

Annex I

Best Practice Guidelines for Key Nutrition Interventions

GROWTH MONITORING AND PROMOTION

Following are best practices in growth monitoring and promotion.

1. Sustainable improvements in child health and nutrition depend on families and communities being motivated to take timely and appropriate actions and being able to see benefits from these actions.
2. An effective program design for growth promotion begins with clarity of its purposes, its scope, and the circumstances in which it functions well. Growth promotion's full impact can be realized when it is employed to make decisions about three types of action:
 - recommendations for individual child care (particularly related to illness and feeding, but also to cognitive and motor development);
 - activity plans for the community that aim to make it easier for families to maintain the growth of their children, for example, by addressing problems of food shortages, poor water conditions, or collective child care needs that extend beyond a single household; and
 - program activities to bolster community actions that affect households with special needs, such as income-generating or transfer schemes.
3. Guidance on the selection of appropriate actions and the content of counseling is needed to improve child health and nutrition.
4. Experience demonstrates that growth promotion increases program efficiency and effectiveness. Based on lessons from experiences that achieved significant impact on child nutrition, the following list of essential "technical" elements of growth promotion can serve as a guide for designing a new program or assessing existing operations.
 - Programs should be community- or neighborhood-based and aim for universal coverage.
 - Monitoring of weight for the individual should begin at birth and be done frequently (monthly) for the first 18–24 months.
 - Child caretakers should be involved in the process of monitoring.
 - Adequate growth (weight gain), rather than nutrition status, should be the indicator of action, by itself or combined with other easily obtained information on the child's condition.
 - A growth chart should be used to record the child's growth progress and to make his/her growth status visible to the child caretaker.
 - An analysis of the causes of inadequate growth is required and should lead to clear and feasible options for action.
 - Negotiation should take place with families, guided by tailored recommendations for what they will do to improve their children's growth.
 - Follow-up should be done.
5. Characteristics to look for in a growth chart include the size of the card and of the writing spaces, and the clarity and positions of the weights and months. All cards should be tested with workers. Culturally relevant details should be included. Nutritional status categories should be replaced with growth channels indicated with thin lines or shading. There should be reminders of key behaviors for particular ages. On one panel of the chart, it is helpful to have key counseling points or cues for the worker about what caretakers should be feeding a child of a particular age to aid in problem diagnosis.
6. Employment of good management principles is as important for effective growth promotion as it is for other program activities (Tontisirin and Gillespie

Box A.1 Example of Job Description for a Community Growth Promotor

- Maintain a roster of all under-two children in the community, enrolling children at birth.
- Organize a monthly weighing of all under-tuos in a community, ensuring 100 percent participation.
- Assist each mother in weighing her child and plotting the weight on the growth chart.
- Help the mother interpret the growth pattern and diagnose the problem, if there is one.
- Depending on the result and a discussion with the mother about causes, refer her to the appropriate program activities, including health consultation and supplementary food.
- Counsel her on one or two activities that she can do at home to help her child.
- Make home visits to children not growing well to provide more encouragement to the mother.
- Organize and participate in community meetings to analyze the growth of the community's children and motivate collective action by the community.
- Help different groups organize specific activities.
- Hold group education sessions on common problems that mothers face in caring for their children.
- For some workers, managing records, food, cases of diarrhea, and/or coordinating with the health center might also be part of the job description.

1999). Programs should have one or more dedicated workers in each community for growth promotion. Their tasks should be limited and well defined. A reasonable job description for such a worker is given in Box A.1.

7. Detailed, area-specific plans should be made, but with room for local innovation.
8. Training should be task-oriented and “hands-on,” covering the entire growth promotion process, with an emphasis on problem solving.
9. Supervision needs to be supportive, continuing the training of the workers and addressing directly problems they confront.
10. Continual monitoring should alert all administrative levels to developing problems. A good monitoring tool is the SKDN model from Indonesia (see Box 3.6). There are four key indicators used for self-monitoring and for other monitoring: total number of under-two children in the community, total number enrolled in growth promotion, total number that attended growth promotion this month, and total number growing adequately. The ratio between

the first and each subsequent column should approach 100 percent as the program progresses.

11. Commitment to program goals should be evident at all levels.

INTEGRATED CARE AND NUTRITION INTERVENTIONS

As described in Chapter 3, adequate care is of fundamental importance to the nutritional status of women and children, yet it is only relatively recently that this area has been treated as a critical strategic area in its own right.

Psychosocial stimulation is but one of several caring practices increasingly recognized as key child development strategies. Large-scale programs that include both nutrition and psychosocial components have been implemented throughout the world and continue to increase. A recent state-of-the-art review (WHO 1999b) concluded that although the number of combined programs that have been evaluated is limited (there are only seven), such programs are generally effective. The following represent conditions that tend to maximize impact:

- interventions targeted at early life—prenatally or infancy and in early childhood;
- children in poorest households with parents lacking relevant knowledge;
- several types of interventions and more than one delivery channel;
- longer duration and higher intensity of intervention; and
- high parental interest and involvement.

Combined interventions are likely to be more efficient than separate interventions because they are intended for the same population and make use of the same facilities, transportation, and client contacts. From an economic standpoint, the marginal costs are expected to be low, relative to impact. Examples are given in Box A.2.

From the perspective of the family, a combined approach increases access to services. Such an approach may also increase overall effectiveness because families who need early intervention often have a variety of risk factors (e.g., lack of maternal education, low birth weight, poverty), several of which may need to be addressed.

Recommendations on program type (e.g., home-based, center-based, or a combination) depend on several

Box A.2 Examples of Combined Nutrition and Care Interventions

- Incorporation of child psychological development into primary health care through the use of development milestones on health cards and the inclusion of simple messages for parents on how to facilitate psychological development.
- Promotion and support of home-based group child care, combined with supplementary feeding for children of working mothers, sometimes with a microcredit program.
- A child-to-child strategy in which older siblings learn skills to help improve the psychological development, health, and nutrition of preschoolers.
- Community development projects that use home visiting and preschool programs as an entry point for other interventions such as income improvements.
- Interventions that combine both psychosocial and nutritional care for high-risk children such as low-birth-weight infants.
- Parent education courses and mothers' groups including breastfeeding support groups.
- Mass media programs (radio, TV, videos) that target both physical growth and psychological development.

Source: WHO (1999).

factors, such as presence of responsible caregivers in the home, safety of the home, quality of caregiving in the center, and stability, support, and training of caregivers in the center. In general, center-based programs are not recommended for children from birth to three years of age, unless the child is an orphan, the mother is in full-time employment, there is no suitable adult caregiver in the home, or there is extreme family disruption or child abuse or neglect.

Actions taken to facilitate child development, in addition to nutrition and health interventions, should contain at a minimum the following: age-appropriate responses of adults; stable relationships with adult caregivers; support for the child's development of language through labeling, encouraging vocalizations, expanding, explaining, and two-way conversations; provision of an environment for the child to explore safely; interesting play materials and books that reflect the child's everyday experiences; warm, affectionate, sensitive, and responsive behavior to the child's signals; and play activities with peers and adults (Grantham-McGregor et al. 1991).

Many children with disabilities can respond as productively as children without disabilities to the same developmental interventions and should be included in such intervention efforts.

Actions should be taken to strengthen the parent's or caregiver's sense of effectiveness as a promoter of child development. Interventions with parental and nonparental caregivers are needed to help them use developmental materials appropriately, to provide challenging activities at the appropriate level of difficulty in which the child can be successful, to become increasingly involved with their children, to respond

verbally to the child's vocalizations, to be responsive to the child's emotional needs, and to avoid physical punishment as a standard child-rearing practice. Parents or caregivers should be taught how to integrate child development activities into activities of daily living as much as possible. Involving other family members in these activities has the potential to increase their impact.

Two other critical elements of program expansion are systematic and continuous training and supervision for both professional and paraprofessional staff, and large-scale studies of effectiveness with careful evaluation of process and impact (see Gillespie 2001).

Adaptation of existing direct (developmental scales and cognitive tests) and indirect (e.g., parent's report) assessments of development in children 18 months to 6 years of age (focusing on psychomotor, gross motor, reasoning, language, and adaptive tasks, including social and emotional behavior) can be used to evaluate program success when the programs are intended to promote and enhance these outcomes.

There is need for an investment of resources to develop new instruments and improve existing instruments intended to assess the cognitive and noncognitive development of children below an age of three years. This is particularly true for large-scale evaluations of program interventions. Further research on the use of parental reports and other approaches, including brief observations, is needed.

Process measures of developmental interventions (e.g., children's and parent's responsiveness to the intervention, children's level of development and change over time, parental level of participation, and factors that inhibit participation) are critical for continuous improvement of programs and for providing assessment

of the strengths and weaknesses of program practices. Such process measures can also serve the functions of teaching parents and other caregivers about their children and providing them with information about how to modify their behavior with their children. Simple checklists, combined with training and supervision, can be used for this purpose.

An example of combining various nutrition and other approaches to improve child growth in India is given in Box A.3.

In sum, the importance of care practices and resources, particularly the linkages between health, nutrition, psychosocial care, and psychosocial development, justifies their inclusion in programming. The following conclusions, as specified by Engle (1999), are worth reiterating here.

- There are long-term consequences for later development and functioning in the early nutrition and care of children.
- Care is an essential element of programs designed to improve growth and development.
- A key element in psychosocial care is the sensitivity or responsiveness of the caregiver to the child's emerging abilities.
- Programs that include care are likely to be effective in increasing nutrient intake and improving growth and development of children, particularly if they begin prior to three years of age.
- In developed countries, effects are most likely to be seen in high-intensity interventions directly with children. However, in developing countries with more "collective" cultures, the effectiveness of interventions directly with caregivers is likely to be greater.
- Although there may be a general recognition of the importance of care and resources for care, much needs to be learned about the best approaches to improving care.

Box A.3 From Food to Care: The Tamil Nadu Integrated Nutrition Project

The evolution of approaches within the Tamil Nadu Integrated Nutrition Project in South India provides an interesting illustration of the need to go beyond supplementary feeding to focus on improving caring practices within the home in order to achieve an impact on moderate levels of underweight.

The Tamil Nadu Integrated Nutrition Project (TINP-I), initiated in 1980, was a forerunner of the Bangladesh Integrated Nutrition Project. TINP-I became well known in international nutrition circles during the 1980s as a "success story," having achieved a highly significant reduction in severe early childhood malnutrition. Evaluations indicated a decrease in underweight prevalence of about 1.5 percent per year in participating districts, twice the rate of nonparticipating ones (Shekar 1991). The success of TINP-I was founded on selective feeding (the careful focus on supplementing the dietary intake of young children when their growth faltered and until their growth resumed), favorable worker-supervisor ratios, clear job descriptions, and a well-focused monitoring system.

The Second Tamil Nadu Integrated Nutrition Project (TINP-II) launched in 1991 in 318 of Tamil Nadu's 385 rural blocks, sought to move beyond reducing severe malnutrition to also make a significant dent in the high prevalence of children suffering from moderate malnutrition, i.e., shifting toward a more preventive focus. The core strategies were regular growth monitoring and promotion, nutrition education, and health checks for all children, with supplementary feeding of moderately and severely malnourished and growth-faltering children, and for high-risk pregnant and lactating women.

Source: Tontisirin and Gillespie (1999).

Although the project was successful in achieving its objectives in reduction of severe malnutrition and infant mortality rate, moderate malnutrition and low birth weight prevalence were not significantly reduced (Gillespie and Measham 1998).

The main lesson learned from TINP-II concerned the need to intensify the focus on localized capacity building, community mobilization, and targeted, interpersonal communications, aimed at improving home-based care and feeding of 6-24-month old children in order to prevent their becoming malnourished. Overall, supportive counseling of caregivers and high-quality service delivery, allied with a concerted move towards social mobilization and participatory planning, should be the pillars of future nutrition improvement strategy.

Most of these substantive lessons are relevant beyond Tamil Nadu. TINP-I has shown that nutrition interventions that are targeted using nutritional criteria, integrated within a broader health system, and effectively supervised and managed, can significantly reduce severe malnutrition. TINP-II has also shown that to go further and prevent children from becoming moderately malnourished is in many ways a harder task and one that requires a significant shift in emphasis. Nutrition programming in Tamil Nadu is still evolving toward such an approach, which stresses human capacity building for home-based action, a proactive integration with the health system, and the mobilization of communities to sustain the process beyond the project.

- Assessment instruments and outcome indicators are being developed and will require careful efforts to become accepted.

One of the main strategies for improving caring practices is communications for behavioral change, discussed below.

COMMUNICATIONS FOR BEHAVIORAL CHANGE

Communications for behavior change (CBC) is a self-explanatory strategy. Previously used terms included nutrition information-education-communication or nutrition education, although the latter has tended to imply a fairly didactic, often top-down approach that has seldom been effective in the long term.

CBC has drawn from the literature on social marketing to improve its relevance and effectiveness. It operates on the basis that new ideas, services, or products can best be introduced if the intended beneficiaries see them as fulfilling their own aspirations and well-being. People will not accept new ideas and technologies designed solely from specialists' concepts. CBC follows a disciplined series of program development and implementation phases, each with steps designed to learn from the community itself: conducting formative research to formulate the whole program's strategy; testing those strategies; designing, testing, and improving messages; designing, testing, and producing communication materials; and monitoring and making necessary revisions in program strategies to better address people who have not tried or who have stopped the desired practices. As the program matures and behavioral changes begin, the design of communication and other program elements should be revised and adapted to that change.

CBC may be directed to several nutrition-related objectives, e.g., improved feeding or caring practices, and compliance with supplementation regimens. It may be used as a complementary strategy alongside, for example, supplementary feeding or growth monitoring (as growth promotion).

There is a need, however, to redirect some CBC efforts toward women themselves. Concrete efforts are needed to improve women's eating practices, which is important for the health of the women themselves and of their children. This is particularly the case in rural areas where women endure the dual burden of moderate to high levels of physical work and frequent pregnancies without noticeable increases in energy and nutrient

intakes. Studies show that female discrimination in developing countries may, to a large extent, be self-inflicted (Holmboe-Ottesen et al. 1989) as a result of a "self-sacrificing" role through which they meet their own needs last. For example, increased female wages were associated with improved nutrient intakes of most household members except the women themselves (Behrman and Deolalikar 1990). CBC activities targeted at women could be specifically designed to reduce and ultimately remove these attitudes.

It is also important to delay childbearing among adolescents. First births can be delayed by postponing the age of marriage and the onset of sexual activity, and by using effective methods of family planning. This requires culturally sensitive CBC programs for changing individual and societal motivations for early childbearing and enhanced opportunities for formal education of girls.

Again, there are few well-designed large-scale evaluations of CBC for nutrition in the existing literature. Recently, several large-scale programs aimed at improving complementary feeding through nutrition education or CBC were reviewed by Dewey (2000), although few had been adequately evaluated. One type of program is the Hearth model (Box A.4). Dewey states that "it is clear that nutrition education can have a large impact on complementary feeding practices." Whether this translates into improvements in growth probably depends on the types of foods promoted, the initial nutritional status of the population, and the degree to which other messages are included in the program. When such programs include an emphasis on breastfeeding (i.e., promoting exclusive breastfeeding for about the first six months), not just improved complementary foods, a growth effect is more likely to be observed. This reinforces the need for comprehensive approaches that address the full range of child feeding practices.

The following set of guidelines is derived from various articles and reviews on CBC for nutrition.

- The focus is on behavior—on understanding existing attitudes, perceptions, and practices, and the social context in which these practices exist; on the blockages or resistances that impede take-up of desired practices—social, cultural, cost concerns, availability, poor service, lack of appeal, etc.; and how these constraints may be overcome.
- CBC takes a systems approach to managing behavior change, integrating the technical

Box A.4 The Hearth Model

The Hearth model, currently being implemented in Haiti, Viet Nam, and Bangladesh, is intended to function as part of a comprehensive program that includes growth monitoring, deworming, vitamin A and iron supplementation, and treatment for infectious diseases. In this approach, volunteer mothers from the community are trained to conduct feeding sessions (called *hearths*) in their homes, to provide malnourished children with one nutritious meal per day in addition to their normal diet. Mothers attend with their malnourished children each day during the two-week rehabilitation period to learn how to prepare nutritious foods and observe the improvement in appetite, activity, and overall health of their children. The meals fed during the sessions are usually developed using a positive deviance approach, by determining which foods are fed by low-income mothers in the same community whose children are well nourished. This ensures that local, affordable foods are chosen and, through the process of discovery, convinces participants that a solution exists that is within their means. Social learning theories are the basis for the nutrition education component of the model.

The impact of the Hearth model has been formally evaluated in Haiti (Burkhalter and Northrup 1997) and Viet Nam (Sternin, Sternin, and Marsh 1997) by collecting data on child weight (though not height). In Haiti, a quasi-experimental longitudinal design was used to compare 192 participants and 185 comparison children from nonprogram communities who were similar in initial weight-for-age z-score (approximately -2.7). The program children were less likely than comparison children to participate in the local growth-monitoring program (25 percent vs. 100 percent). In multivariate analysis, there was a significant difference between groups in change in z-scores during a 12-month period, in favor

of the Hearth program. The effect was greater among children with higher initial weight for age, which was unexpected (a gain of +0.30 WAZ for those with an initial WAZ* of -2.0, but a change of -0.03 for those with initial WAZ of -3.0, and -0.36 for those with initial WAZ of -4.0).

The authors speculated that the Hearth program was most effective at preventing further deterioration among moderately malnourished children, but for those who were severely malnourished the growth-monitoring program may have been more effective because such children were more likely to be referred for medical care. In Viet Nam, the Hearth program is called the Nutritional Education and Rehabilitation Program (NERP), and is part of a larger strategy (formerly called Poverty Alleviation and Nutrition Program and now called Community Empowerment and Nutrition Program) implemented by Save the Children (US) that involves multiple components, including a program to promote health of mothers and infants pre- and postnatally. Data collected before and after implementation of the program in 52 hamlets indicated that within two years, the prevalence of severe underweight (< -3 WAZ) decreased from 23 percent to 6 percent, a trend not observed in other parts of the country. Improvements in child weight appeared to be maintained even after NERP sessions were discontinued (which occurred when the number of eligible malnourished children was too few to warrant the sessions), suggesting long-term improvement in child feeding and care giving practices. The scope of the program in Viet Nam (i.e., both pre- and postnatal interventions) makes it difficult to attribute the changes in child weight solely to complementary feeding, but the sustained effectiveness of the overall approach is encouraging.

*WAZ = Weight-for-age Z score. A Z score is the number of standard deviations of an anthropometric measurement (e.g. weight-for-age) from the median of a normally distributed reference population (such as the NCHS/WHO reference population).

(or clinical) aspects of the program with service or product delivery and with motivations for change. To address behavioral and development objectives properly, the social marketing process includes larger intersectoral processes as well.

- CBC appreciates that not all target audiences are the same and that even within a group (mothers), there may be important segments (e.g., nursing mothers, mothers with children who “don’t want to eat”) that need to be identified and addressed differently.
- Rigorous discipline is enforced in the message-development processes to ensure that messages

always call for, and motivate, a desired action; resolve all known resistances convincingly; offer meaningful benefits; are memorable; and are presented by a convincing authority. Linkages with commercial advertising agencies may enhance this process and the presentation of ideas to identified audiences.

- Media strategies are based upon sound research to ensure that message outreach and frequency are sufficient to achieve the required behavioral objectives. Communication channels are chosen according to the locale and may include direct counseling from fixed sites or door-to-door, the generation of word-of-mouth within the

community, traditional drama or singing groups or puppet shows, promotional events, point-of-sale display material, and innovative use of available mass media.

- Special attention is given to service personnel (including their morale) and to their training in sound counseling practice to be real motivators of behavioral change.
- Effective programs work to achieve a balance between centrally managed activities and locally developed initiatives within target communities. This often means that project funds must be allocated in a decentralized fashion.

Specific nutrition-related recommendations

Find a balance between food and practices. The focus on practices has made it abundantly clear that unless breastfeeding techniques and complementary feeding practices are addressed, providing food alone will have a minimal impact. For example, just promoting “breast is best” is not useful when almost all mothers of young babies are already breastfeeding but need to do it more frequently and exclusively.

Target changes in practices. Several issues appear to be important in any culture (thickness of food, frequency of feeding, nutrient density, quantity, hygiene, patience, and persistence). Very specific behavioral recommendations must be developed for each age group of children, an important step that can only be achieved on the basis of thorough qualitative research.

Do not ignore the first days of life. Bad practices begin with prelacteal feeding. In addition to traditional and nontraditional prelacteal foods, there is an increasing tendency to introduce foods early to “accustom the child to food,” often because the mother must return to work.

Expect the worst characteristics of the daily feeding pattern during and immediately following illness. If mothers give only a small amount of food regularly, they typically reduce the quantity even more during illness. What commonly happens is that mothers try to feed a sick child but give up because the child “just won’t eat.” Rarely does the concept or practice of recuperative feeding (feeding during recovery from illness) exist.

Recognize the extent to which families can do more for themselves. Poverty and/or lack of coping skills may be so prevalent that the mother, family, and community

cannot change their practices enough to have a significant nutritional impact.

Clearly define the barriers to change. Both “environmental” and “attitudinal” resistances (barriers) need to be identified. Environmental resistances included unavailability of certain foods and lack of feeding utensils, as well as health care professionals’ misinformation to mothers about child feeding. Two common attitudinal barriers to improved practices are (1) mothers’ feelings of lack of control, which derive from her low social status—the feeling that she exists to serve her family often means that she lacks the confidence to overcome resistance from her child; and (2) mothers’ perception of not having time to employ the new practices.

Pinpoint motivators or enabling factors, e.g., the significant roles of fathers, whose potential contribution is often undervalued, particularly when it comes to purchasing “special” calorie- or nutrient-dense foods for young children; and food vendors and owners of small food shops or stalls, individuals who are credible and available sources of information related to food purchases.

SUPPLEMENTARY FEEDING OF YOUNG CHILDREN AND WOMEN

The efficacy of prenatal (during pregnancy) and postnatal food supplementation to young children was reviewed in Chapter 3. Here, we consider whether such approaches work in large-scale programs and whether they represent the best use of resources for nutrition improvement.

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. A secondary objective may be to improve household food security through a food or income-transfer effect, and thus facilitate the caring capacity of the household.

Prior to any consideration of appropriate nutrition-relevant action, it is essential to ensure that the problem of malnutrition has been assessed and its causes analyzed. The essential stages in problem analysis 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 to clarify whether supplementary feeding is a potentially relevant action;

3. analysis of the resources and institutional capacity for action to reveal whether it is feasible; and
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.

To assess the relevance of supplementary feeding, it is necessary to assess the degree to which the problem of malnutrition is associated with inadequate dietary intake at the individual level. The priority for supplementary feeding will be the food-insecure households where target individuals do not consume adequate food. In such situations there will also be a need for household food security actions, particularly if the household is “ultra poor” (or “food-poor”). Some problems in scaling up from the individual to the community level are outlined in Box A.5.

Household food security does not equate with individual nutritional well-being, owing to such factors as intrahousehold allocation of food, health, and care-related resources, and individual health status.

There are certain risks attached to supplementary feeding, which should be borne in mind before considering the relevance of a program (see Box A.5). Food supplements are costly. In addition to the cost of the food itself (often financed by food aid), are the hidden costs of transportation and storage, costs of

leakages and corruption, and the disincentive effects on local agriculture. Food supplements may also cause dependency. This is true from an income-substitution point of view but also from the behavioral point of view. Not only do food supplements substitute for income (well documented), but also they often create adverse dietary beliefs (the ubiquitous use of milk, for instance, gives mothers the false impression that milk is necessary for healthy child growth even though most poor families cannot afford to buy milk nor do they own dairy cows). Widespread and long-term feeding programs may have a pernicious effect in disempowering families from resolving their own problems and meeting their obligations as parents.

If it appears from the causal and resource analysis that supplementary feeding is relevant to the problem and its causes, and the selected infrastructure appears capable of supporting it, 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.

As discussed in Chapter 3, efficacy evidence of the benefits of maternal supplementation, much of which comes from the Gambia, shows that the lower a woman’s prepregnancy weight, the greater the potential increase in birth weight from a given unit of supplemented food. Given the high prevalence and severity of low prepregnancy weight in South Asian women compared

Box A.5 From Efficacy to Effectiveness: Problems with Scaling Up Supplementary Feeding Programs

The most common causes for failure of supplementary feeding programs are

- irregular or inefficient supply, delivery, and/or distribution of food for various reasons, including corruption;
- inadequacies in institutional capacity, training, supervision, monitoring, evaluation, and community involvement;
- leakages due to poor targeting;
- irregular participation of the target group;
- inappropriate timing or duration of supplementary feeding;
- leakages due to intrahousehold sharing of food with the nonneedy, 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 intrahousehold food distribution practices;
- lack of counseling on the need to actually feed supplementary foods to the targeted child; and
- lack of attention paid to combatting other important causes of malnutrition, e.g., through communications approaches aimed at improving home-based caring practices.

Source: Gillespie (1999).

with their West African counterparts, it may be assumed that the benefits to birth weight would be at least as high.

It is recognized 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 (e.g., Box A.6). Nevertheless, in such situations, there should be some scope for influencing the actual use of food to improve nutrition outcomes more efficiently by employing nutritional logic.

Once a decision has been made to undertake a supplementary feeding program, an early critical stage of project design is targeting in order to increase efficiency by focusing on those most in need. But who should benefit from the intervention? And who should be targeted so that these benefits may be realized? The beneficiaries of supplementary feeding programs should be those individuals who are at risk of becoming

malnourished (or are already malnourished) as a result of factors that, at least in part, can be addressed by supplementary feeding.

Targeting may be geographical, to the most needy areas in a country; functional, to those population subgroups who are most vulnerable as usually defined by age and/or physiological status (e.g., 6-24-month-old children and pregnant and lactating women); and individual, to those found to be in the process of becoming malnourished (e.g., children whose growth is faltering). As well as being needs-based, the chosen targeting mechanism must also take account of such aspects as the available infrastructure and administrative capacity as well as important sociocultural and political considerations that may be antagonistic to the notion of selection.

Transparent and enforceable entry and exit criteria are required. This means that the indicator for screening must be modifiable with food. Growth of children (monthly weight gain) is the best indicator. Too frequently, static weight-for-age is used as the indicator but this is less sensitive for food intake, especially in children older than two years of age. Unfortunately, use of children’s growth for screening for food supplements is widely believed to be a disincentive to mothers to do whatever they can to improve their child’s growth. One solution is to have a maximum duration of benefit that is enforced and to have the growth promotion isolated in time and place from the food distribution.

The next design stage concerns the food strategy, i.e., 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. Supplementary foods should be culturally acceptable and permit the preparation of meals that are digestible, palatable, energy dense and micronutrient rich, without being bulky. Other important prerequisites 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.

Supplementary feeding, if it is considered appropriate, should never be seen as the pivotal intervention in a malnutrition control strategy, but rather as an adjunct to approaches designed to optimize the use of existing household-level resources such as CBC.

Box A.6 Tackling the Food Bias: the ICDS in India

“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.”

“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 interpersonal communications and counseling, which are vital to improve the care-related determinants of child nutrition.”

Source: Gillespie and Measham (1998).

Note: GOI = Government of India; ICDS = Integrated Child Development Services; TINP = Tamil Nadu Integrated Nutrition Project.

When considering the age at which growth failure starts to occur, i.e., between 6 and 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.

The benefits of supplementary feeding will be enhanced by complementary actions that address the health and care-related causes of malnutrition, to the extent that they exist. Important nutrition-relevant complementary actions aimed at young children include growth monitoring and promotion, the protection and promotion of breastfeeding, and appropriate complementary feeding practices, immunization, and disease management including oral rehydration therapy, micronutrient supplementation, and deworming. For women, high quality and timely ante- and postnatal care is essential, including tetanus toxoid immunization, micronutrient supplementation (iron and folic acid tablets for pregnant women and possibly postpartum vitamin A megadose where vitamin A deficiency is known to be a problem), iodized salt consumption, malaria chemoprophylaxis in endemic areas, and reproductive health education.

Other prerequisites include adequate technical and operational capacity of the implementing institutions. Functional administrative support systems including effective logistics, supplies, transportation, storage and delivery systems, and efficient funding mechanisms to regularly support them are crucial for program operation. Strong managerial capabilities and efficient technical support systems (staff training, retraining, and technical backstopping; supervision monitoring and evaluation) are critical, as is the adequate selection, training, and motivation of program staff. Especially important is a functional monitoring, evaluation, and management information system for collection, processing, timely analysis and interpretation, and regular feedback of information required for ongoing decision making and motivation.

SCHOOL FEEDING

Physical growth of schoolchildren aged 6 to 9 years is mainly the result of environmental and genetic factors and the interaction between these factors (Bengoa

1971). In population groups that have experienced constraints to economic and social development, most of the factors affecting the physical growth of school-aged children are related to environmental factors experienced before puberty (Habicht et al. 1979), including poor food consumption patterns, illness, lack of sanitation, and poor health and hygiene practices.

Data on the nutritional status of school-aged children are scarce. The recent *Fourth Report on the World Nutrition Situation* (ACC/SCN 2000) provides data for the Latin America and Caribbean region only. Height census data of schoolchildren have been used for planning, evaluation, and advocacy in Central America (Delgado, Palma, and Fischer 1991). This information has allowed governments and other organizations and institutions working in the countries to detect growth retardation, to screen high-risk groups, and to target social interventions for nutrition security and human development.

The potential for catch-up growth among stunted school-age children is thought to be limited after age two years, particularly when such children remain in poor environments (Martorell, Kettel Khan, and Schroeder 1994). A recent study in the Philippines, however, has shown that some catch-up between the ages of 2 and 8.5 years is feasible for children who were not born with low birth weight or severely stunted in infancy (Adair 1999). Stunting at age two years, however, regardless of whether catch-up was achieved or not, was shown to be significantly associated with later deficits in cognitive ability (Mendez and Adair 1999), further emphasizing the need to prevent early stunting.

The fact that hunger alleviation in school children improves school performance has been documented in developing and developed countries. Studies in Jamaica, for example, have shown that those children who benefited most from nutrition improvement were wasted, stunted, or previously undernourished (Grantham-McGregor et al. 1991).

A recent review of school feeding programs (Miller del Rosso 1999) has highlighted the following as key concerns when considering the option of school feeding.

1. Clarify goals: schooling or nutrition/short-term hunger or political. The following are possible goals.
 - Alleviate short-term hunger (evidence strong).
 - Increase enrollment and attendance (evidence strong).
 - Improve micronutrient status (evidence available from few programs).

- Improve learning outcomes (evidence weak).
 - Raise community participation (depends on modality and local circumstances).
 - Improve health and nutrition of school children (evidence weak).
 - Improve health and nutrition of children's families (no evidence).
2. Target the population: define precisely (poor, geographic, indigenous, gender, by grade) according to goals and which group needs food to achieve those goals. Targeting should be transparent, with clarity on who is targeted and why.
 3. Timing during the school day depends on goals (breakfast or morning snack is generally better than lunch for hunger and learning objectives).
 4. Rations should be defined as having lowest cost to achieve goals. Consider
 - calories (1/4-1/2 of daily needs);
 - micronutrients (especially iron): up to 100 percent of needs, and cost effectiveness of alternatives (fortification vs. supplementation);
 - prepared vs. cooked on site (prepared can be cheaper; obviates need for kitchen and cooking equipment);
 - on-site vs. take-home (at-school eating does not guarantee that food is "supplemental"; take-home is generally shared; take-home is more of income transfer); and
 - local vs. imported foods: cost, foreign exchange, dietary habits shift.
 5. Costs are in the range of US\$20–200 (with a median \$81) to deliver 1,000 kilocalories for 365 days. It is important to consider the opportunity cost (how else might this money be used to achieve the same goals), and alternatives to feeding (lower cost) including parental education, deworming, micronutrient supplementation, or cash transfer.
 6. Complementary services are necessary to achieve nutrition, health, or education goals. Include a curriculum with nutrition education for children and their parents, water supply and sanitation at school, health services/first aid at school, parental education, deworming, detection and compensation for learning disabilities (hearing, vision), and CBC.

Deworming is one strategy that can have a high pay-off at this age group. Helminth burdens are most intense during the years of schooling (Bundy 1990). Single and multiple helminthic infections have been shown to be associated with growth retardation (Latham et al. 1990) and catch-up growth has occurred in preschool children after deworming (Hlaing 1993). Deworming preschool and school-age children has been shown to improve physical growth (Aswathi et al. 1995; Bundy and Guyatt 1996). Where hookworm is heavily endemic, primary school deworming programs can also improve iron status and prevent moderate and severe anemia; deworming may be needed at least twice yearly (Stoltzfus et al. 1998).

Increasingly, early childhood learning centers are being put in place with World Bank support. Together with primary schools, it is possible to intervene to reach children 2–9 years old and often older children who are still in primary school. But because not all children go to school, child-to-child nutrition-related activities need to be explored further and tested. This may be particularly relevant for girls in situations where many girls do not go to school, such as in India.

HEALTH-RELATED SERVICES

Health services can directly benefit nutrition with regard to disease prevention and management, health promotion, and nutrition-relevant service delivery. Specifically:

- Maternal health and nutrition can be enhanced through antenatal care including micronutrient supplementation and birth spacing, to benefit fetal growth and development.
- At delivery, the mother can be counseled on early initiation of breastfeeding and on breastfeeding practices; vitamin A can be given as a single high dose.
- During infancy and early childhood, growth monitoring can give timely warning of health and nutrition problems; immunization contacts can be used for vitamin A supplementation and counseling on complementary feeding.
- Periodic deworming may be carried out.
- With regard to the management of disease, emphasis should be placed on the importance

of continued feeding, including breastfeeding, on diet composition (energy density, micronutrient content), and administration of vitamin A in endemic areas.

Maternity care that is effective, affordable, accessible, and acceptable is essential, including prenatal health and nutritional services, safe delivery, and postpartum care. The well-documented increase in the coverage of prenatal services, currently greater than 50 percent in most developing countries, offers a unique opportunity to reach women during pregnancy with a package of health and nutritional services, including education, counseling, and micronutrient supplements. About one third of women in developing countries, however, still do not have access to good-quality health services during pregnancy and childbirth, especially poor and uneducated women who live in rural areas.

With regard to adolescent girls, a priority is the prevention and management of unwanted pregnancies and management of abortion services by improving access to birth spacing information and services, including counseling, education, and family planning. Family planning services still need to be fully integrated with other health and nutritional services for women of childbearing age. Information-education-communication family planning strategies need to incorporate women's health and nutritional concerns. Existing service delivery channels for contraceptive products can be used effectively for the provision of iron supplements and other nutritional services to women.

A number of such interventions regarded as essential for nutrition—antenatal care, safe delivery, immunization, disease management, and others—are by their nature normally part of the regular health services. Some key activities have recently been proposed as a key “nutrition minimum package” (Box A.7).

Some nutrition activities within health services are being promoted and codified in the WHO/UNICEF Integrated Management of the Child Illness (IMCI) program (Box A.8). The IMCI strategy is a comprehensive program to improve child health and reduce deaths from major childhood illnesses. Because malnutrition is a contributory factor in an estimated 54 percent of child deaths (Pelletier et al. 1994), the program includes extensive guidelines on child feeding for both health care workers and parents. The ultimate aim is to break the vicious cycle of inadequate dietary intake leading to disease (see Figure 1.2).

Box A.7 The BASICS Nutrition Minimum Package

The BASICS project has recently provided a strong justification for a concerted focus on interventions through the health system 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 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 catalyzing improvements in home-based caring practices.

Source: BASICS/WHO/UNICEF (1999).
BASICS = Basic Support for Institutionalizing Child Survival, a global child survival project funded by USAID.

Complementarities between health service delivery and community nutrition

Community-based programs are different from, and complementary to, health services in several important respects. They are primarily aimed at *preventing* malnutrition, although they need to facilitate referral to health services for those who become malnourished. They usually include some developmental activities, from infrastructure (water/sanitation, food storage, buildings) to income generation, safety nets, or credit. Community involvement and ownership are crucial, in contrast to the top-down delivery of health care—part of which, like supplies, equipment, and trained personnel, is necessary.

Community-based nutrition programs have an important role in ensuring high and timely coverage of key health services such as immunization. Women's visits to health services, for either curative or preventive child health care, are excellent opportunities for health workers to tap and provide health and nutritional preventive services (education, counseling, and micronutrient supplements) to women.

Box A.8 Integrated Management of Childhood Illness (IMCI) Evaluation

To evaluate the impact of the nutrition-counseling component of IMCI, a randomized controlled trial was conducted in Pelotas, Brazil, by dos Santos and Victora (1999). The 28 government health clinics in the city were stratified by baseline levels of child malnutrition and socioeconomic status of the neighborhood, and then randomly assigned to intervention and control groups. In the intervention group, all doctors in charge of child health care received a 20-hour course in nutrition counseling using a local adaptation of the IMCI guidelines. In total, 33 doctors were included in the study and 13 patients <18-months old were recruited from each doctor's practice. The nutritional advice promoted in the intervention group was specific to the child's age, and included promotion of exclusive breastfeeding for at least four months; frequent breastfeeding; avoidance of bottles; 3 meals per day (or 5 if not breastfed) for children 6-24 months old; inclusion of specific foods such as mashed chicken liver, shredded or minced chicken, or meat, egg yolk, and mashed fruits; use of dense mixtures of foods; addition of a teaspoon of oil or fat to the food; and stimulation of the child to eat. The study included an evaluation of doctors' knowledge immediately after training and six months later, observations of consultations, and home visits of study children at 8, 45, and 180 days after the initial

consultation to assess maternal knowledge and practices, and child dietary intake and anthropometric status.

The results indicated that doctors' knowledge of child nutrition and counseling skills improved, although their performance waned six months after the training had been completed. Maternal recall of key messages and satisfaction with consultations were significantly better in the intervention group. There were no significant differences between groups in energy or protein intake of children, but fat intake was higher in the intervention group (34 vs. 31 grams/day) (micronutrient intake was not reported). Although there were no significant differences between groups in growth of children under 12 months of age, weight gain (but not length gain) and change in weight-for-height z-score among children older than 12 months were greater in the intervention group than in the control group. Mean height-for-age z-scores at the last home visit in children older than 12 months were 0.24 in the intervention group and -0.13 in the control group, suggesting relatively little stunting in this population. Thus, it is not surprising that linear growth did not differ between groups, but it is also unclear whether increased weight gain can be considered a beneficial outcome. Parallel studies of the impact of IMCI in other populations are currently under way.

Note: z-score = the number of standard deviations of an anthropometric measurement (e.g. weight-for-age) from the median of a normally distributed reference population (such as the NCHS/WHO reference population).

Another important connection is that health (and other) services can provide supervision and support for community workers—they are often the crucial link with government and other more central resources (see Tontisirin and Gillespie 1999). Strengthening nutrition-relevant activities in the health services provides a key synergistic opportunity for addressing malnutrition. The incremental nature of the costs of strengthening nutrition activities within the health services may also make it an attractive option.

All this emphasizes that community programs and health services are complementary, and each needs the other for dealing with malnutrition (which in turn benefits health). Some data on health service-based programs from the country reports are given in Table 7.1.

MICRONUTRIENT SUPPLEMENTATION

The efficacy of micronutrient supplementation in achieving certain objectives, whether the control of the micronutrient deficiency or improved child growth or pregnancy outcome, has been reviewed in Chapter 3,

both with respect to single and multiple nutrient interventions. Experiences with scaling up from small-scale community-based trials to large-scale programmatic environments is reviewed here for iron and vitamin A supplementation.

Iron

In contrast to vitamin A and iodine deficiency control, there remains a significant gap between the efficacy (potential effect) and the effectiveness (actual effect under expected conditions) of programs aimed at controlling iron deficiency anemia among highly vulnerable subgroups such as pregnant women and older infants.

The impact of most large-scale iron supplementation programs has not been evaluated. The main operational constraints identified in a review of six large-scale programs aimed at pregnant women (Gillespie, Mason, and Kevany 1991) were

- inefficient and irregular supply, procurement, and distribution of supplements;

- low accessibility and utilization of antenatal care by pregnant women;
- inadequate training and motivation of front-line health workers;
- inadequate counseling of mothers; and
- low compliance of the intended beneficiaries with the supplementation regimen.

Thus, supplementation programs share many of the problems that hinder primary health care and essential drugs programs in developing countries. Many of these deficiencies can be avoided or rectified in supervised clinical trials. However, small-scale trial efficacy does not readily translate into large-scale programmatic effectiveness. Iron tablets are not magic bullets and interventions to combat anemia must be seen in the context of overall quality of care for women and children. A severely anemic woman, for example, is at much greater risk during childbirth if birth care is not adequate.

Examples of large-scale programs that have not in the past led to a significant decrease in anemia prevalence include those in Indonesia (Sloan et al. 1995; Achadi 1995), India (Sood 1988; Gillespie, Mason, and Kevany 1991) and the USA (Kim et al. 1992).

Problems in supply-side factors in many programs in the past have been so serious as to render it difficult to know the full extent of lack of compliance as an ultimate obstacle to success—the tablets have just not been getting to people for them to consume regularly. Recently, in Bolivia, one million tablets deteriorated in storage because they were not distributed to peripheral health centers, nor was there a demand for them (Schoffelen 1996). Reasons for dropout from a supplementation program are more likely to be related to poor supply and availability of the tablets than to side effects (Gillespie, Mason, and Kevany 1991). For example, in India, the rate of beneficiary dropout from the National Anaemia Control Programme in the mid-1980s ranged from 9 to 87 percent between different states with a mean of 58 percent (GOI 1989). More than 80 percent cited tablet supply failure as the reason; fewer than 3 percent cited side effects from consumption. Similarly, a publication from MotherCare (1997) states that “there is little evidence that noncompliance due to gastrointestinal side effects is an important reason that women are not taking the recommended number of iron-folate pills.”

There is some evidence that compliance has been a significant problem in current daily regimens (WHO

1990; Schultink 1996) and this may be related to undesirable side effects (Ekstrom et al. 1996; Ridwan et al. 1996) and to poor communications (Galloway and McGuire 1991).

In sum, the effectiveness of supplementation programs is likely to depend primarily on the following factors, starting at the community level.

- *Community demand*, based on community awareness of the problem and consequences of iron deficiency anemia, the benefits from supplementation, and the motivation to continue taking supplements. To generate such an awareness and demand, an explicit communications component aimed at both women and men is required. Communications need to derive from an understanding of local terms, perceptions, beliefs, traditions, and perceived obstacles to compliance, including side effects.
- *Motivated, well-trained, approachable, and supportive community-based program functionaries* able to explain the nature of the problem and how it can be tackled successfully, including through other diet-based approaches. Supplements should be encouraged positively as health promoting rather than negatively as disease curing. Adequate supervision and performance monitoring are also required. Community leaders should also be involved as educators.
- *Good population coverage and targeting to at-risk groups* (e.g., pregnant women, adolescent girls) and at-risk areas (e.g., endemic malarial or hookworm-infested areas).
- *Early initiation of supplementation during pregnancy*. Late initiation cannot be compensated for by higher doses (e.g., 120–240 milligrams daily) later, and would also lead to more side effects.
- *Good quality delivery systems accessible to the target population*. These should be as far as possible functionally integrated within (but not necessarily limited to) existing channels, e.g., schools, traditional birth attendants, through Expanded Program of Immunization (EPI) outreach, etc. Supplements could also be made available at retail stores, free, at cost, or in exchange for a coupon from the health center.
- *An organized procurement process and a regular*

and timely supply of low-cost supplements to delivery outlets, based on appropriate targeting criteria.

- *Supplements of good quality*, stability, shelf life, color, smell, and acceptable to the local population.
- *Simple but effective monitoring at all levels of the system* from supplement supply, through coverage, and compliance with consumption to biological impact.

Operations research is still needed to help us understand *how* to implement appropriate interventions effectively on a large scale. Allied to this, more effective advocacy and communication on the national importance of iron deficiency prevention and control are urgently required.

Iron deficiency control strategy development is further hampered by uncertainties that persist over etiology in different situations, particularly in Africa where the noniron deficiency causes of anemia may be significant. Working criteria to distinguish the different types of anemia are needed in order to define better the target groups as well as the most appropriate action. A recently developed tool, the life cycle anemia risk matrix, may help in organizing etiological assessments with a view to better determining and prioritizing appropriate control strategies (Gillespie and Johnston 1998).

Vitamin A

Available data (ACC/SCN 2000) suggest that there is opportunity and need for targeting, among nations, for major vitamin A deficiency (VAD) control programs. Unquestionably, there is also a rationale for targeting particular sectors of the population within affected countries. Unlike iodine deficiency, VAD is linked much more to the nature of foods available and to feeding practices than to geochemical or other conditions affecting the whole population. Many studies suggest that, like iron, VAD has strong socioeconomic associations and, indeed, iron deficiency and VAD often coexist in the same subpopulations.

The great majority of countries where VAD is known to be a major public health problem have policies supporting the regular supplementation of children, an approach of known effectiveness that can reach the subpopulations affected by, or at risk of being affected

by, VAD. Supplementation coverage has increased significantly in the last few years, spurred on by the linkage of supplementation to immunization. Integrating the administration of vitamin A supplements with immunization services, which reach 80 percent of the world's children, has been WHO/UNICEF policy since 1994, although progress has been slow and somewhat limited. In contrast, the addition of vitamin A to polio vaccination campaigns has been quick to catch on and is proving to be one of the most successful implementation strategies for reaching large numbers of at-risk children. National Immunization Days (NIDS) offer a ready-made delivery infrastructure and unparalleled reach—in 1997 alone, more than 450 million children were immunized during polio NIDS. In 1998, 88 percent of the countries where VAD was a severe to moderate public health problem conducted NIDS, two thirds of which included vitamin A, benefiting more than 24 million at-risk children. This success was the result of a coordinated strategic effort between UNICEF, WHO, major international donors, NGOs, and academic institutions (UNICEF 1998).

The main limitation of NIDS is that they only provide the opportunity for one dose of vitamin A per year, whereas vitamin A-deficient children need to receive supplements at least twice a year. A minor setback has been the report (WHO 1998) that coupling vitamin A administration with immunization, while safe, may not have been as effective as had been hoped, at least in terms of mortality reduction. While recognizing the dramatic progress made with supplementation coverage, the NIDS linkage should not be considered as a panacea, and we must continue to seek new approaches.

Almost all would agree that food-based approaches (including fortification where feasible) are the logical preferred long-term strategy. There is urgent need to expand efforts in fortification where foods reaching the target population groups are processed or where local fortification is feasible (Mannar 2000).

FOOD-BASED STRATEGIES FOR MICRONUTRIENT DEFICIENCY CONTROL

A recent review (Ruel and Levin 1999) explores the evidence of the impact and effectiveness of food-based strategies to reduce vitamin A and iron deficiencies, in an effort to reexamine the potential of food-based strategies to reduce micronutrient malnutrition. The

main strategies reviewed are food-based interventions that aim at 1) increasing the production, availability, and access to vitamin A- and iron-rich foods through the promotion of home production; 2) increasing the intake of vitamin A- and iron-rich foods through nutrition education, communication, social marketing, and behavior change programs to improve dietary quality among vulnerable groups; and 3) increasing the bioavailability of vitamin A and iron in the diet either through home preservation or processing techniques. Plant breeding strategies are also briefly discussed because of their potential to increase the content of vitamin A and iron in the diet.

With regard to vitamin A, the recent literature points to the potential of home gardening combined with promotional and education interventions. However, few of the projects that were evaluated quantified the impact of home gardening on home production, income, market sales, and women's control over income. And only a few of these studies actually measured their impact on vitamin A and other micronutrient status indicators.

Production and education interventions to increase the supply and intake of iron from plant foods have not been as popular as for vitamin A. Experience with food-based approaches to increase production and/or consumption of heme or nonheme iron-rich foods is very limited, but some lessons were clear. In addition to the well-known problems of bioavailability with iron from plant sources, the experience with animal production suggests trade-offs between increased income from selling home-produced animal products and increasing own consumption of these products to improve dietary quality. Similar to home gardening interventions, a strong nutrition education component is critical to achieve improved dietary diversity through animal production interventions.

The review highlights two contrasting facts. On the one hand, it is clear that some technologies and strategies reviewed have the potential to address many of the concerns about both the intake and the bioavailability

of vitamin A and iron among impoverished populations. On the other hand, critical information gaps still exist in relation to both the efficacy (with respect to new information on vitamin A bioavailability from plant sources) and the effectiveness of many of the strategies reviewed, even for approaches as popular as home gardening. There is potential for existing home-processing technologies to address some of the concerns about the bioavailability of vitamin A and iron. Cooking, preservation techniques, home processing techniques, and food-to-food fortification (to increase promoters or reduce inhibitors of iron) were reviewed. Many of these technologies are simple, low-cost home-processing techniques, which in some cases are part of traditional food practices of the target populations. However, there has been limited effort to promote, implement, and evaluate such technologies in community trials. Plant breeding strategies are at a very early stage compared with other approaches and the information is not yet available on their potential efficacy and effectiveness. Additional studies on bioavailability in humans are needed to understand the full potential of plant breeding.

Significant progress has been achieved in the past 10 years in the design and implementation of food-based approaches, particularly with respect to the new generation of projects integrating production and nutrition education and behavior change strategies. Yet, little has been done to evaluate their efficacy, effectiveness, feasibility, sustainability, and their impact on the diets and nutritional status of at-risk populations. In particular, information on the cost effectiveness of food-based interventions is noticeably absent from the recent studies. Despite their complexities, it remains critical to demonstrate both the efficacy and the effectiveness of food-based strategies in order to provide the most basic information to further promote their use in the fight against micronutrient malnutrition. Food-based approaches could be an essential part of the long-term global strategy to alleviate vitamin A and iron deficiencies but their real potential is still to be explored.

Annex II

An Assessment of Nutritional Surveillance Systems for Crisis Management in Asia

Following the conceptual discussion in Chapter 6, the nutritional surveillance system in Indonesia implemented by Helen Keller International is evaluated here for its effectiveness in informing decision makers of the process and the outcomes of interventions.

Criteria for Evaluating Nutritional Surveillance Systems in Asia

1. *User-driven objectives.* Nutritional information systems in Asian developing countries are not designed specifically for crisis management. Existing information from other sources, however, provides opportunities for building crisis management objectives. One exception is the surveillance system run by Helen Keller International (HKI) in Indonesia, which was able to adapt its program monitoring objectives immediately to crisis management (HKI 1999). However, it is not clear to what extent the objectives of this surveillance system are linked to the users' need for information.
2. *Instruments for information gathering.* Simple and sustainable data collection instruments that could be modified to meet the objectives of crisis management are urgently needed. For example, the growth-monitoring data collected through existing nutrition information systems provide insights into the impending food and nutrition problems. The Integrated Child Development Services (ICDS) in India, growth and birth weight surveillance systems in Sri Lanka, and the Bangladesh Integrated Nutrition Program (BINP) provide opportunities for this approach. However their weak linkages to decision-making systems at the local, regional, and national levels render them currently ineffective for crisis management.
3. *Institutional structure.* HKI's experience in Indonesia presents a clear example of how to build crisis management systems for existing surveillance systems. While it is possible to incorporate additional data requirements into program monitoring systems such as the ICDS and BINP, efforts must be made to identify the regions and areas that are chronically affected by food shortages and are vulnerable to food and nutritional crises.
4. *Capacity for data collection.* A major obstacle for regular monitoring of the process and outcome of nutrition intervention programs is the capacity for data collection. In addition to not being prepared for data collection during the crisis situation, the data collected by program-driven monitoring continue to be of poor quality and do not meet the decision-making needs of program managers. Experience from well-organized surveillance systems indicates that investment in generating capacity for quality data collection has one of the highest payoffs of the surveillance systems (Pelletier 1995).
5. *Capacity for data processing.* To increase the utility of data for designing crisis interventions, the capacity for data processing is fundamental. Special efforts to train staff involved in data entry and verification are essential to increase the timeliness of data processing and to improve the quality of data. Once again, HKI's crisis-monitoring system in Indonesia provides a good example of creating and monitoring capacity for data processing. Absence of decentralized data processing facilities, however, presents major constraints in implementing recall and revisits of households once the questionnaires are received in Jakarta or Surabaya (HKI 1999).
6. *Capacity for data analysis and interpretation.* The timeliness of data analysis and interpretation crucially depends on the capacity for its analysis, and such capacity is severely lacking in many Asian countries (Mock and Mason 1999). Monitoring and evaluation of nutrition interventions require continuous analysis of data from program monitoring systems. In the absence of the required capacity, much of the data

collected by the systems remain unanalyzed. The ICDS and National Nutrition Monitoring Surveys in India are typical examples (Gillespie 1998).

7. *Timely generation of information.* Designing programs in response to the crisis requires the provision of timely information to the affected groups of the population. In addition to the capacity for data collection, processing, and analysis, this requires overcoming bureaucratic hurdles in releasing the information in the form of reports. The HKI experience in Indonesia indicates that releasing information regularly under the title "Indonesia Crisis Bulletin" and in the form of press reports helps get the attention of the users in the government agencies, funding agencies, and other NGOs.
8. *Commitment of decision makers for using information.* Without adequate demand for the information by decision makers, the surveillance systems may remain only data-collection exercises. This also has implications for the quality of data collected. Unless the information generation is linked to users through appropriate institutional arrangements, the surveillance systems may not be sustainable. Information collected for addressing crisis situations escapes this problem because there is high demand for evaluating the impact of the crisis on nutritional and health outcomes.
9. *Cost effectiveness.* Limited experiences in nutritional surveillance indicate that information generation and use for crisis management would be most cost effective if the existing monitoring systems could be modified or adjusted to meet information needs during crisis periods. However, this requires the presence of a sustainable cost-effective system of nutritional surveillance. Nutritional surveillance systems for growth monitoring or program evaluation that depend on external resources and are not linked to the existing structures are less likely to be cost effective in the long run. HKI in Indonesia, although very effective in providing information for response programming, may not be sustainable in the long run without the proper linkages and transfer of skills to the community and regional institutions.
10. *Institutional development.* Unless institutions are developed for nutritional surveillance, including those involved in data collection, processing, analysis, and dissemination, understanding the impact of crises on nutritional outcomes will remain a challenge. Furthermore, designing appropriate responses to emergency situations requires institutions with sufficient capacity that could be modified for crisis management. In the absence of well-functioning, nationwide, nutritional surveillance systems, strengthening the sentinel surveillance in the chronically food deficit areas is a strategic option. However, it must be noted that modifying the sentinel surveillance system to address the nationwide impact of the economic crisis will not be adequate to generate responses at the aggregate levels.
11. *Impact of information on decision making.* It is important to evaluate the impact of interventions chosen on the basis of nutritional surveillance in order to strengthen the case for investment in nutritional surveillance. The existence of the HKI surveillance system even before the crisis in Central Java clearly demonstrates the importance of nutrition monitoring even during periods without major food emergencies. Continuous information on the conditions of the poor and the malnourished, and on the impact of interventions designed according to such information, provides support for institutionalizing the surveillance system in Asian developing countries.

Annex III

Consensus Statement of the Manila Forum on Food Fortification Policy 21–24 February 2000

After four days of deliberation, participants from eight nations and a number of international, technical, and donor agencies attending the Manila Forum on Food Fortification Policy agreed on the following set of principles, strategies, and actions.

PRINCIPLES: VISION FOR 2010

- All people of the region should have access to affordable, safe, and efficacious fortified foods as a long-term and permanent commitment to the elimination of micronutrient malnutrition.
- All salt intended for human or animal consumption should be iodized.
- Flour fortification with essential vitamins and minerals should be an integral part of all strategies to control and prevent micronutrient deficiencies.
- Fortification, particularly with iron, vitamin A, zinc, and folic acid, of staple foods like rice, cereals, and oil as well as condiments and industrially processed complementary foods, should be encouraged.
- Food laws should be reviewed and amended to ensure that they are supportive and enabling to the addition of all essential micronutrients in appropriate food carriers.
- Public policies and regulations that constrain or impede investment in food fortification to reduce micronutrient malnutrition should be reviewed and amended.
- While the cost of food fortification must ultimately be borne by the consumer, it is recognized that a transition period of cost sharing and public financial involvement may be necessary.
- It is recognized that food fortification is part of a comprehensive strategy that includes supplementation, dietary diversification, breastfeeding promotion, and other public health measures.

- Achieving this vision will involve coordinated action at national and regional levels.

NATIONAL STRATEGIES

- Open channels of communication in order to continue and expand public, private, and civil sector dialogue and partnership at the highest national levels.

NATIONAL ACTIONS

- Designate a National Core Group, initially coordinated by the National Country Focal Point at this Forum, to further develop the recommendations and actions discussed in the country work groups at the Forum and wherever necessary consider the following steps.
- Hold a national advocacy meeting engaging the highest national policy-making levels.
- Designate a multisectoral national team to prepare a 10-year investment program, identifying priority actions for both public and private sectors to create an enabling environment for fortification and mechanisms to minimize costs, enhance supply, and create demand.
- Update and widely disseminate data on prevalence of micronutrient deficiencies including the insertion of micronutrient-related data collection into demographic health surveys and other ongoing health surveys.
- Collect and analyze data on nutrition, consumption, industrial capacity, market distribution, and other

factors needed to identify appropriate and effective vehicles for fortification.

- Collect and disseminate information demonstrating the impact of reducing micronutrient deficiencies on economic growth and productivity or, if needed, undertake studies for this purpose.
- Review and recommend financial incentives for food fortification, such as reduced tariffs and taxes.
- Develop a monitoring framework to evaluate the success of fortification.
- Continue, expand, and follow up on the public-private sector dialogue initiated at this Forum.

REGIONAL STRATEGIES

- Develop regional institutions as centers of excellence for harmonizing data collection, conducting bioavailability and efficacy trials, and managing food fortification programs (including food science, quality assurance, epidemiology, food safety, and social marketing).
- Assess the potential for affordable, industrially produced, fortified complementary foods as an emerging priority for food policy to support child development.
- Develop a framework for drafting and proposing harmonized regional and international trade standards and guidelines for food fortification.
- Develop a framework that promotes an enabling environment for the fortification of foods to protect public health.

REGIONAL ACTIONS

- Create a Regional Core Group comprised of the Asian Development Bank, Micronutrient Initiative, International Life Sciences Institute, and the National Focal Points from the eight participating groups to develop further the Consensus Principles of the Manila Forum as well as the following regional actions. The Regional Core Group will seek collaboration with United Nations (UN) and bilateral

development agencies and develop continuing consultations with the World Trade Organization and consumer organizations.

- Advocate the presentation and discussion of the Manila Forum principles, strategies, and actions in appropriate regional fora such as the annual meetings of the Subcommittee on Health of the Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) and the regional committees of the World Health Organization (WHO).
- Advocate the insertion of the Manila Forum principles into the appropriate consultations of health and trade organizations.
- Sponsor discussions to harmonize standards, regulations, and guidelines for fortification of flour and other staples (cereals, condiments, cooking oil, and complementary foods) and propose these for the endorsement of regional bodies such as Codex, ASEAN, SAARC, and other appropriate organizations.
- Include micronutrient malnutrition issues, including the Consensus Principles of the Manila Forum, in the agenda of regional expert group consultations such as associations of pediatricians, nutritionists, and reproductive health specialists.
- Identify regional institutions for training and capacity-building activities in cooperation with groups such as the Centers for Disease Control and Prevention, WHO, Food and Agriculture Organization of the United Nations, United Nations Children's Fund, and other United Nations and bilateral agencies.
- Create a corps of regional food fortification specialists to consult regarding both industrial feasibility and public health assessment.
- Act as a clearinghouse for food fortification information including the development of a World Wide Web site.
- Link to Consultative Group on International Agricultural Research initiatives to develop micronutrient-rich varieties of rice and other staples.