys (e.g. Demographic and Health Surveys (DHS), MoH sources, nutrition surveillance systems) Central Statistical Authority, UN databases e.g. ACC/SCN, World Bank, UNICEF, WHO.
Prevalence of severely underweight under-three year olds (%)	
Prevalence of moderately underweight under-three year olds (%)	
Micronutrient deficiency indicators.	

IMMEDIATE CAUSES	
Indicator	Source of data
<i>Inadequate dietary intake</i>	
Quantity and quality of under-two year olds' diets with regard to requirements, and in relation to adequacy of adult dietary intake	Diet surveys e.g. 24 hour recalls.
<i>Disease/infection</i>	
Period prevalence of diarrhoea (12–23 month age), acute respiratory infection, measles, malaria	MOH, studies

UNDERLYING CAUSES	
Indicator	Source of data
<i>Food</i>	
% of household expenditure allocated to food	Household budget/expenditure surveys, Food consumption studies, Central Statistical Authority, UN databases e.g. World Bank, FAO, WFP, UNICEF, ACC/SCN
Number of meals eaten per day	
Dietary diversity (re: micronutrients) (by region, income group, gender and season, if available)	
<i>Care</i>	
% 0–6 month olds exclusively breastfed	DHS surveys, MoH data, studies, Central Statistical Authority, UN databases e.g. UNICEF, WHO, World Bank
% 6–12 month olds receiving complementary foods	
Maternal nutritional status (e.g. % MUAC < 21cm—see chapter 4)	
<i>Health</i>	
Immunization coverage (% of 12–23 month old children received measles vaccination;	MoH data, studies, Central Statistical Authority, UN databases e.g. WHO, World Bank, UNICEF, ACC/SCN.
% of pregnant women receiving tetanus toxoid vaccin.)	
Access to health center (no. MCH centers/100,000 population)	
Quality of health services (population per physician/nursing person; per caput public expenditure on primary health care)	
Access to safe water and sanitation (% population)	

The Project Identification stage has now been completed. The nature, extent, severity and distribution of malnutrition has been assessed and its main causes analysed. The next step of deciding on appropriate action relates to the Project Preparation stage of the Project Cycle. With a knowledge of the main causes of malnutrition, it is possible to judge whether supplementary feeding is potentially a *relevant* approach. Once this has been determined its *feasibility* can be examined in the light of existing institutional capacity. Finally, it will be useful to attempt an analysis of the *efficiency*, or *cost-effectiveness* of supplementary feeding viz-a-viz alternative interventions for preventing or alleviating malnutrition.

3.1 Relevance

The question of whether supplementary feeding is a relevant intervention for alleviating malnutrition can never be answered in isolation. There is no universally-applicable design blueprint for success in nutrition programming. Each program's effectiveness and efficiency will be determined by its relevance to the problem to be addressed and the local context in which it is to be implemented. This is why it is imperative to ensure that the problem has been adequately assessed and its causes analysed.

As mentioned earlier, the most common purpose of supplementary feeding is to prevent or alleviate malnutrition through reducing the nutrient gap between an individual's actual consumption and his/her requirement. Other objectives of supplementary feeding programs in the past, which are usually additional and secondary to the one above, have included:

- To improve household food security through a food or income transfer effect, and thus facilitate the caring capacity of the household in general and the mother in particular.
- To provide an incentive for the target group to availability of certain services e.g growth promotion activities, health care, school attendance etc (however, the incentive rationale is *never* sufficient in itself. It is more

Risks

There are certain risks attached to supplementary feeding which should be borne in mind before designing a program:

- It may provide a disincentive to self-reliance and home-based provisioning
- If a program is designed to provide an incentive to participate or attend in some other activity, disrupted food supplies will affect this participation.
- It may be perceived as “the solution” to malnutrition, and the all-consuming focus of a program. Its very existence may deter stakeholders from dealing with other contributory factors.
- Hand-outs may stigmatise recipients.
- The time required to manage a supplementary feeding program is time that could be used for other nutrition-relevant activities e.g. counselling, so it has to be judged to be the most efficient use of resources.
- Delivery cost-effectiveness may be less than other feasible options which have potential for impact, and for which preconditions exist (i.e. the cost of delivering 1\$ worth of food is higher than that to deliver 1\$ cash, and maybe even more than the value of the food itself).

In order to avoid or minimise these risks it is essential that a strong rationale for supplementary feeding is established in any context.

important to improve attendance by improving the access and quality of health services. Where food is used a pull factor, there is moreover the risk that when it is no longer available, attendance will drop off again).

In order to assess the relevance of supplementary feeding, it will thus be necessary to assess the degree to which the problem of malnutrition is associated with inadequate dietary intake at the *individual* level. It is not sufficient, for example, to justify supplementary feeding purely as a *household* food security intervention unless it can be shown to be more efficient and/or effective than other options for ensuring household food security.

With regard to the conceptual framework, there are four possible configurations of household food security and the dietary intake of the malnourished targeted individual, as shown in Table 3.1 below.

Table 3.1: Food-Related Causes of Malnutrition at the Individual and Household Levels

	Inadequate dietary intake of target individual	Adequate dietary intake of target individual
Food-insecure household	Priority target group. Supplementary feeding should be consistent with household food security strategies. Once household food security has been achieved, the situation should be re-assessed.	In this case, at least one person in the household is not consuming enough food, even if it is not the target individual. Household food security action required.
Food-secure household	Care factors are important. Communication for behavior change is likely to be the most important intervention here. Supplementary feeding may be initiated in the short-term.	No food-related intervention required. Individual is malnourished for other non-food reasons, most probably health-related.

3.1.1 Priority target: Inadequate dietary intake in a food-insecure household

The priority for supplementary feeding will be the food-insecure households where target individuals do not consume adequate food. Here there there will also be a need for household food security actions—particularly if the household is “ultra-poor” (or “food-poor”). Lipton has defined the “ultra-poor” as those households which achieve less than 80% of their caloric requirements despite spending 80% of their income on food. He suggests that approximately 15% of Asian or African households may fall into this category (Lipton 1983).

The ultra-poor have been found to contravene certain established food behaviour laws. Normally, when income rises, the proportion of expenditure allocated to food decreases (Engel's Law) and the proportion of calories derived from staple foods also decreases (Bennet's Law) as more non-food purchases and increased food variety respectively is purchased with this extra income. In other words, the income demand elasticity for energy becomes weaker as income rises. With the ultra-poor the income or expenditure demand elasticity for energy is much higher—often not significantly lower than unity. Income transfers for this group will translate more readily into extra food. Moreover, as their income rises, neither the proportion allocated to food purchases, nor the staple-food ration decreases—in violation of Engels and Bennet's Laws (Strauss and Thomas 1990).

Clearly, household food security actions designed to provide a food or income transfer are a priority for this group. The range of options for household food security action—e.g. employment or asset generation, food subsidies, food stamps, rations, quotas etc—lies outside the scope of this toolkit module. Cash income transfers are one option for this group—providing the actual means to purchase foods exist.

Such action will help solve the household food security constraints, but there exists a big gap between *household* food security and *individual*

nutritional well-being, as the conceptual framework illustrates. This gap relates to such factors as the intra-household allocation of food, health and care-related resources, and the health status of the individual.

Household income may correlate well with household food security, especially for the ultra-poor, but numerous studies have documented the poor correlations between household income and child nutritional status (e.g. Marek 1992). Income has a positive effect on household food consumption but a less robust effect on nutritional status. In India, studies have shown that household income is not nearly so useful a discriminator of child nutritional status as maternal literacy, for example (IIPS 1995). Women's income contributes more to nutrition than men's.

The adequacy (with respect to requirements) of a child's dietary intake does not normally rise proportionately with rising household food consumption. Many studies have shown that under-three year olds have proportionately lower calorie adequacy levels than other adults in their households, regardless of income or social group. The particular dietary needs of young children are often not appreciated. Feeding practices may also be sub-optimal. This is far more likely to be due to a lack of awareness of the particular nutritional needs of the growing child, than due to any explicit discrimination. There may not be an awareness that a certain amount or type of dietary mix is required by a young child from six months of age, or that it needs to be prepared hygienically and fed frequently. In such situations, clearly the emphasis needs to be placed on improving such practices through communications for behavioral change (see chapter 7 and toolkit module "*Communication for Behavior Change in Nutrition Projects*"). One thing is becoming increasingly clear—it is much more difficult to change discriminatory rules of intra-household allocation of food and health resources, than it is to focus on improving child caring practices.

It is important thus to realise that rarely will the decision be to undertake *either* supplementary feeding, *or* a food/income transfer (see section 7.3), as the objectives of these two types of programs are quite differ-

What is the Objective?

One reason why the ICDS program in India has not been successful in significantly accelerating nutritional improvement among young children is that food is considered by many stakeholders as a means to address unmet household caloric needs, not as a means of combatting child malnutrition. In order to maximise its utility for the latter, a recent India Sector Review suggests it should be pro-actively employed for the following purposes:

- As a nutritional supplement
- For educational purposes
- To assist time-constrained mothers
- As a “bait” or incentive to increase participation in other activities
- For institutional support

Indeed, some commentators have suggested that the obsession with food as opposed to nutrition within the ICDS should be tackled by removing the food altogether. In the Bank-supported poverty alleviation program in Sri Lanka, for example, the nutrition component was initially intended to include food supplementation (using the *Triposha* supplement), although the food delivery was highly erratic. Over time, the program evolved away from food dependence. Participation and impact increased, as more attention was paid to important determinants of malnutrition that did not require external food delivery.

ent—the former aimed at reducing nutrient gaps among target individuals and the latter aimed at decreasing food insecurity among vulnerable households. With regard to the framework, one program aims at addressing an immediate cause at the individual level while the other addresses an underlying cause at the household level. It is much more likely that a dual approach of reducing household food insecurity at the household-level and preventing malnutrition among vulnerable individuals will be most cost-effective with regard to malnutrition reduction.

3.1.2 Inadequate dietary intake in a food-secure household

If malnutrition is largely associated with health or care factors—as is likely in food-secure households—then supplementary feeding will be less appropriate in the long-term than communications for behavior change. For example, in India, a recent study of five states has shown that between 63–81% of malnourished children come from food-secure households (Chirmulay *et al.* 1997) i.e. the top left hand box of the matrix.

Supplementary feeding may have a role in the short-term, though it will be vital that it is linked to efforts to improve the capacity and practice of adequate care to the targeted individual through behaviour change interventions (see chapter 7). Communications approaches would aim to improve both the use of existing household level resources as well as improving the utilisation of the supplementary food i.e. minimising leakages.

There will however be important interactions. For example, there may be situations where household food security is achieved, but at a high cost in terms of human and economic resources. If the child's mother is forced to spend long hours working to achieve food security, then the cost may be reduced time for child care which adversely affects the child's nutritional status.

How would supplementary feeding help in such a situation? Supplementary feeding could reduce the time the caregiver needs to spend working

Table 3.2: Costs of Achieving Household Food Security

	Household food-secure	Household food-insecure
Uses a large proportion of available resources.	Food-secure, but vulnerable	Worst-off
Uses a small proportion of available resources	Best off	Not too difficult to improve

Source: Jonsson and Toole (1991)

outside the home thus benefiting child care. Nevertheless, if care is a major part of the problem, such an indirect intervention should not be at the expense of efforts to directly address the problem (see chapter 7).

3.2 Feasibility

If supplementary feeding is judged to be a relevant approach to addressing the problem, the next stage is to examine whether it is *feasible* given existing institutional capacity. Supplementary feeding programs aimed at preventing or combating young child malnutrition are most usually linked to mother-and child health care (MCH) services. Notable exceptions include the Tamil Nadu Integrated Nutrition Project and Integrated Child Development Services programs in India, both being stand-alone projects supported by the Bank. The main question is "can the chosen infrastructure support the addition of a supplementary feeding component?".

To answer this it will be necessary to conduct an analysis of existing human, economic and organisational resources with a view to mapping the coverage and quality of existing nutrition-relevant programs, and relevant primary health/MCH services.

Such a resource inventory may highlight gaps or opportunities. It may be necessary to contact a variety of groups including various ministries with programs relevant to nutrition, donors, NGOs, representatives of community-based organisations etc. Essentially what is required is a basic knowledge of which nutritionally vulnerable groups have been targeted, what services are available to them, and what is the quality of such services and programs.

Integrating supplementary feeding with health services can bring mutual benefits and be more cost-effective in preventing or reducing malnutrition. Food may provide the incentive (or the “bait”) that improves health care attendance leading to better health as well as better nutrition. It is vital to ensure that food supplementation does not become de-linked from communications over time (see India example in chapter 7 box). As mentioned earlier, supplementary feeding programs are only justified where the primary objective is nutritional.

3.3 Efficiency²

If it appears from the above analysis that supplementary feeding is relevant to the problem and its causes and the MCH infrastructure appears capable of supporting it, a final question may be: “Is supplementary feeding the most efficient or cost-effective approach in this situation?”

Cost-effectiveness analysis may be carried out prior to the choice of intervention—providing the data are available to enable a comparison between options on the grounds of efficiency—and/or it may be carried out as part of the evaluation process. It is useful, not only for selecting

²The basics of cost-effectiveness analysis are briefly described here. The reader is referred to the detailed discussion of cost-effectiveness analysis which is provided in Nutrition Toolkit Module No. 3 “*The Economic Analysis of Nutrition Projects*”.

the best option/s for action, but for planning budgets and deciding on the financing strategy.

3.3.1 Clarifying terms

The *effectiveness* of a program is essentially a measure of the extent to which a program is making progress towards its immediate objectives i.e. whether its inputs are being transformed into outputs, through appropriate processes, leading to intended effects.

The *efficiency* of a program relates to the amount of resources needed to achieve an effect—often expressed with respect to other options. In a sense, efficiency is the ratio of impact to process. Cost-effectiveness is an economic measure of efficiency.

Cost-effectiveness is usually ultimately expressed as the cost of achieving a certain outcome. This may also be specifically referred to as *biological* cost-effectiveness (e.g. dollar spent per percentage point

Quantifying Effectiveness

Effectiveness may be quantified as per following example: A program has the outcome objective of reducing the prevalence of underweight preschool children in three years, from its current baseline prevalence of 40%. Three years later a survey reveals the prevalence among those covered by the program to be 25%. Effectiveness can be expressed as a ratio, in which the numerator is a measure of the reduction in prevalence and the denominator is the baseline prevalence. Therefore the reduction in prevalence here is $40 - 25 = 15\%$, and the effectiveness is $15/40 = 37.5\%$.

reduction in child underweight prevalence); as opposed to *delivery* cost-effectiveness which is the cost of delivering a quantum of calories to a target group member. In a sense, delivery cost-effectiveness is a measure of the efficiency of the process, while biological cost-effectiveness is a measure of the efficiency of attaining the outcome.

Cost-benefit analysis on the other hand is a means of assessing the monetary benefits which would accrue per monetary cost incurred. This is rarely attempted in nutrition programs, for the simple reason that it is hard to put a cash value on the various benefits that might associate with nutritional improvement—even if we knew what they all were, or when they had accrued. For example, it might be possible to estimate the number of lives saved per percentage reduction in underweight prevalence using assumptions based on previous studies, but how does one value a human life? How is a minor illness weighted against a major illness? What weight is applied to hunger or pain? If cost-benefit analysis is attempted, such valuations usually reflect the priorities of those commissioning the analysis. Cost-benefit analysis is best reserved for programs for which the main outcome is already monetized e.g. income-generation programs. Cost-effectiveness analysis is more appropriate as it avoids the need to express benefits in monetary terms, yet it permits comparison of alternative ways to accomplish a certain objective and select the one that will do so at least cost.

The various steps to be taken in assessing costs are detailed in the *Economic Analysis* toolkit module and not repeated here.

Cost comparison between different programs is difficult as costs are not only related to the variations in program objectives, components or size, but also to differences in the whole context and environment in which these have been implemented. Delivery cost-effectiveness comparisons have nevertheless been undertaken by Horton 1993, based on a sample of 52 feeding programs (see Table 3.3).

Table 3.3: Unit costs of feeding programs

(1988 US \$ cost per 1000 calories delivered per person per day per year)

Category	Range	Median	Mean	No. programs
All progs.	19.25–300	74.48	88.51	52
Asia	32.10–300	70.01	91.29	21
North Africa	65.53–104.7	87.34	88.63	5
Sub-Saharan Africa	55.80–96.25	81.46	78.95	5
Latin America	19.25–272.54	67.18	87.96	21
School feeding	19.25–208.59	81.46	88.74	11
MCH feeding	26.75–272.54	73.84	85.64	37
Small (< 100,000)	26.75–272.54	96.48	121.92	7
Medium (100,000–500,000)	24.38–96.25	68.11	62.99	10
Large (> 500,000)	19.25–139.0	96.90	89.85	7
Government operated	19.25–272.54	75.11	91.73	37
NGO operated	24.38–300.00	77.98	89.70	14

Source: Horton 1993

The main findings may be summarised as:

- There is an enormous range of costs (\$19–\$300, with a median of \$74 and a mean of \$89).
- There are relatively small variations in program costs across broad geographic regions
- There is little difference between school feeding and MCH feeding

- Small programs are most costly and medium-sized ones the least-costly.
- There is little difference in costs with regard to the main implementing agency (government or NGO) although there may be differences with regard to the availability of external funding (which was not investigated by Horton)
- Food costs tend to account for around 75% of total costs on average

Programs which provide greater services may be costlier, but they may also be more biologically cost-effective if their impact is significantly increased.

In general, data on nutrition interventions were found by Horton to be extremely scarce in comparison to health interventions. Data on costs were weak, while data on outcomes were extremely weak.

Nutrition interventions were found to be less cost-effective than many health interventions when effectiveness was indicated with respect to lives saved (e.g. \$1500 per death averted for a targeted feeding program (TINP-I) and a vitamin A distribution program). However, "per death averted" (which is the main outcome for health intervention comparisons) is not appropriate for nutrition—at least not in isolation—as it does not take into account a range of benefits that occur over different time spans, relating to morbidity reduction, cognitive development, productivity increases etc. Comparisons using such an outcome measure may thus be biased against nutrition interventions.

Where the main objective refers to malnutrition reduction, cost per child removed from the severe or moderate underweight category (i.e. cost per malnutrition averted) would be a more appropriate indicator. Using this, Horton found costs to vary significantly e.g. Tamil Nadu Integrated Nutrition Program (\$33), Philippines targeted food subsidy (\$331), face-to-

face nutrition education in Dominican Republic (\$493), mass media nutrition education in Indonesia (\$12) (although in the later project, outcome data were less well-controlled than in other studies).

Financing Food Expenditures

A May 1996 memo spells out the Bank position on financing food expenditures. The memo states that “expenditures for the purchase of food intended for human consumption are generally not eligible for Bank financing”, although there are the following stated exceptions. Food expenditures may be financed if the provision of food is:

“(a) an essential and integral part of a project that is designed to i) reduce the acute risk of disease, or reduce the severity of disease, for all age groups, (ii) reduce or prevent mental retardation and poor school performance, (iii) enhance children’s growth and development, (iv) reduce adverse pregnancy outcomes for mother and child, (v) facilitate a systemic transition by supporting for a limited time the continued delivery of critical education and health programs previously provided by public sector enterprises, or (vi) facilitate a resettlement operation, or an operation that transfers production to economically justified alternative activities, by temporarily sustaining the livelihood of the affected populations;

(b) the most feasible and cost-effective alternative toward accomplishing these objectives;

(c) effectively targeted; and

(d) monitored to minimize distribution of food to populations outside the target group.”

Biological cost-effectiveness differences between different interventions for controlling malnutrition are usually not very great. Given this, and given the fact that accurate data are usually difficult to collect, cost-effectiveness may, in many situations, not be the most useful discriminating variable for choosing an appropriate single or mix of interventions. Context-specific considerations of preconditions, feasibility and appropriateness may be more useful in facilitating such decisions.

3.4 Conclusion

In sum, it will be necessary to gain some knowledge of the balance of household food security and individual dietary adequacy in any situation where malnutrition exists before a decision is made as to whether supplementary feeding is relevant. If individual dietary inadequacy co-exists with household food insecurity, then supplementary feeding has potential. But it should never be seen as the pivotal intervention in malnutrition control strategy. It is rather an adjunct to approaches designed to optimize the use of existing household level resources such as communication for behavior change. The optimal situation is one in which supplementary feeding can reduce nutrient intake gaps among the most nutritionally vulnerable individuals, provide an incentive for attendance at health clinics (for immunization, counseling etc) and improve the capacity and practice of care for children and women.

It is recognised that in many situations, the choice of "food or no food", of supplementary feeding versus some other intervention, is not one that can be completely determined by the foregoing logic. Food is political and giving food is an effective vote-catching device for populist governments. Nevertheless, in such situations, there should be some scope for influencing the actual use of food to more efficiently improve nutrition outcomes through employing nutritional logic.

In order to design any effective project, it will be necessary to establish a hierarchy of objectives, in terms of both priority and time scale. Such a hierarchy should emerge from the problem and resource analysis. Logical framework analysis offers a means of visualising the hierarchy of objectives and the inputs and activities needed to fulfil them. In a logical framework (or logframe for short³), the hypotheses concerning how each level is expected to exert its effect on the one above it are made explicit. The framework is the backbone for project planning and is a means to ensure that all stakeholders are focused on both the ends and the means. It leads to a clear specification of key indicators for monitoring and evaluation (see chapter 8).

The starting point of the logframe is a statement of the *long-term development objectives* which should relate to those of Bank support. Through contributing to an improvement in the nutritional and health status of pregnant and lactating women and young children (the target group), the entire population will benefit over time as the inter-generational cycle becomes increasingly virtuous. A better nourished and healthier population in turn will have a higher quality of life and be more productive, benefiting the nation as a whole.

The achievement of such long-term objectives require the achievement of certain milestones, which take the form of the *immediate objectives* of a supplementary feeding program. Immediate objectives should be based on what is known about the type and degree of potential outcomes or effects that are achievable with supplementary feeding, based on past experience (see chapter 1). Outcomes or effects thus refer to the quantity or quality of direct results achieved, whether these are due to the program or otherwise. Outcome objectives should refer to the change in status of the targeted population, and should be quantified and time-bound, challenging yet realistic—based on what is known about past trends.

For each objective, there should be at least one quantifiable *project output* at the next level down. Project outputs comprise the quantity and

An Example of a Simple Log Frame*

Long-term (development) objective:

- To improve the nutritional and health status of pregnant and lactating women and young children.

Immediate objectives (outcomes or effects):

- To reduce the incidence of low birth weight among the target group by . . . % of existing levels in five years;
- To reduce the prevalence of moderate underweight among targeted children by . . . % in five years;
- To reduce the prevalence of severe underweight among targeted children by . . . % in five years.

“Targeted” refers to those beneficiaries for whom the intervention was originally intended—not only those who actually participated (see chapter 5). Thus, the combined effect of the coverage (an output) and the efficacy of the intervention is being measured. Such outcome data may only be collected during mid-term and endline evaluations e.g. every 2–3 years.

Outputs (coverage and quality of services delivered)

Women:

- Proportion of total pregnant women registered before the 20th week of pregnancy

- Proportion of targeted pregnant and lactating women who are regularly receiving food rations
- Proportion of registered pregnant women regularly receiving ante-natal care and nutrition counselling

Children:

- Proportion of targeted children regularly participating in the program (incl. immunization, growth monitoring and promotion, and supplementary feeding)

The above indicators refer to coverage and frequency. Ideally, there should also be at least one output indicator of the quality of service delivery.

Inputs

- Human, economic and organisational resources e.g. personnel, training, supervision, food, weighing scales, growth charts, other equipment, facilities etc.

**Please note that the specific indicators required to monitor project performance and evaluate progress towards objectives are described in detail in chapter 7.*

quality of goods and/or services created or provided by project activities which use certain inputs. Output indicators are often equated with process indicators. For supplementary feeding programs through MCH systems, the main outputs comprise the receipt of food rations by identified target groups, the delivery of essential preventive and curative health services and counselling support aimed at improving nutrition. Finally, the *project inputs* refer to the quantity or quality of human, financial, physical and organisational resources provided for program activities. An example of a simple logframe of a supplementary feeding intervention attached to MCH services is provided in the box below.

Programs with immediate objectives such as those described in the example above would be eligible for Bank financing if other local or governmental sources of funding were found to be unavailable (as per guidelines in the box in section 3.3).

Targeting increases programmatic efficiency through focusing on those most in need. But who should benefit from the intervention? And who should be targeted so that these benefits may be realised? The beneficiaries of supplementary feeding programs should be those individuals who are:

1. Malnourished, or
2. at risk of becoming malnourished . . .
3. . . . as a result of factors which, at least in part, can be addressed by supplementary feeding.

Once a group of beneficiaries has been identified the targeting strategy defines the most effective way to reach them, including how the needy can be separated from the less-needy with the least administrative and political friction. The targeting strategy should be as simple as possible so as to be fully understood and accepted by all stakeholders.

There are two main types of criteria that need to be employed in targeting—needs-based criteria and capacity-related criteria. In addition, it is important to be aware of any political and socio-cultural constraints to the notion of targeting.

5.1 Needs criteria

Program effectiveness will always be greatest where the problem is most severe and widespread—this is a function of the problem, not the program. Needs-based targeting may be carried out with respect to the following types of criteria:

- Age (e.g. under-twos, who are most at-risk of becoming malnourished)
- Physiological status (e.g. pregnancy, lactation, when nutritional requirements are higher)

- Nutritional status (e.g. with regard to underweight, wasting or stunting indicators)
- Growth status (e.g. with regard to growth faltering)
- Gender (e.g. female-headed households)
- Socio-economic status (e.g. the poorest households)
- Season (primarily the hungry or lean seasons where seasonality is marked)
- Type of food (self-targeting may be achieved through the selection of particular types of food to be distributed).

Geographic targeting without individual screening is the most expensive in terms of absolute resources required, but the least expensive with respect to the costs of the actual targeting process. Screening individuals according to pre-defined criteria reduces the amount of input resources required but may be expensive to carry out.

Supplementary feeding may be therapeutic (if targeted to severely malnourished individuals) or preventive, if targeted to those at risk of becoming malnourished. For supplementary feeding to be *preventive*, it needs to be the following:

- Targeted to pregnant women, if a primary objective is to prevent low birth weight. If the woman is reached early in pregnancy, malnutrition of both her and her child may be prevented.
- Targeted to very young children i.e. 6–24 months
- Targeted to children whose growth is faltering.

It is usually most cost-effective to combine geographic with vulnerable group and finally individual targeting to the most needy, in a three-stage process, as described below.

Stage 1: Geographic targeting

A first stage of targeting is at an international level whereby the Bank targets resources internationally according to certain policy criteria. Sub-national, geographic target areas should then be chosen on the basis of greatest need as defined by indicators of child malnutrition. The table below may be helpful. One useful indicator of childhood stunting, which reflects long-term nutritional deprivation, is the percentage of children with low height-for-age, as may be gleaned from height censuses on school entry. (Further detail is provided in the “*Nuts and Bolts*” module).

Where anthropometric data do not exist, infant or child mortality rates may be used as a rough proxy for the degree of need. A decision may have been made following the problem and resource analysis to focus only on rural or on urban areas.

Table 5.1: Proposed WHO Classification of Worldwide Prevalence of Stunting and Underweight

	Height-for-age ($< -2SDs$)	Weight-for-age ($< -2SDs$)
Low	< 20	< 10
Medium	20–29	10–19
High	30–39	20–29
Very High	≥ 40	≥ 30

Source: WHO 1997

In addition to national sources of nutrition survey data such as ministries of health, planning or social welfare, international sources of data include the WHO Database on Child Growth and Malnutrition, DHS surveys supported by USAID, the ACC/SCN country updates, UNICEF database on child nutrition, or FAO country profiles.

Stage 2: Vulnerable group targeting

Following the stage 1 selection of the most needy geographical areas within a country, the most needy population sub-groups may be selected as follows:

- Select children on the basis of their age, or women on the basis of their physiological status (i.e. during pregnancy or lactation).
- In order to increase the emphasis on prevention (thus maximising impact) select only the youngest children—ideally 6–24 months.
- Children below six months should be exclusively breastfed and must *not* be targeted for supplementary feeding
- If resources allow, select a wider age category e.g. 6–36 month olds. As mentioned in chapter 1, although most growth benefits accrue in the 6–24 month age band, there are other effects (such as increased activity and psychological development) which may benefit children above two years of age. It may be more cost-effective to widen the age-categories (if resources allow) rather than widen the geographical target areas, owing to economies of scale in focusing on select regions. However, such a widening should not in anyway be construed as diluting the priority attached to reaching the youngest (6–24 month old) children.

Stage 3: Individual targeting⁴

Individual targeting using anthropometry should be done in order to select:

- only children who are moderately or severely malnourished (therapeutic), or
- the above *plus* those children who are in normal or mild underweight categories but whose growth is significantly faltering (preventive), and
- at-risk or malnourished pregnant and lactating women.

Each program needs to determine adequacy in growth and what constitutes faltering. Different programs in the past have set different monthly weight gain cut-offs. In general, for a 6–12 month old child, growth faltering may be defined as failure to gain at least 300g per month for two consecutive months, while for a 12–24 month old child, it may be defined as failure to gain at least 150 g per month for two consecutive months.⁵ The actual process of targeting growth-faltering children should be educational and lead to better child growth if it is combined with nutritional counselling for growth promotion—see chapter 7.

In communities where the incidence of low birth weight is known to be above 20%, and chronic energy deficiency among adult women is at least 30% (i.e. BMI < 18.5), blanket coverage of an intervention is prob-

⁴The reader is referred to two other toolkit modules: “*Promoting the Growth of Children: What Works*” and “*Nuts and Bolts*” for a more detailed treatment of individual targeting based on growth data.

⁵Please refer to Nutrition Toolkit Module No. 4 “*Promoting the Growth of Children: What Works*”, page 17.

ably warranted and targeting is unnecessary. In other situations, for targeting interventions to those pregnant women at risk of delivering an intra-uterine growth-retarded baby in order to increase birth weights, the optimal one-time indicator is pre-pregnancy weight or weight measured in the first trimester, which may serve as proxy for pre-pregnancy weight (Institute of Medicine 1990, Krasovec and Anderson 1991). (A two-stage screening of low pre-pregnancy weight or low height followed by attained weight at mid-pregnancy may be even more predictive of intervention benefit.)

Maternal mid-upper arm circumference (MUAC), is correlated with pre-pregnancy weight, and may be useful for rapid screening of pregnant women with respect to IUGR risk where scales are not available (Krasovec and Anderson 1991), although it has been recommended that this approach be validated before reference data are developed (WHO 1995). MUACs are simple to determine, tapes are portable, inexpensive to purchase and maintain, and measurement requires only simple training for community-based workers such as traditional birth attendants. MUAC tapes may also raise awareness of nutrition. Cut-off points relating to biological risk of LBW and foetal and infant mortality are consistently in the range of 21.0 to 23.5 cm for most countries, at least in Asia and Latin America (data are required to validate this range for Africa). MUAC is however far less responsive to intervention than weight (WHO 1995) and so has little utility for monitoring interventions.

Pregnant women may be weighed when they use nutrition and health services, e.g. for child growth monitoring, immunizations, or supplementary feeding, if they already have a child. Weights taken at this time, may proxy the pre-pregnant weight for the mother's subsequent pregnancy. It may be more difficult to reach women with first pregnancies, and women with many children who might find it difficult to find time to access services. Mother-retained mother-and-child growth cards may also be useful, particularly if a box is included for maternal weight.

At present, anthropometric measurements cannot be used effectively to assess the nutritional status of individual lactating women for intervention targeting, though BMI has been suggested as a potentially useful interim indicator (WHO 1995) with a cut-off of 20.3 at one month post partum delineating adequate from inadequate nutritional status. The BMI would be expected to decrease during the first six months of lactation after which time the adult cut-off of 18.5 would apply.

The above criteria for targeting individual children and women relate to *entry* into the supplementary feeding program. If such anthropometric targeting is undertaken, the following *exit or discharge criteria* should also be employed to maximise efficiency:

- For children, if the child grows out of the eligibility criteria for three successive months, then s/he need no longer receive supplementary food rations.
- For women, there is no need for anthropometric exit criteria. Pregnant and lactating women qualifying for feeding according to the above entry criteria should continue to be fed throughout pregnancy and, if resources permit, for 6 months during lactation. If resources are limited, the first 4 months of lactation should be targeted.

5.2 Capacity criteria

As well as being need-based, the chosen targeting mechanism must also take account of such aspects as the available infrastructure and administrative capacity (see section 3.2), as well as important socio-cultural and political considerations which may be antagonistic to the notion of selection.

The criteria of need and capacity may be antagonistic—in the sense that the capacity (e.g. infrastructure) may be least developed in those areas

where the need is greatest. A pragmatic balance between these two criteria needs to be struck in targeting. The neediest areas and individuals where at least the minimum capacity required to implement a program exists, need to be selected. Where capacity is limited, and child malnutrition prevalence high, age-targeting alone may be considered, aimed at preventing the youngest children (6–24 months) from becoming malnourished.

5.3 Politics

Targeting reduces the political constituency of the program, although it may heighten the politics of the program. At the community level, targeting criteria may conflict with the sense of entitlement, while at the national

Political Aspects of Targeting Supplementary Feeding in India

In the 1980s, the Bank-assisted Tamil Nadu Integrated Nutrition Program (TINP-I) succeeded in significantly reducing child malnutrition using specific anthropometric entry and exit criteria for supplementary feeding. Meanwhile, the nationwide Integrated Child Development Services (ICDS) program was expanding throughout the country, based on targeting households with poverty criteria for universal supplementary feeding of their children. Evaluations have shown that despite TINP being more successful in reducing malnutrition, and being more efficient, the ICDS model was retained by the Central Government. Unfortunately, a poverty-based rationale for targeting supplementary feeding has a greater populist appeal than the use of anthropometric criteria, despite it being less efficient in identifying individuals who are most likely to nutritionally benefit.

level, welfare programs may exist for reasons of political patronage and vote-catching, and hence targeting may be considered undesirable. Targeting criteria may be ranked as follows, in order of declining social contentiousness: socio-economic, geographic, anthropometric, age or physiological status. A pragmatic judgement needs to be made on the optimum criteria, keeping the long-term development objectives in mind.

Communications components can serve to raise awareness of the logical rationale behind targeting and thus improve acceptability. Indeed, this was a critical part of the Tamil Nadu Integrated Nutrition Program. Where the community itself is aware of child nutritional status, there are benefits in local level decision-making with respect to targeting children. In many nutrition programs, selection criteria are only used for selecting into the most costly component of the program—often supplementary feeding—while other components are generalized e.g. nutrition communications. Many of the latter are preventive.

Finally, it will be politically essential to harmonize the targeting strategy with the particular priorities of existing national nutrition policies, programs and declarations.

A decision has been made to undertake supplementary feeding to combat malnutrition and to target the intervention to a pre-defined group of individuals in the population. This chapter concerns the strategy adopted to distribute food in the supplementary feeding program, including consideration of the nutrient content of the food supplement, type of foods used, systems of supply and distribution, and the timing, frequency and duration of feeding. Further detail on these issues is provided in the “*Nuts and Bolts*” module.

6.1 Nutrient content of food supplements

Given that the primary objective of supplementary feeding is nutritional i.e. to close energy and nutrient gaps, the energy and nutrient content of the supplementary foods should as far as possible be based on whatever is known about the size and nature of this gap, ideally from baseline data. The issue is not only sufficiency of calories, but also adequacy with respect to micronutrients. If fortification of commodities with one or more micronutrients can be achieved, it is likely to be a cost-effective approach in preventing micronutrient deficiency.

To optimally close nutrient gaps, rations should supply nearly one third of the energy needs of pregnant and lactating women and just over one half the energy needs of young children (FAO 1993).

For women:

- The ration should supply 350 kcals for pregnant women, and 500 kcals during lactation. If rations are provided as take-home, these amounts should be doubled.
- Pregnant women should receive rations with 1.2g, 6.1g and 10.7 g protein in the 1st, 2nd and 3rd trimesters respectively (i.e. 3–12% energy)
- 20–25% of the energy should be in the form of fat.

For children:

- Eligible children (defined by age and perhaps also by anthropometric status) should receive 350–500 kcals if fed on site, or double this amount if given as a dry take-home ration.
- Protein should supply 8–12% energy
- Fat should supply 20–25% energy in order to increase energy-density and reduce bulk.

Detailed guidelines on the nutritional and technical aspects of the production of formulated supplementary foods for children 6–36 months of age are provided in the 1994 Codex Alimentarius, Vol. 4, 2nd edition, p53–64 (Joint FAO/WHO Food Standards Program, Codex Alimentarius Commission). An annex to these guidelines (which itself is annexed to the “*Nuts and Bolts*” module) provides recommendations on the micronutrient content of foods for such children. When foods are supplemented with one or more of the micronutrients, the total amount of added micronutrients contained in 100g dry food should be at least two-thirds of the reference daily requirements below:

<i>Nutrients</i>	<i>Recommended Daily Requirements</i>
Vitamin A	400 mg retinol equivalents
Vitamin D	10 mg (if little exposure to sunlight)
Vitamin E	5 mg
Thiamine	0.5 mg
Riboflavin	0.8 mg
Niacin	9 mg
Vitamin B ₆	0.9 mg
Folate	50 mg
Vitamin B ₁₂	1mg
Calcium	800 mg

Iron	12 mg (assuming low bioavailability diet)
Iodine	— (no FAO/WHO reference; recommended intake = 50–70 mg/day).
Zinc	10 mg

Legend: mg = microgramme

6.2 Types of foods

The choice of food supplement and its form will depend on the individual target, and whether the food is to be provided as a wet (on-site) ration or dry (take-home) ration (see 6.3).

Supplementary foods should be culturally acceptable and permit the preparation of meals which are digestible, palatable, energy-dense and micronutrient-rich, without being bulky. Other important pre-requisites include cost-effectiveness in closing nutrient gaps of recipients, reliability of supply, feasibility of transport, storage and processing, short cooking time, low fuel costs, and adequate shelf-life. The choice of local versus external production should be based on such criteria (see summary checklist below).

The food basket should comprise basic foods such as cereals, pulses, oils and fats which supply most of the energy, protein and fat needs, along with additional foods which are chosen to add micronutrients and improve the taste, variety and overall acceptability of the ration e.g. fruits and vegetables. In general food baskets may comprise 1–3 commodities. Most commonly supplied food rations comprise a basic cereal/pulse combination and edible oil. The food basket must not be too complex or this will overburden staff at health institutions, as well as putting pressure on logistical systems of supply and distribution. As a contingency, program designers should consider replacements for foods in the food basket, should supply shortfalls or distribution bottlenecks occur at any time.

Table 6.1: Examples of rations

	Example 1		Example 2	
	Maize flour	175g	Rice	170g
	Beans	20g	Lentils	30g
	Oil	20g	Margarine	20g
<i>Nutrient content:</i>				
Energy (kcal)	843		820	
Protein (g) (% of kcal)	21 (10)		22 (11)	
Fat (g) (% of kcal)	25 (27)		20 (22)	

Source: FAO (1993), p43.

The cost of a ration is important with regard to maximising coverage of the needy population as well as long-term sustainability. Costs are determined by size and composition of the ration and may vary from US \$200 per tonne for maize or soya-fortified sorghum grits, to US \$325 for corn soya blend and up to US \$2400 for canned fish. (These are unit costs, not including costs of transportation).

The nutrient values of various foodstuffs and a discussion of issues concerning fortification are provided in the *"Nuts and Bolts"* module.

Low-cost blended foods (usually cereal-pulse combinations), especially if fortified with essential nutrients, may be used if no appropriate local alternative exists and they meet the criteria mentioned above. It is imperative however that their provision in a supplementary feeding program does *not* reduce efforts to promote the use of local foods. Over 50% of the supplementary feeding projects supported by the World Food Programme (WFP) include a blended food, approximately half of which are locally produced. WFP assists countries in building national capacity to produce such foods, as well as supporting projects which aim to support beneficiaries in locally growing micronutrient-rich foods which they themselves can prepare in suitable ways as complementary foods for their children.

Indiamix

Indiamix is a low cost, micronutrient-fortified blended food, distributed through the Integrated Child Development Services (ICDS) program in India, supported by WFP. It is processed using locally available raw materials (maize or wheat combined with soya) which promotes sustainability and provides agricultural incentives. Where capacity exists, local production can be undertaken which keeps transport costs to a minimum as well as generating employment for target group households. Indiamix has a short cooking time, which keeps fuel costs down and saves women's time.

Summary checklist for designing an adequate ration

Ration composition (g/day for each foodstuff)

Nutritive value (within range):

- Energy
- Protein
- Fat

Micronutrient concentrations (% daily requirements of vitamin A and iron provided by ration)?

Risk of irregular supply when item locally processed ("high" or "low")?

Preparation/cooking time ("reasonable" or "high")?

Local food habits respected ("yes" or "no")?

Storage/shelf-life?

Cost (FOB* Price in US\$) cents/daily ration

Other:

*FOB: Free on Board prices which equals the cost of the commodity plus the cost of its transport to the nearest harbour plus the cost of its loading.

6.3 Distribution systems

There are significant trade-offs in terms of resource requirements and administrative efficiency between the two main methods of food distribution—on-site feeding and take-home rations.

On-site feeding is effective in ensuring the food supplement is actually consumed by the target population although it is not easy to know whether it is truly a supplement to the habitual dietary intake, or whether it substitutes for a portion of the home diet which is later withdrawn. Substitution has been well documented in the past. Leakage due to substitution in on-site feeding has been estimated to range between 37–53% of calories as compared to 46–82% if the ration is take-home (Anderson *et al.* 1981). The variation among programs has been found to be as great as the variation between different types. However, although seen as a leakage, such sharing could be a desirable benefit to the family.

On-site feeding is time-consuming and relatively expensive in terms of both the project personnel managing the feeding and the beneficiaries who have to attend the centers to be fed, usually on a daily basis. It is most often restricted to therapeutic feeding of severely malnourished children and the feeding of vulnerable under-fives attending day-care centers.

Take-home rations are easier to administer and with lower participation costs. They may also be more effective in reaching the most vulnerable under-two year old children in situations where mothers are unwilling or unable to attend an on-site feeding center every day. On the other hand, the gap between food distributed and the amount consumed by the intended recipient is likely to be greater, given the increased likelihood of sharing or leakage within the household. Food after all is a fungible resource which, if given free, effectively serves as an increment to household income, to be used according to the pre-set intra-household rules

Table 6.2: Comparing Delivery Options for Supplementary Foods

Take-home rations	On-site meals
<p><i>Consumption of food by recipient</i> No guarantee that only the recipient eats the ration. Usually it is shared by family, sold, given to animals or wasted.</p>	<p>All ration eaten under supervision. Help can be given to ill/anorexic children. Recipients may be given less food at home (substitution)</p>
<p><i>Responsibility and education of families</i> Families take responsibility for feeding recipient. Less opportunity for education. Caregiver spends less time and effort attending feeding site.</p>	<p>Responsibility for feeding may be taken away from family, but in small feeding programs, caregivers may help prepare food and feed recipients. Feeding problems can be identified and dealt with.</p>
<p><i>Logistics, organization and costs</i> Large numbers can be covered. Fewer resources and facilities needed. Costs are lower.</p>	<p>Many resources including well-trained staff, and much supervision needed. Costs are higher, including the caregiver's opportunity costs in attending feeding site regularly.</p>

Source: Adapted from FAO (1993)

on distribution. Food which is non-perishable and marketable is particularly fungible.

To allow for this, take-home food rations are usually twice the size of on-site rations. Another option is to design the supplement so as to promote self-selection, or a disincentive to sharing or substitution. Chile's Complementary Feeding program, for example, provided acidified milk to children to

reduce sharing. A study later estimated that 80% calories from this milk actually were consumed by the child (Harbert and Scandizzo 1982).

The provision of a supplement coupled with intensive counseling should have a significant benefit (see chapter 7). It is usually more effective to channel resources into improving self-care and child care practices than it is to attempt to improve intra-household resource distribution, although the latter needs to be addressed through relevant community education interventions in the long term.

A study designed to compare the relative merits of take-home ration distribution and on-site feeding in moderately malnourished Chadian children found that on-site feeding resulted in only a marginally better nutritional effect, but with higher drop-out rates. On balance, the take-home system, which was cheaper, easier to manage and promoted better maternal involvement was considered most efficient (Stefanak and Jarjoura 1989).

6.4 *Timing of distribution*

There are several aspects of timing, in addition to those related to targeting (e.g. the age of the child— see chapter 5). The choice of time of day when on-site feeding takes place is important, to ensure that caregivers can bring their children. Studies have shown that participation is more related to convenience, with respect to the time and energy it takes to acquire the supplement, than to characteristics of the women (McGuire and Popkin 1989).

There may be significant costs of participation to be borne by beneficiaries including the time required to travel to and from the feeding center, time spent waiting and time spent in actual feeding. The alternative use of the participant's time determines this participation cost. This explains why participation rates are inversely associated with distance between the participants' residence and the feeding center. Whether a household

chooses to let their children participate in a feeding program will depend not only on the real cost (time, cash etc) but on the balance between that cost and the perceived value of the benefit received. Raising the quantity or quality of the ration or improving access also increases this benefit-cost ratio.

Services also need to be user-friendly to women, which means they need to be more flexible and rooted in the communities in which the women live. Some of the most common barriers to female attendance at health care centers apart from the high opportunity cost of women's time, include poor treatment by male workers, distance to travel, lack of ready cash, inadequate transportation and the culturally-determined deterrents that restrict female mobility.

6.5 *Frequency of distribution*

Frequency of ration distribution depends on the objectives of the program, and on local conditions and facilities. If there is a participation incentive objective, frequency should match the desired frequency of attendance (e.g. monthly to match the frequency of growth monitoring and promotion activities.)

Small, frequently distributed rations are more likely to add to consumption than larger, less-frequently distributed rations, just as regular wages are more likely to be used for consumption than seasonal lump-sum payments. But increasing frequency, will also increase costs—both to the program and to the beneficiary who will need to attend the centers more often. A judgement will need to be made on the optimal frequency based on such countervailing factors.

6.6 *Duration of supplementation*

Duration will vary with the objectives of the program and the target groups selected. If age-targeting is employed, then those within the eli-

gible age range will be included for the duration e.g. a maximum of 18 months for 6–24 month olds. Pregnant women should be fed from the time of pregnancy registration (usually some time in the second trimester) until the seventh month following the birth of their child, if resources permit. If anthropometric criteria are also used, then the child will be fed so long as s/he qualifies with regard to the entry and exit criteria (see chapter 5). An indicative duration may be used for planning purposes.

Complementarity is important at all levels. When considering the age at which growth failure starts to occur i.e. between 6–24 months of age, it becomes clear that supplementary feeding does not offer the best means of prevention *in isolation*. At this time the child does not need much food *per se*. It is the quality of food (including most importantly its micronutrient content), how it is prepared and how it is fed to the child that are crucial concerns, along with the protection of the child from disease.

Where supplementary feeding is found to be a relevant, feasible and cost-effective use of resources for nutrition improvement, its benefits will be enhanced by complementary actions. Such actions need to primarily address the health and care-related causes of malnutrition, to the extent they exist. But it will also be important to directly address food insecurity at a household level, as discussed in chapter 3.

7.1 Complementary actions through the health services

The effectiveness and efficiency of integrated health/nutrition programs in reducing malnutrition has been found to be greater than that of feeding programs alone (Kielmann *et al.* 1978). This is not surprising given the strong synergistic interaction between inadequate dietary intake and ill-health described earlier. Thus, while substantial improvements in a given outcome variable (e.g. growth, health, survival) are possible without integration of health and nutrition interventions, integration makes possible improvements in each of these outcomes at a cost significantly lower than the combined cost of two separate interventions.

There are other positive synergies. Supplementary feeding can as discussed be an *incentive* for mothers and children to avail of important

⁶The details of some of these strategies are provided in other toolkit modules such as “Nuts and Bolts”, “Promoting the Growth of Children: What Works”, and “Communication for Behavior Change in Nutrition Projects”.

preventive health care services such as immunization, growth monitoring and promotion, nutrition counselling etc—thus promoting their health and, in turn, reducing curative health care costs. This is important given that only 59% pregnant women in developing countries receive prenatal care (WHO 1997).

The most important nutrition-relevant complementary actions through the health system include the following:

For children:

- Growth promotion⁷ including:
 - Growth monitoring
 - Protection and promotion of breastfeeding
 - Promotion of appropriate complementary feeding practices⁸
 - Hygiene and environmental sanitation education
 - Disease management, including feeding during and after diarrhoea, oral rehydration therapy
- Immunization
- Micronutrient supplementation, including vitamin A mega-doses for children from 6 months, and possibly iron supplements where anaemia is prevalent.
- Promotion of consumption of iodised salt
- Deworming

⁷Please refer to Nutrition Toolkit Module No. 4 *“Promoting the Growth of Children: What Works”*.

⁸Please refer to the *“Nuts and Bolts”* module.

For women:

- Ante-natal and post-natal care which includes:
- Tetanus toxoid immunisation
- Micronutrient supplementation, including iron and folic acid tablets for pregnant women and possibly post-partum vitamin A mega-dose where vitamin A deficiency known to be a problem; iodised salt consumption.
- Malaria chemoprophylaxis in endemic areas
- Reproductive health education including increasing birth intervals, AIDS prevention

7.2 Growth promotion and communications for behavioral change

Communications for behavioral change (CBC) is an essential complementary strategy to supplementary feeding. (A comprehensive treatment is provided in the toolkit module *“Communication for Behavioral Change in Nutrition Projects”*, to which the reader is referred.) CBC is particularly relevant to addressing the care-related determinants of malnutrition through optimizing the use of existing household-level resources for nutritional improvement.

Growth monitoring and promotion (more appropriately referred to as “growth promotion”) is a specific communications approach aimed at behavioral change, through making the impact of preventive actions visible to families and to others in the community and health services. Information about adequate or inadequate changes in weight can be used to reinforce positive practices, motivate changes in harmful ones, reward and sustain new behaviours, and target nutrition and health ad-

The Nutrition Minimum Package

The BASICS project, supported by USAID has recently provided a strong justification for a concerted focus on interventions that aim to improve the following six key nutrition-related behaviors:

- Exclusive breastfeeding for about six months
- Appropriate complementary feeding starting at about six months in addition to breastfeeding until 24 months
- Adequate vitamin A intake for women, infants and young children
- Appropriate nutritional management during and after illness
- Sustained consumption of iron/folate tablets taken by all pregnant women
- Regular use of iodized salt by all families

Such a minimum package of interventions should be integrated in all primary health care projects, with health workers playing an important supportive role in catalysing improvements in home-based caring practices.

vice and services at the individual, community and program levels. Growth monitoring—as with any type of monitoring—is effective only when the information is actually used—hence the switch to the all-encompassing term “growth promotion”. Its rationale is one of prevention, through identifying growth faltering early on (see chapter 5). The Nutrition

Toolkit module # 4 *“Promoting the Growth of Children: What Works”* provides detailed recommendations on appropriate support to growth promotion approaches. It also provides the following advice (on page 56) regarding integration of growth promotion with other activities such as supplementary feeding:

“While integration of activities is critical to resolving growth problems, it also must be done carefully. Program experience indicates that integration is best when the growth promotion activity is run by a non-governmental organization or, if governmental, by women affairs or community services. Growth promotion as a preventive and educational strategy can easily be overwhelmed by medical, curative activities or those of feeding/food distribution. It is critical that in the detailed planning for integration, particularly if multiple services are offered at the growth promotion session, the basic educational work of growth promotion should be given sufficient attention”

7.3 Improving household food security

Supplementary feeding’s primary objective is to reduce or close nutrient gaps of vulnerable individuals within households. As discussed in chapter 3, it is important to stress that supplementary feeding is not, and should not be perceived as, a household food security intervention.

If households are food-insecure then there will be a need, through complementary action, to improve the household’s ability to provision itself through one or more of a variety of food or income transfer options, which lie outside the scope of this module.

One way of linking supplementary feeding to household food security interventions might be to link supplementary food production to income-generation activities benefiting women, or to find ways of reducing the caregiver’s time spent in food provisioning or food preparation (the latter

Recent experience from India

The following are extracts from two Implementation Completion Reports (ICRs) from India—the first relating to the Integrated Child Development Services (ICDS) project, and the second to the Second Tamil Nadu Integrated Nutrition Project (TINP-II). Both ICRs were completed in April 1998.

ICDS-I:

“A fundamental problem of program philosophy affected the implementation of this and the ICDS II project. ICDS is widely viewed, by political leaders, bureaucrats, functionaries and beneficiaries alike, as a government program providing pre-school education and child feeding. In contrast to TINP, no major effort has been taken to market the program as one aimed at preventing malnutrition through behavior change among mothers. This accounts in large measure for the preoccupation of GOI and the states with quantity over quality, and their related lack of interest in research and evaluation. As a result, and as shown in multiple evaluations, ICDS has relatively limited impact on its main objective of reducing malnutrition. Social indicators are better in ICDS blocks than non-ICDS blocks, and ICDS runs better in Bank-financed blocks than in other blocks. But despite strenuous efforts over many years, the Bank has not succeeded in its efforts to promote in ICDS, the kind of *behavior-change* program Tamil Nadu succeeded in harnessing through TINP.”

will benefit both food and care factors). The optimal approach is one that generates income for women, without compromising child care within the household. Income-generation and labour-saving are the key strategies here.

“A second, related lesson concerns the need for an increased emphasis on the health and care-related factors determining nutrition outcomes in the youngest children. Food supplementation should not be considered as the *raison d’être* of the project, but rather as one of several means to improve child growth and nutrition. Such a pervasive food distribution bias has reduced the attention and priority attached to inter-personal communications and counseling, which are vital to improve the care-related determinants of child nutrition.”

TINP-II:

“The main lesson learned from TINP II is that the strategies adopted to deal with moderate malnutrition were broadly appropriate, but there is a continuing need to intensify the focus on localized capacity-building, community mobilization and targeted, inter-personal communications. Severe malnutrition is now minimal but moderate malnutrition, with all its detrimental consequences, remains significant. There needs to be greater emphasis in future on improving home-based care and feeding of the youngest children to prevent them from becoming malnourished. Geographically, targeting to remote hamlets needs to be prioritized, for example, through the establishment of mini-centers.”

Other potentially complementary activities include home or community gardens (to produce micronutrient-rich fresh foods), improvements in on-farm storage and food processing and preservation e.g. use of amylase-rich flour to reduce bulk in complementary foods.

The aim would be to ensure complementarity between household-level food security interventions and individual-level nutrition interventions. Neither type can substitute for the other and both operating together are likely to be more cost-effective than either alone. However, it is important to ensure that the primary objective of reducing malnutrition is not compromised. Implementation and management modalities should thus be clearly differentiated.

7.4 Training

Improving the nutrition-related knowledge and skills of MCH workers is one of the most important means of improving national capacity. Nutrition needs to be better understood as a critical determinant and indicator of an individual's health status. The mutual benefits to both health and nutritional status of exclusive breastfeeding for the first 4–6 months, appropriate complementary feeding from six months, the particular nutritional needs in pregnancy and lactation including those relating to micronutrients, etc, need all to be internalized and viewed as an essential part of the health worker's job.

Training needs can be assessed by reviewing the skills and motivation that exist and comparing these with what is required. MCH staff who manage supplementary feeding programs ideally need to exhibit the following traits:

- Good relationship with families, community leaders and any community-based workers;
- Good counselling skills;
- Ability to recognize when to refer/seek support from specialists;
- Good relations with district management;
- Ability to support growth monitoring and promotion activities including growth chart maintenance;

- Ability to manage food movements, food distribution and supplementary feeding;
- Ability to complete records and to analyze and make decisions based on monitoring data;
- Ability to adhere to drug and supplement protocols e.g. vitamin A, iron supplementation.

Counselling skills are particularly important, despite usually being the ones that are considered last in a training program (see above). The particular skills to be inculcated in training include how to ask open questions, how to listen and use encouraging non-verbal communication and body language, how to avoid being judgemental, how to empathize, and to accept and validate what the caregiver feels, how to recognize and praise what is being done correctly, and finally how to check what is practically feasible, before targeting appropriate advice in simple language.

There are many generic training manuals available (e.g. WHO, UNICEF) which can be modified to fit local conditions and particular program objectives.

7.5 Ensuring complementarity through partnership

Malnutrition is a multi-causal problem that cuts across many agency mandates and demands the creation and strengthening of partnerships to maximise the efficiency and effectiveness of relevant actions.

The most important partnership is between the World Bank and the government who has requested its support. At a working level, community partnerships are clearly essential too. Governmental commitment may be manifested in support to food transport, distribution and non-food costs to the extent possible. Beyond this, there will usually be a need to

actively collaborate with United Nations organizations, bilateral donors and NGOs in order to ensure a harmonised, holistic approach to combatting the primary causes of malnutrition, whatever they may be.

Governments can help encourage such partnerships. Inadequate governmental capacity may be compensated by national-level efforts to coordinate those agencies who can provide such resources. One effective way of doing this is through the formulation of a national nutrition policy. The post-ICN National Plans of Action for Nutrition (NPANs) may form the basis for inter-agency collaboration which is coordinated by the government.

At more localised levels, partnerships need to be formed with NGOs who are best placed to understand local perceptions, priorities, constraints and opportunities. Participatory appraisals are essential to understanding the role of supplementary feeding in malnutrition reduction and NGOs are effective partners in managing such appraisals and mobilising communities in general. Without community mobilisation and a growing ownership of nutrition programs, sustainability will remain elusive.

This chapter focuses only on the type of monitoring and evaluation systems that are relevant to supplementary feeding programs. It is assumed that the reader has read the toolkit module *“Monitoring and Evaluation: A Guidebook for Nutrition Project Managers in Developing Countries”* which comprehensively covers the relevant generic issues.

8.1 Monitoring

The monitoring system needs to be grounded in the log frame (see chapter 4) and aim to keep track of inputs, process and outputs as measures of program performance. The measurement of the outcomes or effects (immediate objectives) on the other hand, is the primary purpose of on-going (e.g. mid-term) and final evaluations.

It is essential to choose only the minimum key set of monitoring indicators having addressed the following key questions:

- Which data are needed? [refer to logframe]
- How often?
- By whom?
- For what purpose?
- What level of aggregation is required (regions, communities, households)?
- Which potential indicators are valid, reliable, sensitive, feasible as well as acceptable to beneficiaries?

The three main outcome indicators, as defined in the logframe example in chapter 4, are:

- Low birth weight incidence
- Percentage of severely underweight among targeted children
- Percentage of moderately underweight among targeted children.

Low birth weight is an outcome indicator relating to supplementary feeding targeted to pregnant women, (although obviously affected by other factors), while the other two indicators are measures of the outcome of the child feeding component. Thus the inter-generational continuum is fully monitored and progress towards the immediate objectives can be assessed.

8.2 Model proforma

The following is an example of a core monitoring proforma. The indicators in bold relate to the objective statements in the logframe (see chapter 4).

OUTCOMES

These outcome indicators are relevant for quarterly monitoring and for evaluation purposes. The primary outcome indicator for *monthly* monitoring purposes is the percentage of young children growing adequately.

1. Nutritional and growth status

1.1 Monthly monitoring outcome indicator:

Number of eligible* (targeted) children weighed that month (A)
 Number who are growing adequately** (B)
 % growing children (B/A)

1.2 Quarterly monitoring and periodic evaluation indicators:

Number of babies born during previous three months (A)
 Number of babies weighed within ten days of birth (B)
 % birth weight coverage (B/A)

Number of babies with birth weight less than 2.5 kg (C)

% low birth weight incidence (C/B)

Number of eligible* children weighed (D)

Number above -2 SDs weight-for-age (E)

% normal or mildly underweight (E/D)

Number of normal or mildly underweight children (E) who are growth faltering** (F)

% normal or mildly underweight children who are growth faltering (F/E)

Number between -2SDs and -3 SDs weight-for-age (G)

% moderately underweight (G/D)

Number below -3 SDs weight-for-age (H)

% severely underweight (H/D)

2. Nutrition behavior change:

Qualitative measures of actual behavior change by beneficiaries and the quality of workers' antenatal, postnatal and young child counseling need to be employed to track these outcomes. This may be done quarterly and during evaluations. Perceptions of both beneficiaries and workers regarding growth and nutrition, relevant child health, care and feeding practices as well as the objectives and design of the program. Refer to "*Communications for Behavior Change*" toolkit module for options on relevant indicators and methodologies.

Notes:

*eligibility to be defined at the targeting stage (see chapter 5); most likely all 0–24 month old children will be eligible for weighing, whilst 6–24 month olds who qualify anthropometrically will be eligible for feeding.

**"growing adequately" is the inverse of growth faltering (see chapter 5 for definition).

OUTPUTS (monthly)

Pregnant women

Number of total pregnant women in target population (A)

Number of registered pregnant women (B)

% total registration (B/A)

Number pregnant women newly registered (C)

Number registered before 20th week (D)

% early registration (D/C)

Number registered pregnant women receiving regular check-ups, incl. counseling (E)

% ante-natal coverage (E/B)

Number registered pregnant women receiving supplementary foods (F)

% supplementary feeding coverage (F/B)

Lactating women

Number of registered lactating women (A)

Number of registered lactating women receiving supplementary foods (B)

% supplementary feeding coverage (B/A)

Number of birth deliveries (C)

Number of mothers receiving first post-natal consultation (D)

% post-natal coverage (D/C)

Number of mothers receiving child nutrition counselling (E)

% child nutrition counselling coverage

(E/outcomeF + outcomeG + outcomeH)

Children

Number of eligible children in target population (A)

Number weighed (B)

% weighing coverage (B/A)

Number of weighed eligible children receiving supplementary foods (C)

% supplementary feeding coverage (C/B)

Number of 12–23 month old children (D)

Number of 12–23 month old children who are fully immunized (E)

% full immunization coverage (E/D)

INPUTS (monthly)

Food Movements

- Stocks remaining at the end of preceding period (quarter)
- Quantity received during this period
- Losses
- Quantity available for distribution
- Quantity distributed to beneficiaries:
 - Pregnant women
 - Nursing mothers
 - Children
 - Total
- Remaining stocks

Personnel

- Training courses conducted
- Timely basic and refresher training?
- Joint training: community workers with clinic workers?
supervisors with front-line workers?
- Site of training? Hands-on field work?
- Content and style of training?
- Evaluation of training?

Equipment and materials available

- Weighing scales
- Growth charts
- Educational material
- Posters
- Counselling aids
- Monitoring proformae

Data should be collected by front-line workers from growth charts, ration cards and registers. Simple monthly monitoring reports should be shared with supervisors at regular meetings, where progress is discussed and problems addressed. Monthly reports should then be aggregated into quarterly reports at supervisory level and combined with the quarterly outcome monitoring reports. These consolidated summary reports should then be sent on to higher administrative levels every quarter, with a description of relevant actions taken on the basis of their findings, as well as requested support from these higher levels, if required.

In addition, front-line workers can chart essential indicator ratios in graphic form on community charts every quarter and initiate periodic focus group discussions on their findings.

8.3 Evaluation

An evaluation essentially comprises a *description* of what happened (in relation to what was intended to happen), an *analysis* of why/how it did or did not happen, and finally a *prescription*, in the form of recommendations, on what to do next. Description and analysis focus on inputs, outputs, processes, outcomes and impact. The questions to be answered by an evaluation may include those related to effectiveness, efficiency, impact, relevance and sustainability. The generic methodologies and implementation issues are discussed in the “*Monitoring and Evaluation*” toolkit module.

While anthropometry provides the main outcome indicators for evaluations, it should nonetheless be remembered that it does not encompass other effects or benefits of improved nutrition such as increased activity and exploration of the child and cognitive skills. Severely underweight children are most likely to respond to supplementary feeding with improved growth, but moderately underweight children are more likely to respond with increased activity, greater disease resistance and possibly improved cognitive development (see chapter 1). These outcomes are

important, albeit very difficult to measure. Nevertheless, following the principle of “plausible inference”, it is well known that for a given anthropometric improvement, certain other beneficial outcomes are likely to be achieved e.g. relating to cognitive development, productivity, mortality etc, as these have already been demonstrated in longitudinal studies. For example, a meta-analysis has established that approximately 56% child mortality is directly or indirectly associated with child malnutrition, as proxied by deficits of weight-for-age (Pelletier *et al.* 1994)

Evaluations should delve deeper into the dynamics of the program. For example, an evaluation of a supplementary feeding program may seek to track the movements of children into and out of the feeding component of the program. What are the characteristics of children who fail to graduate from feeding after a certain period of time? Or those who, on graduation, return within a few months due to further growth faltering? Answers to such questions can point to what needs to be done to improve, for example, the content or methods of communications for behavior change, so as to improve home-based care for nutrition.

Specific operational research findings of studies commissioned during program implementation (on the basis of priorities revealed by monitoring systems, for example), may be considered within an evaluation. For example, the degree to which leakage or substitution occurs in supplementary feeding may need to be investigated, to determine whether the target group is actually being effectively covered, and if not, why not.

An evaluation may consider the relevance or appropriateness of the project—particularly for a long-standing project in a rapidly changing environment. Are the objectives still relevant? Is supplementary feeding still a rational approach to combating the current causes of malnutrition in the project area? Do the assumptions which underly program design remain valid? A project’s objectives after a few years of implementation may be considered to have been too ambitious—particularly if unforeseen changes have occurred in the conditions. If so, the evaluation must

make a judgment about the actual progress made with respect to what is considered to have been feasible. One of the key differences between monitoring and evaluation is that evaluation, unlike monitoring, may question program goals and hence judge relevance.

An evaluation should consider sustainability—conventionally defined as the durability of positive results. But sustainability is more than this. Emphasis is increasingly being placed on the ability of the program to strengthen the capacity of a person, household or community to adapt to changes in their surrounding developmental environment. Programs may deliver services which improve nutrition, and it will be important that such services and benefits continue. But the long-term aim is to facilitate or strengthen community-based nutrition-improving processes. This is another reason why center-based supplementary feeding should be integrated with approaches which are geared to improving awareness, knowledge and skills and increasing self-reliance e.g. community nutrition and health education and counselling, as discussed in chapter 7.

It is thus ultimately the *sustainability of the process*, not the program that is most important, with the link between the two being ownership by all stakeholders, and primarily those who are intended to benefit. There are a variety of strategies for enhancing community ownership which are relevant to nutrition and health interventions including supplementary feeding. These lie beyond the scope of this module.

Program sustainability, considered in this way, is a milestone along the road to process sustainability. To the extent that the program itself remains relevant and is an effective and efficient use of resources, as compared to other options, it should continue. This will be determined by periodic evaluations. A “sustainability index” is described in the “*Monitoring and Evaluation*” toolkit module as one means of evaluating the sustainability potential of nutrition projects.

The World Food Programme (WFP) is the food aid arm of the United Nations system. One of the strategic goals set by the WFP Mission Statement is to provide food aid *“to improve the nutrition and quality of life of the most vulnerable people at critical times in their lives”*. In October 1997, the WFP Executive Board endorsed the following policy and operational principles:

- a) **Greater focus on tackling early malnutrition.** WFP will increase the share of food assistance to contribute to improving the nutritional status of mothers and children at critical times in their lives.
- b) **Advocacy.** Problems of early malnutrition will receive priority attention in the assessment of country needs for food assistance. WFP will define and communicate this focus in the process of the Common Country Assessment, the preparation of the Country Strategy Note and the United Nations Development Assistance Framework, and through dialogue with national authorities and the bilateral donor community.
- c) **Priority groups.** WFP will limit its assistance to those women and children whose nutritional vulnerability is directly linked to a lack of sufficient and appropriate food intake. Priority will be given to malnourished children and undernourished expectant and nursing mothers. Food delivery performance, child growth and birth weight are the key indicators for monitoring progress. Food assistance with a focus on the prevention of early malnutrition will require careful analysis and verification that supplementary feeding is indeed the best means of achieving this objective.
- d) **Food rations.** Commodities included in the food basket will be micro-nutrient-fortified to the extent possible. WFP will make necessary arrangements with food aid donors, or, where this is not possible, meet the costs of fortification under the category of direct support costs. WFP will strengthen its assistance to the local production of low-cost blended foods.

- e) Cost-effectiveness.** The appropriateness of the food aid intervention will be judged on the basis of its targeting and transfer efficiency. In LDCs, where it is needed most, such assistance may involve higher costs.
- f) Safeguarding the effectiveness of food assistance.** To ensure that its food assistance is fully effective, WFP will take pro-active measures such as: strengthened efforts to integrate WFP's work with other United Nations agencies, particularly through the preparation of the Country Strategy Note and the United Nations Development Assistance Framework; increased collaboration with NGOs; and, especially in post-emergency situations and in remote areas where food needs are greatest, increased flexibility to meet a minimum of non-food expenditure such as training, nutrition education materials, weighing scales, growth charts, etc. from WFP's own resources under the category of direct support costs.
- g) Duration of assistance.** The sustainability and appropriate duration of WFP food assistance to address early malnutrition must be considered in terms of its long-term benefits. Its duration should be determined in light of need, the recipient countries' own capacities and commitment, and the actual performance of the WFP-assisted programs.
- h) Development in relief.** WFP will continue to make optimum use of targeted supplementary feeding programs through MCH structures as a safety net during the phasing out of general relief programs. WFP will encourage the alignment of financial, technical and administrative resources in relief situations with the longer-term strengthening of MCH services for populations in remote, food-insecure areas.

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