

Chapter 4

Strengthened nutrition strategies

The main focus of the nutrition strategies proposed in the country studies [1–8] is to strengthen the local level programs, through a combination of community organizations and service delivery. This involves greatly increased coverage of programs, plus in some cases increasing the resources per child applied (intensity), and with stress on building local organizational capabilities. Program content tends to continue current approaches, with some shift in emphasis. But the major resource requirements proposed are for massively increased population coverage, reflected in increased numbers of village level workers or volunteers (mobilizers), supported by supervisory staff (facilitators). The common themes are reviewed in this chapter. Finance and implementation are discussed in chapter 5.

In this context it should be recalled that the success in Thailand in the 1980s and 1990s in rapidly reducing and almost eliminating general malnutrition provided some ideas throughout the country studies. A summary diagram based on the system in Thailand [9] is reproduced in figure 4.1. Although this stems from Thailand, it is of general application, where basic services interface with communities to help plan and implement programs. These are helped by a structure of facilitators/mobilizers—Thailand trained nearly 1% of the population, 500,000 people, for voluntary village work in health and nutrition—and their ratios provide a point of reference in planning for other countries.

Here the content of the programs within the proposed strategies is first examined. A summary check list, country-by-country, is shown in table 4.1. Then the suggested coverage and intensity of resource use is reviewed, as summarized in table 4.2, which compares the proposals with the current situation as reviewed in chapter 2 and its associated tables. This analysis follows that of the guidelines (Annex 1), which suggested addressing coverage, targeting, intensity, and content as the four factors that define successful programs. (Targeting has not been used much in the programs designed, but appears as phasing of geographic coverage in several proposals.)

Content of improved nutrition strategies: local-level programs

Consideration of factors in relation to the life cycle context provides a common approach. The basis for the proposed strategies is shifted to earlier in the life cycle than in many of the current programs. This represents a conceptual advance. As shown in chapter 1 (e.g., fig. 1.1), birthweight is a major determinant of later child growth and development; and this in turn is influenced by maternal nutritional status, currently and in the mother's own childhood. The recognition of the importance of women's nutrition and of fetal development underlies this shift in program emphasis.

Some of the interventions are usefully rationalized in this relationship to different stages of life. Those in the first half of table 4.1 are roughly ordered in this

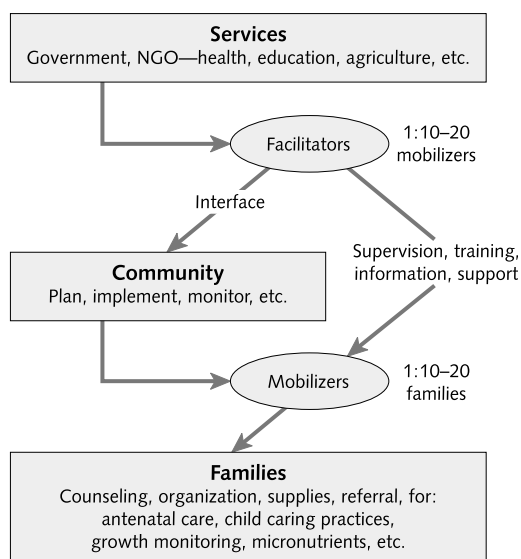


FIG. 4.1. General structure for community-based programs, based on Thailand. Source: adapted from K. Tontisirin, personal communication, 1996; and ref. 9, p. 50

way. In this table, shift upwards in proposed emphasis is indicated by black squares (■), and continuation, but usually with much increased coverage proposed, by gray squares (◻). It should be emphasized that giving priority to a large number of components is not necessarily a good thing. Concentration on the most relevant to specific conditions (causes and context) is needed, and this step of analysis remains to be done (see section on 'outstanding issues' below). The components in the

highlighted areas in table 4.1 are generally accepted as part of most community-based nutrition programs.

Women's health and nutrition, then antenatal care, feature in most programs. Some caution in expectations is needed here, as there are limits to how far antenatal care can increase birthweight when the mother is already stunted; but it should be a priority. Support for breastfeeding and good complementary feeding practices address crucial issues. In all eight

TABLE 4.1. Major components proposed for nutrition strategies

Component	Bangladesh	India	Pakistan	Sri Lanka	Cambodia	Vietnam	China
Women's health and nutrition	■	◻	◻	■	■	■	◻
Antenatal care	◻	◻	■	◻	■	■	■
Breastfeeding	◻	◻	■	◻	■	■	◻
Complementary feeding	◻	◻	■	◻	■	■	◻
Growth-monitoring B: specifically including birthweight	◻	◻	■	◻ B	◻ B	◻	◻
Micronutrient supplementation (vitamin A, iron)	◻, ◻	◻, ◻	◻	■, ■	◻, ◻	◻, ◻	■, ■ Vitamin D, calcium
Micronutrients— dietary change	◻	◻	×	◻	◻	◻	◻
Fortification	■ (Iodine)	◻ (Iodine)	◻ (iodine, vitamin A) New iron	◻ (Iodine)	◻ (Iodine)	◻ (Iodine)	◻ (Iodine) New iron
Food security	◻	◻ Home gardens	Later	◻	■	◻	■ Home gardens
Supplementary feeding— external resources	?	◻	×	×	×	×	×
Supplementary feeding— internal resources	◻	◻	×	◻	×	×	×
Immunization, oral rehydration therapy	◻	◻	◻	◻	◻	◻	◻
Health referral	◻	◻	◻	◻	◻	◻	◻
Day care	New	■	Later	×	×	×	◻
Water/sanitation	×	×	Later	◻	■	■	◻
Deworming	◻	◻	New	?	◻	◻	?
Nutrition/microcredit	New	×	×	?	■	◻	×
Adolescent girls	New	◻	×	◻	×	◻	?
Infant formula code	◻	◻	◻	?	?	?	?
Nutrition information system	■	◻	◻	■	◻	◻	■
National IEC	◻	◻	◻	■	◻	◻	◻

New: activity not widely included now, or only pilot tested so far, proposed for strengthened program.

■ continued at about same or high priority. ◻ included with increased priority. ◻ included but not stressed, or low priority.

× not included.

Components common to most programs are in **boldface**.

Sources: ref. 1–7.

TABLE 4.2. Main requirements/features for some components in local programs

Component	Counseling (for behavioral change)	Supplies	Organi- zation
Local organization (e.g., village nutrition workers)			■
Antenatal care	■	■	
Infant feeding	■		
Growth-monitoring	■	■	■
Micronutrient supplementation		■	■
Supplementary feeding		■	■
Immunization, oral rehydration therapy	■	■	
Deworming		■	
Health referral			■
Day care			■
Water/sanitation		■	
Microcredit		■	■

Sources: ref. 1–7.

countries, and especially in the South Asian ones, a substantial proportion of infants are not yet getting solid foods after six months, or even by 12 months of age (see fig. 1.9), and changing this represents an important opportunity for future programs. Growth-monitoring programs provide useful support for local activities—it should be obvious but maybe needs repeating that growth-monitoring by itself is useless and must be part of programs that address causes of malnutrition. When it is, growth-monitoring provides a useful focus and starting point; more important, it is the means of identifying individual children for attention of community- and facility-based workers, and thus helping to target their resources at the individual level.

As summarized in table 4.1, all seven proposals give some emphasis to women's health and nutrition, antenatal care, breastfeeding, complementary feeding, and growth-monitoring. At least in Cambodia and Sri Lanka, growth-monitoring is taken to the next logical stage, to include birthweight, and this idea might well be adopted elsewhere. This group of activities is now often gathered together under the heading of 'caring capacity.'

Enhanced micronutrient programs are recommended in all the country proposals. Supplementation with high dose capsules of vitamin A is carried out for mothers immediately after delivery, with National Immunization Days, with the Expanded Programme of Immunization (EPI) contacts, and through community programs and the health care system. Support and expansion of this process is likely to be cost-effective and sustainable. Supplementation with iron (or iron/folate), usually envisaged as part of antenatal

care, is not that effective in combating iron-deficiency anemia, and while included in most programs (as it should be) is likely to be less effective in the long run than fortification. China's proposals include concern for rickets, hence vitamin D and calcium; it is quite likely that rickets in early childhood, reported to be highly prevalent in many parts of China, occurs elsewhere in the region, and should be investigated.

Fortification is likely to be the longer-term solution to many micronutrient deficiencies, as it has been in industrialized countries. This will be discussed further in the section on 'central programs.' Means of fortification with vitamin A have been studied for a while, and are proceeding in a number of places. For iron the concept of fortification is gaining ground, although there are serious obstacles to be surmounted [10], e.g., rice is technically difficult to fortify. Investment in research in iron fortification is likely to be highly cost-effective.

Iodine-deficiency disorders (IDDs) are very prevalent, and the main intervention, iodization of salt, has been adopted as a policy by all the countries. The biggest issue now is implementation and quality control. Where surveys have been done, e.g., in Bangladesh [11], extremely variable salt iodization levels have been found. This lends itself well to community monitoring, as cheap and effective salt testing kits are available from UNICEF. Improvement of systems for salt iodization and distribution provides a good opportunity for investment in the future, and is highlighted as such by most of the country studies, which propose at least continuing priority for this intervention.

Overcoming micronutrient deficiencies by dietary change is of less proven effectiveness. Most studies propose continued support for this approach, often including home garden promotion.

Supplementary feeding is a crucial issue, largely because it can take up much of the resources available for nutrition. Using external supplies—food aid—does not solve the problem, as personnel are then occupied with administration; anyway, this source is phasing out. Internal resources can be used for complementary weaning foods as well as supplementing those at high risk of malnutrition; Thripasha in Sri Lanka is an example. Generally provision of supplementary food is not regarded as either a good use of funds, nor necessarily as very effective, in fact sometimes it can be counterproductive. The Integrated Child Development Services (ICDS) in India has come to be seen as a food distribution program, and people attend when there is food available, which was not its intent nor the best approach. An exception may be among extremely poor populations, as with the Bangladesh Integrated Nutrition Project (BINP), where the meager resources simply are not available to adequately feed young children. This question of the proper place (if any) of supplementary feeding remains to be fully resolved; it

probably could be with research using existing data, as will be noted in the section on ‘outstanding issues.’ Meanwhile, the policy put forward in most of the country studies of preferring to use resources for other actions is likely to be correct.

Deciding the priority in practice of the other activities summarized in table 4.1 is situation specific. As noted, those in the highlighted areas are conventionally included in nutrition programs. But all need to be matched to both the local causes of malnutrition, and to the opportunities and organizational conditions. In general the activities put forward seem as solidly based as they could be, given the paucity of evaluation research, and would be judged to be in the mainstream of current knowledge. Indeed, it is how activities are adopted and supported within communities that is now the key question, rather than a need to radically redesign the activities themselves (even if some have updated designations, such as caring capacity).

The types of resources needed for these components of local programs are illustrated in table 4.2. While much depends on behavioral change, this is by no means all that is required. Supplies and organization, at a minimum, are also needed in many cases. The counseling and other needs all apply to interaction between individuals, e.g., similar to health services or schools, which are very limited in most of the countries at present. This explains why the proposals are for such a major expansion, particularly of personnel to be involved. However, it is also the reason that local programs can be effective, if the content is correct and they have adequate organization, coverage, and intensity.

Organization, coverage, and intensity

The characteristics of country programs, now and as proposed in the improved nutrition strategies, are summarized from the country reports in table 4.3. This table expands on the data given in table 3.2. The proposals generally envisage a major expansion of programs for which some experience in the country already exists, rather than suggesting completely new programs. In Pakistan there is little community level work in this area at present, so the ideas are newer; in India the ICDS already has wide coverage, and expansion and intensification are proposed. Otherwise the proposals build on current programs with low coverage, with some organizational developments.

For China and Sri Lanka the suggestion is to work with the governments’ poverty alleviation programs to provide for activities aimed at preventing child malnutrition. These poverty alleviation programs have extensive coverage, so the issues are to do with acceptance by these organizations, training and provision of staff, and testing operating methods. In Cambodia and Vietnam the focus is on working with and through

non-governmental organizations (NGO), whose outreach in general is presently quite extensive and can be enlarged for national coverage; however, they would need to be assisted and oriented in specific work on nutrition. In Pakistan the proposal is for a large-scale training and support operation through current health personnel (including traditional birth attendants—TBAs) and volunteers to be recruited; although the health services exist, much of this would be starting from scratch. The Bangladesh proposal would expand nationwide activities already underway in a limited number of districts (thanas) supported by a World Bank project, the Bangladesh Integrated Nutrition Project (BINP), modified by excluding supplementary feeding, but now primarily under the leadership and responsibility of the health ministry (Ministry of Health and Family Welfare). A national nutrition program has been started recently, along the lines envisaged here. In India the proposals would essentially channel more resources through the present structure of the ICDS.

The first four programs mentioned above (China, Sri Lanka, Cambodia, and Vietnam) appear to be related to grass roots organizations that link into community structures, and have some track record of success in this. From this viewpoint if the proposals attract the necessary resources they seem likely to be widely implemented. In contrast, making headway in Pakistan is going to pose a particular challenge. There is less tradition of community-based work, and the nutrition-oriented program would be breaking new ground. A somewhat similar challenge applies to the Bangladesh proposal—here it is the NGOs that have experience in community work, and some new ground will again have to be broken following the country study proposal. It is worth noting that some consideration has gone into phasing the expansion of these programs in all cases, and phased implementation plans are included.

The proposed expansion in coverage of programs is shown country-by-country in the third column of table 4.3, and displayed in figure 4.2. A massive expansion is proposed.

The other parameter is the resources per capita required (intensity), which can often be estimated in concrete terms as numbers of people to be trained, equipped, and otherwise supported. (These generally take a major share of the budget, so are a useful indication for financial needs also). The key personnel are referred to as ‘mobilizers’ and ‘facilitators,’ and ideal ratios for impact (based partly on work in Thailand as shown in fig. 4.1) are:

- » mobilizers/population, approximately 1:100 (1:10–20 households in Thailand)
- » facilitators/mobilizer, approximately 1:10–20

While these benchmarks originate from the Thai system, an informal review of their extent in South-

Table 4.3. Organization, coverage, and resources proposed for country nutrition strategies: characteristics of local (community-based and service delivery) programs

	Local organization (major component)	Coverage	Intensity		Annual budget (US\$ millions)
			Mobilizers/ population	US\$/ child/yr	
Bangladesh					
Now	Several, e.g., BINP	Low (6 thanas, 40 planned)	1:1000	\$18 (BINP)	\$14
Proposed	Mainly through MOHFW additional to BINP)	National (380 thanas,	1:500	\$3.8	\$67.5
India					
Now	ICDS, thru Dept. of Women and Child Development	About 74% of blocks	1:1000	\$2 (non-food)	~\$200
Proposed	ICDS, thru Dept. of Women and Child Development	100% of blocks	1:300	\$10.0 (non-food mainly)	\$1,380
Pakistan					
Now	None	Low	1:500 (LHWs)	Low	
Proposed	Through health system (LHWs, dais, CHNVs)	75% after 5 yr	1:500 (dais+ CHNVs)	\$2.2	\$45.5
Sri Lanka					
Now	Small-scale, e.g., PNIP.	Low	1:750	?	
Proposed	Thru Samurdhi (poverty alleviation program)	At scale, national (12,000 GNDs in 238 divisions); first 25 divisions (10%)	1:150 (community workers)	\$3.4	\$9.1
Cambodia					
Now	Both government (e.g., CASD) and many NGOs	CASD, 20%	?	\$11 (CASD)	\$4CASD
Proposed	Village Development Committees (already exist widely)	National	1:500(mobilizers/facilitator 1:10–15)	\$6.0	\$9
Vietnam					
Now	CPCC Pilot community-based	15% Low	1:450 1:100	\$0.8 \$2.6	~\$1.6
Proposed	CPCC, CSC	National, phasing over 10 yr	1:100 (m/fac 20)	\$0.44	\$4.9 (average)
Philippines					
Now	Lakass, thru BNS	15% of municipalities	1:300	\$0.4	~\$5
China					
Now	UNICEF/ government pilot	Low	1:50		
Proposed	Expansion, through poverty alleviation program	200m people, in 600 counties, 12,000 townships, with 500,000 mobilizers, in 10 yr	1:200	\$0.5 (costs for volunteers only)	\$14.8

Sources: ref. 1–8. For coverage and intensity data, Cambodia [2, p. 59, 72], India [3, p. 122], Pakistan [4, p. 93], Philippines [8, p. 132], Sri Lanka [6, p. 99, 112].

BINP = Bangladesh Integrated Nutrition Programme; MOHFW = Ministry of Health and Family Welfare; ICDS = Integrated Child Development Services; LHW = lady health workers; GND = Grama Niladhari divisions; CHNVs = community health and nutrition volunteers; PNIP = participatory nutrition improvement project; CASD = Cambodia action for social development; CPCC = Committee for Protection and Care of Children; CSC = Commune Steering Committee; BNS = Barangay nutrition scholar.

east Asia in 1995, shown in table 4.4, indicates that, for example, in Indonesia similar ratios at the mobilizer-population level were achieved; and that an adequate supervision ratio was customary in Vietnam (facilitators:mobilizers of 1:5—but of course there were far fewer mobilizers). For the present overview, the Thai mobilizer/population ratios (1:100) are used for comparison; the reports did not lend themselves to calculating the proposed facilitator/mobilizer ratios, but this should be done when more detailed planning proceeds. The estimates for mobilizers/population (m/p), now and in the proposed future programs, are shown in the fourth column of table 4.3, and displayed in figure 4.3. It should be noted that these ratios apply to part-time volunteers; fewer mobilizers per population would be needed if they worked full-time and were remunerated and if village workers were trained and employed.

The pilot-scale activities on which certain of the proposals are based have m/p ratios around the ideal, e.g., in Vietnam and Sri Lanka (PNIP, not shown in table 4.3). In China, where the pilot programs are reported to have a measured impact on stunting, the m/p ratio was 1:10 households, approximately 1:50 population. For large-scale operational programs the present ratios vary a lot but generally fall short of those expected to have an impact, of 1:100 population (10:1000 in figure 4.3); and although proposed to be improved in the future, usually remain substantially less than the ideal. This is presumably in part because of what is judged to be realistic in budgeting terms, as much as based on an assessment of likely impact. Thus it can be seen (from table 4.3) that m/p ratios of 1:300 or 1:500 are commonly proposed (Bangladesh, India, Pakistan, Cambodia), and 1:300 is estimated for the current Philippines program. (Note that these estimates attempt to calculate the ratios in the areas where there are programs, and not to simply compare the total mobilizers to the national populations.) These ratios are likely to be too low for substantial impact, certainly for the impact later used for the cost-benefit

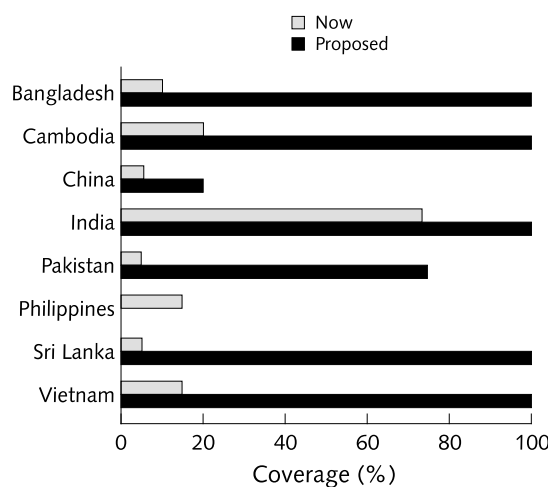


FIG. 4.2. Proposed coverage of community-based nutrition-oriented programs compared with current programs. Source: table 4.3

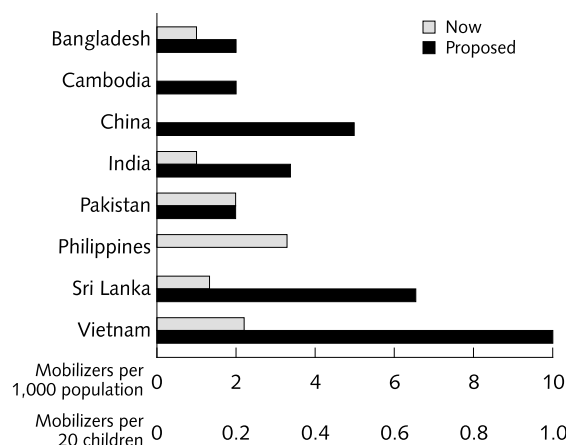


FIG. 4.3. Proposed intensity of current community-based nutrition-oriented programs in terms of mobilizers/child ratio within programs. Source: table 4.3

TABLE 4.4 Ratios of mobilizers to facilitators

Country	No. facilitators	No. mobilizers	Facilitators: mobilizers	Mobilizers: population	Facilitators: population
Thailand	25,000	500,000	1:20	1:100	1:2,000
Cambodia	3,000	0	0	0	1:2,500
Indonesia	15,000	3,000,000	1:200	1:67	1:12,000
Laos	0	1,000	0	1:5,000	0
Vietnam	8,000	40,000	1:5	1:2,000	1:10,000
Myanmar	14,000	0	0	0	1:2,100
PNG	5,000	10,000	1:2	1:770	1:1,600

Note: facilitators are salaried field workers, usually at one level above village (e.g, district); mobilizers are village workers, who may be volunteers, earn wages, or have other remuneration.

Source: Participants in Mahidol/UNICEF regional meeting in Southeast Asia, Dec 1995.

calculations of 50% reduction in underweight over 10 years.

The intensity calculations are given in US\$/child/year in table 4.3 (column 5), and displayed in figure 4.4. In chapter 2 it was suggested that an expenditure level of US\$5 to \$15/child/year was likely to be needed for impact, and that at this level an accelerated decrease in the child underweight prevalence of around 1.5 to 2.0 percentage points/year (pp/yr) might be expected. This estimate is consistent with the BINP in Bangladesh at US\$18/child/year, which was carefully planned to produce an impact on nutrition; and with the Community Action for Social Development (CASD) in Cambodia at US\$11/child/year, which is considered to be having a worthwhile impact. Other such estimates are needed and probably feasible from existing data, but these are probably in the right range to give some guidance.

The proposed budgets and implementation plans are thus probably over-optimistic and underfunded in most of the proposals. The levels of proposed expenditure in Bangladesh, Pakistan, Sri Lanka, and Vietnam are less than US\$5/child/year. In China, the estimate is not for the full budget, only for the training and volunteer support; but it is probably still too low. This is in line with the personnel estimates (e.g., m/p ratios), and gives a consistent picture of perhaps a too timid approach. It will cost a significant amount to improve nutrition but the benefits are likely to be worthwhile (although there is limited comparability between the costs and benefits, due in part to this cost underestimate, which is discussed in the next chapter); but the proposed level of effort may be too low.

The summary indicator used previously (fig. 2.4), combining coverage and intensity, is shown for the proposals in figure 4.5. This assesses the potential extent of community-based programs at a level of 1 mobilizer to 20 children. While a considerable expansion is envisaged, at this ratio the proposals still fall

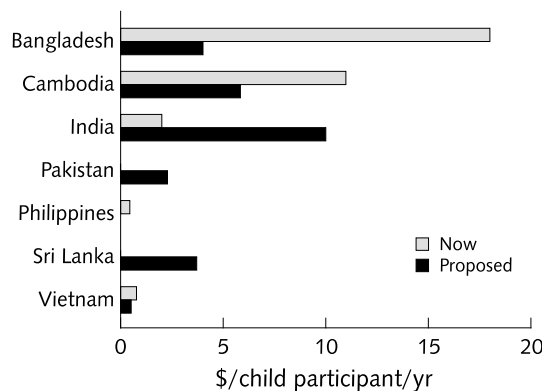


FIG. 4.4. Proposed intensity of community-based nutrition oriented programs in terms of US\$/ child/year within programs. Source: table 4.3

short of what is theoretically required. However, this also depends heavily on the specifics of program organization, particularly on whether village-level workers are volunteers or paid, and whether part- or full-time. The ratios of 1:20 come from part-time volunteers (e.g., as in Thailand and Indonesia, see table 4.4), and a better measure would be along the lines of person-days per child, full-time equivalents, or the like. Nonetheless, these calculations may at least give a starting point.

Whether the relatively low level of input proposed in some cases can actually have much impact is a very important question. Using either measure of intensity (m/p or US\$/child/year) leads to similar conclusions. The impact-to-resources relationship is unlikely to be linear [12], and applying too little resources (especially indiscriminately, without assessing context) may be wasteful. Either more resources have to be obtained and used, or those available should be focussed, by targeting, until the level is reached where impact is achieved. There is a risk that certain of the estimates in table 4.3 (columns 4 and 5) are a warning sign that some proposals are just too under-resourced to be likely to have a worthwhile effect.

Central programs

The major efforts proposed are for local level programs, in line with the analyses of causes and interventions likely to be effective. A number of additional and complementary activities operating from central levels are likely to have a direct impact on malnutrition, either by themselves or in support of local programs. These should be appealing as a basis for an investment having a lower cost than local programs, not depending on individual contacts, but they are not a substitute

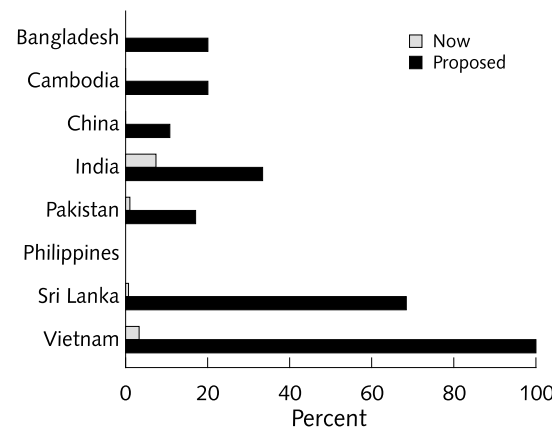


FIG. 4.5. Proposed national extent of community-based nutrition-oriented programs in terms of total numbers of mobilizers as % of that required at 1:20 children for overall population. Source: calculated from data in table 4.3

for these and should not be seen as a less costly option that can be undertaken isolated from direct actions through local organizations.

Three promising areas that form part of most proposals concern fortification, nutrition information systems, and information, education, and communication, in this context particularly using mass media. The proposals are briefly reviewed next.

Fortification

For *iodine* legislation and salt fortification programs are underway in all the countries. But the battle to control iodine-deficiency disorders (IDD) is far from over. The current challenge and opportunity is to improve quality control at the points of consumption, retail, storage, and production. This can be approached in various ways, using cheap and reliable tests that are readily available, often supplied by UNICEF. These lend themselves to use by communities, and a system can be envisaged whereby community organizations, health facilities, schools, and other establishments regularly monitor the iodine content of the salt being consumed, and report findings to a controlling authority. This would create awareness and mobilize public opinion to improve iodization standards. Other means of monitoring, involving inspection, for example, may also be supported. In any event, salt iodization would seem to provide an important opportunity for investment in a highly cost-effective intervention to prevent malnutrition and bring extensive benefits in terms of human capital and productivity.

Fortification with *vitamin A* is gradually expanding, usually with oils and fats (e.g., cooking oil and margarine), and is likely to provide the long-term solution to vitamin A deficiency. In most of the countries research is still needed to determine suitable foods to fortify ('vehicles'), and on the technical matters of stability, acceptability, and so forth. When a strategy is decided, testing, manufacturing, and marketing become the focus. Appropriate investments in research, testing, and implementation should be appealing, with a likely high degree of sustainability and cost-effectiveness.

For *iron* the stakes are even higher, because it is possible that fortification may provide the viable approach to controlling iron deficiency currently known and may be applicable to large population groups. Iron deficiency is extremely widespread and (unusually among the different types of malnutrition) shows no signs of general improvement. At the same time, none of the countries have got beyond the research stage in fortification, and there are formidable technical and social problems to overcome. Nonetheless, an investment in research, although perhaps higher risk than for other micronutrients, should be a high priority in a strategy to address malnutrition. Success would

bring great benefits in terms of human capital and productivity.

Other needs are being uncovered as research proceeds. In China calcium and possibly vitamin D are problematic and supplementation and/or fortification may be indicated; this needs more research, but of a type that is within current knowledge and it need not take a long time. Zinc deficiency may be widespread—some of the recent studies to establish its existence and effects were done in Vietnam—and fortification may be one answer. Additional deficiencies are all too likely to be demonstrated as extensive in the near future.

The costs of addressing deficiencies through centrally operated fortification schemes are relatively minor compared with local nutrition programs. Some of the country studies provide estimates. For example, in Cambodia the cost of a national salt iodization program is estimated as US\$0.5 million/year, about US\$0.05/capita/year. Detailed costs, to include the critical research needs in many cases, have not been comprehensively determined in the studies, but it is sure that they will appear relatively low compared with other programs, and represent an extremely good value. Estimates of benefits in terms of preventing lost productivity are given in most of the reports, and are summarized in chapter 5.

Nutrition information systems

A critical gap in the process of formulating the proposals emerging from the country studies has been that there is essentially no good data on program impacts on nutrition—the Tamil Nadu Integrated Nutrition Project (TNIP) may be one exception [13, p. 68)]. Thus it has not been possible to compare the effects, let alone the effects per cost, of any of the components discussed, from large-scale programs in the countries concerned (or from virtually anywhere). The program designs are based on a mixture of pilot level (efficacy) results, impressions from inadequate evaluations, rapid assessments, and acts of faith. This is such a worrying deficiency, due not to technical constraints but to the needed work simply not having been done, that it should come to the top of the list of functions for nutrition information systems. Less demanding information requirements, for monitoring and management information for instance, need to be met by building the systems into program activities.

A combination of methods, with stress on obtaining data through time, should be supported as programs develop—but not in isolation. Information seems cheap, but there are major opportunity costs, and investment in data must complement not substitute for local programs. The methods usually include capturing data from growth-monitoring, using clinic and health system records, and other administrative sources (e.g., schools). Representative sample surveys have expanded

in recent years, many within the demographic and health surveys (DHS) and UNICEF multiple indicator cluster surveys (MICS), and these provide both baseline information for monitoring trends, and designs that can be built on.

Much of these data remain to be fully analyzed, and a cost-effective early investment would be to sponsor more extensive analyses, in the first instance for the purpose of elaborating the plans coming from the country studies. More generally, support should be included for capacity building for information systems, at various levels of organization, in investment plans.

National information, education, and communication (IEC)

Most proposals recognize the opportunity for building up national information, education, and communication (IEC) in support of nutritional improvement, often using mass media in combination with the components for behavioral change within local programs. The focus is generally on those causes of malnutrition linked to caring practices. Thus breastfeeding promotion and protection, and encouragement of correct complementary feeding practices, are obvious targets. The latter is particularly important in the Asian countries—if successful a campaign to shift the age of introduction of solid foods to around six months could have large effects on preventing growth failure. In addition, the shift would be straightforward to monitor, e.g., by repeating the DHS surveys that have so clearly documented the problem.

As Asian countries rapidly adopt technology and capitalize on the information revolution, it should become easier to reach the poor and malnourished with useful information that can make a difference. Information on diet, on access to immunization and supplements, and to lower cost solutions to a range of problems could have far reaching effects.

Details of costs of enhancing national IEC capabilities remain to be worked out, and indications only are given in the country reports—but these should be enough to make the case that they are likely to be a good value in the overall context of strengthened nutrition strategies.

Outstanding issues and opportunities

This overview of possible strategies raises a number of issues that apply generally and which will need to be resolved as progress is made towards effective and economic investment plans. Most of this can be done by research using existing data, although in some cases it may be better to design new studies. The issues and opportunities are discussed in the sequence in which they arise in this section.

Concentrate resources on relevant activities and target groups that can respond

This policy seems obvious but is not stressed in the proposed strategies, in part because the analyses have not gone far enough to define the associated opportunities. Some answers are generic, applicable in most countries—especially those involving human biology, such as the importance of birthweight or the contribution of micronutrient deficiencies to growth failure. Others are situation specific, particularly involving behavior like breastfeeding and complementary feeding habits, or water/sanitation interactions, or factors interacting with women's status. A one-size-fits-all approach accounts for many low impact interventions; but the proposed program contents tend to follow these lines.

The point has been well made [14] that the issue in defining target groups is not relative need, but relative ability to respond; if the target group, however needy, does not or cannot respond the intervention is ineffective. In part this is the same as correctly tailoring interventions to relevant causes, and taking account of contextual and other interactive factors. Developing better service delivery in Pakistan may not benefit the socially excluded who cannot get access; urging mothers, who cannot avoid travelling to work without their infants, to exclusively breastfeed is impractical; destitute mothers simply cannot feed nutrient dense-foods frequently to six month old infants, whereas better-off mothers with no time face other constraints; several examples concerning women's status, literacy, and other factors were given earlier. However, addressing the issue of targeting potentially effective interventions to those who can respond constitutes a crucial gap that will fundamentally influence the actual potential for investment.

The gap can be closed partly by formulating some general principles to provide guidance for detailed country planning. The examples above can be expanded and researched. There is a wealth of data relevant to nutrition now available for all the countries in the studies, secondary analysis of which could be brought to bear on these issues; what is needed is a deliberate decision to do this.

Identify critical contextual factors for supporting policies

This should lead to a decision on which factors can and should be modified. A start was made on this issue—and it was usefully clarified—by the UNICEF study discussed earlier [15], and a number of examples were given in chapter 3. This issue now needs to be investigated systematically and quantitatively. The aim should be to define which interventions are likely to be

effective in specific circumstances; to look into whether important contextual factors can be modified to make them more effective; and to consider if intervention designs should be adapted. Here again, some generic points could be established to provide guidance for planning country investment projects.

Community-based programs compared with facility-based programs

The underlying assumption in all the country proposals is that building up community-based organizations and activities, often supported by government line ministry personnel as facilitators, that are usually based in health centers or other facilities, is likely to be a good option. This approach takes precedence over an alternative, which would put resources into existing or new facilities. These are not in conflict in principle, and indeed should complement each other. For example, the Integrated Management of Childhood Illness (IMCI) initiative envisages many interventions that are the same as those proposed here, but operated primarily through health facilities. They are in competition in the real sense that it is recommended that resources be focussed on the community-based approach, with village organization, village volunteers, high ratios of mobilizers to population, and facilitators supporting these. However, none of the studies have compiled data to evaluate the relative effectiveness of the different organizational approaches, nor indeed has the more general experience been looked for and applied.

Thus there is no solid basis for asserting that the recommended focus on the community is the more effective approach. Indeed, in the health field the question remains open as to whether focussing resources on health facilities might not be preferable (R. Knippenberg, personal communication, 1998). While there is good reason to suppose that the community-based route is promising, it remains an unresolved issue, hence a weakness in the proposals, that the relevant experience supporting this central decision—to go for the community as the top priority—in all the country studies has not been brought to bear. Again, this is a gap that can begin to be filled by existing information.

The effectiveness of village-level workers is essential to community-based programs, yet there is still no adequate knowledge of how to recruit, train, and particularly remunerate these key people. In the Philippines with World Bank/Asian Development Bank (ADB) support the Early Childhood Development Project aims to test paid workers versus volunteers; and other programs, such as BINP (Bangladesh) and in India could provide experience. It is urgent to know more about this issue.

Supplementary feeding compared with behavioral change

The absence of evaluation research on the impact of large-scale nutrition-oriented programs has been highlighted often in this overview. However, one specific aspect of far-reaching consequences to the whole design and budgeting concerns the place, if any, of supplementary feeding; and the comparison of using the same resources for other possible components, many of which are aimed at behavioral change. When adopted, supplementary feeding typically takes about half the budget in food costs, plus generally un-assessed quantities of staff time. In addition, the availability of the supplementary food may become the perceived reason for the program's existence. Yet here again it is not possible to point to studies that have directly compared the relative cost-effectiveness of these two approaches. This is one case where it would probably be necessary to collect fresh data to address the issue. The country studies, as a result, while mostly opting not for supplementary feeding (see table 4.1), have not been able to base this on more than educated guesswork.

The right decisions are probably being made—to go for behavioral change, caring practices, micronutrient supplementation, and so on, rather than food per se—but it would be reassuring to have a firmer basis in fact, which research could establish. Presumably this need for reassurance will also apply to potential donors of investment level funds.

Is nutrition impact directly proportional to the level of effort?

If one unit of effort (e.g., expenditure) produces one unit of impact, and two units of expenditure produce two units of impact, and so on up and down the scale of investment, then the cost-effectiveness (or -benefit) will not depend on the level of effort, but they will be in a simple ratio to each other. Thus applying too low a level of resources simply solves the problem more slowly, but keeping at it will work eventually. At the other extreme, using massive resources will make the problem go away very quickly. Unfortunately this is unlikely to be so. At a minimal level of resources, they just get absorbed in administration, small-scale work, information, and research, and no noticeable impact occurs. Almost certainly one needs to get above a certain level of input to reach a point of increasing returns, when the response/resource curve starts to rise. This is what a normal dose-response curve looks like. (There are many reasons why the curve will flatten at a sufficiently high level of resources, including intergenerational effects; but these are unlikely to be of practical importance here.)

This non-linearity is absolutely crucial here, and its consideration not a luxury. One way to put it is that it means that cost-effectiveness is not independent of the level of effort, and we need to know what level of effort leads to acceptable cost-effectiveness. Specifically, if too little resources are put in, they will be wasted; they will not have a useful, if small, effect and will simply disappear. As demonstrated earlier, the indications are that the proposed level of effort in some of the country studies may well be below the level at which we think that impact can be achieved. Aside from anything else, this would mean that some of the cost-benefit calculations (chapter 5) are an overestimate on these grounds alone.

There are several options for closing this gap, none mutually exclusive. One is to accept that the rough guide of US\$5 to \$15/child/year does get into the area where response occurs, as is likely, and increase or focus the resources to get into this range. Another is, to bring together the countries' experience, and where this is inadequate to sponsor the needed research, to better estimate the characteristics of the input/response relationship. A third is to draw on results in related fields at least for the shape of the curve, and then try to scale this to the nutrition field. In any event, it seems essential to address this issue honestly, rather than hoping for the best where large-scale resources are potentially involved (and losing credibility if they fail to produce impact for reasons as inherently simple as not reaching the needed level of input).

Fortification

Micronutrient deficiencies are the most common forms of malnutrition, affecting at least half the population of the eight countries. Fortification is likely to be the long-term solution, and is at the stage that investment in research is a good bet to bring large returns. The position has some similarities to that of crop-breeding before the green revolution, when excellent gains to far-sighted investment in agricultural research—in part through the Consultative Group on Agricultural Research (CGIAR) system—were achieved. In the country studies supporting research and development in micronutrient fortification represents a promising investment. Probably research in iron and iodine fortification offer the best opportunities at the moment, and these are introduced below.

Iron fortification research is at the earliest stages of the three major micronutrients, certainly presenting challenges, but with enormous potential pay-offs. The issues are substantially technical: how to provide milligram quantities of iron in a bioavailable and acceptable form, with intakes within a fairly narrow range, through foodstuffs that are widely consumed on a regular basis. In most of these respects iron is

a more difficult problem than vitamin A or iodine. Nonetheless, the resources and vigor of the research efforts have been small relative to the problem, and provide a ready made opportunity for new investment.

Iodine fortification of salt is well established and effective, but still the deficiency is common, and the effort remains not fully resourced. A number of incremental supporting actions—community-based monitoring was highlighted earlier—offer good opportunities for effective investment.

Emerging problems: stunting, rickets, and birthweight

Several newly recognized nutritional problems and related opportunities have been highlighted by the country studies. These may have heightened significance in representing topics that the follow-up to the country studies could take a lead in pursuing.

In China there are two unusual observations, which may or may not be related. While underweight prevalences in young children have declined, to the point of near elimination in urban areas, recently this has been due to reduction in the wasting component, and stunting has fallen much less. In contrast, the impact of nutrition programs is reported to be more on stunting. The reasons for these observations are not understood, although a number of theories (e.g., invoking impact of some micronutrient deficiencies on growth) are available. At the same time, China has reported extraordinarily high prevalences of rickets, up to around two years of age. Similar conditions are possible in other countries in the region. The significance goes well beyond growth itself: stunting is generally the measure most associated with survival and child development, and these are the important outcomes to benefit rather than growth per se. Where research in these areas would lead is unknown, but it is possible that these indications reflect some important underlying phenomena that should be pursued. For example, the relatively benign picture of malnutrition trends in China may not be so, if it is really the stunting and its link to child development that we should be considering. What may be happening is an emerging situation of other nutrient deficiencies which should be investigated.

The close link of birthweight and child nutrition, illustrated in figure 1.1, is becoming clearer as research progresses. Recent preliminary findings from Sri Lanka and Bangladesh have linked mild iodine deficiency to lowered birthweight and increased underweight prevalences in children under two years old (as mentioned in chapter 1). If this is confirmed by research now being planned, it has extensive implications for programs: if intrauterine growth is somewhat held

back by mild iodine deficiency (which would not be surprising, but has not hitherto been shown on a population basis), then it is possible that intellectual development is also affected. If this is so, then iodine status becomes a crucial issue during pregnancy over much of Asia, to the point that supplementation during pregnancy (e.g., with multiple supplementa-

tion) may need to be considered until the adequacy of iodine in the salt supply can be guaranteed.

So far results suggest that a substantial impact on underweight prevalence (usually regarded as a measure of general malnutrition, and the prime indicator for nutritional goals) might be achieved by improving iodine status. If confirmed, this would be a further

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