

Chapter 5

Financing and implementing programs

Financial requirements

The country studies from Bangladesh, India, Pakistan, Sri Lanka, Vietnam, Cambodia, and China put forward proposals for strengthened strategies for improving nutrition, usually over 10-year periods, with associated budget estimates [1–7]. These proposed programs were described in chapter 4, and some characteristics were summarized in table 4.3. In chapter 2, gaps in current programs were outlined, with approximations to implied resource needs calculated from assumptions on US\$child/year requirements for impact (see table 2.2). Here these various estimates are brought together and judgements are made on the likely resource needs over the next decade for having a significant impact on child malnutrition. Additional details are in Annex 2.

Applying US\$5/child/year to population estimates for the seven countries gives a requirement of around US\$1300 million per year. Current expenditure figures are not available, but knowing the low coverage and/or intensity of existing programs (see fig. 2.1 and 2.2) it is reasonable to assume that no more than 20% of this sum is currently being applied (except perhaps for India, where it may be somewhat higher). Thus the estimates of overall needs here represent the major part of the requirements. The need estimates by country are given in table 5.1, column B. The calculation based on US\$5/child/year is on the low side, but is probably enough to get into the responsive area of the dose-response curve for resources/effect on nutrition, and provides an ‘in-principle’ basis for estimating financial needs.

The budget estimates from the country studies—based on specific program plans—can be compared with these in-principle estimates, as shown in column C of table 5.1. In Bangladesh the estimates are similar, the program designed to reach full coverage after several years, with an average intensity of US\$5.9/child/year (column D of table 5.1). The report from India proposes both near universal coverage and high intensity (US\$12.0/child/year), thus the budget estimate is considerably greater than one based on the

assumptions in column B; an alternative estimate for the Integrated Child Development Services (ICDS) in India made recently by Measham and Chatterjee [9, p. 45–47] gave a figure of an additional US\$380 million per year over 10 years, roughly doubling the existing expenditure, but less than the figure put forward in the country report. Both Pakistan and Vietnam seem considerably under-budgeted (US\$1.9 and \$0.6 per child/year), and the plans and budgets may need to be reviewed with this in mind. Sri Lanka and Cambodia may have adequate budgets proposed, at US\$5.6/child/year.

The studies supported by the Asian Development Bank (ADB) and the United Nations Children’s Fund (UNICEF) had multiple objectives, which differed by country. The involvement of India and China was primarily for the policy studies themselves, rather than for funding proposals, neither being eligible for soft loans—with a substantial grant element—from the ADB. China’s plans and budget estimates mainly referred to training at the sub-national level, hence are not comparable with the other figures for this reason also. The Philippines study did not lead to proposals for programs and associated funding.

Thus for viewing the resource implications it makes sense to look at Bangladesh, Cambodia, Pakistan, Sri Lanka, and Vietnam, as given in the last row of table 5.1. From the proposals a total of around US\$160 million per year is the estimated need for these five countries; calculated from population data this increases to around US\$250 million per year, which may be more realistic. Micronutrient programs (discussed later) add about US\$30 million per year, to give a total of US\$190 million to \$280 million per year. As noted earlier, the country proposals do not always distinguish new and add-on funding from that already in place or expected. Nonetheless, most of these financial needs undoubtedly represent new funds that would need to be found, from governmental or donor sources. The overall financial picture thus can be broadly sketched out, and should be enough to lead to more detailed country planning. The relation of proposed funding

TABLE 5.1 Estimates of ratios of savings due to reduced malnutrition: program expenditures in tenth year of program, with program budgets as proposed, and with expenditures per child set as US\$10/child/year

A Country	B Calculated from population at US\$5/child/yr (US\$ millions)	C Additional funds needed, US\$/yr		D Intensity (\$/child/yr)	E Calculated losses from malnutrition per year (from country reports, see notes) (US\$ millions/yr)	F Rate of malnutrition reduction at 1.5 pp/yr: 10-year change in prevalence; % reduction	G Cumulated savings from reduced mal-nutrition (US\$ millions)	H Over 10 years		I Savings: expenditure ratio at US\$5/child/yr
		Proposed in country reports						Savings: expenditure ratio (proposed)		
		Total (US\$ millions/yr)	Intensity (\$/child/yr)							
Bangladesh	76	89	5.9	2,300	65% to 50%; 23%	2,645	3.0	3.5		
India	575	1,380	12.0	8,100	50% to 35%; 30%	12,150	0.9	2.1		
Pakistan	119	46	1.9	1,200	40% to 25%; 37%	2,220	4.8	1.9		
Sri Lanka	8	9	5.6	100	30% to 15%; 50%	250	2.8	3.1		
Vietnam	42	5	0.6	465	45% to 30%; 33%	767	15.3	1.8		
Cambodia	8	9	5.6	67.5	52% to 37%; 29%	98	1.1	1.3		
China	489	(15)	(0.2)	NR	NA	NA	NA	NA		
Total	131	1,553								
Bangladesh, Pakistan, Sri Lanka, Vietnam, Cambodia	253	158								

Sources and notes: Column B: additional funds calculated from total child population based on US\$5/child/year. Column C: data from chapter 5 of country reports [1–7]. Column D calculated from child population (1994) and column C. Column E: losses estimated in country reports from PROFILES calculations [8], except Sri Lanka new estimate made in report [6, p. 122–30], and Pakistan where losses re-estimated by comparison with other countries. Column F is based on underweight prevalences for 1995, from table 1.1. Column G is calculated for the underweight reduction rates in column F, i.e., (% reduction * 10 * 0.5*losses (column E)). Column H is the ratio of column G to the proposed budget expenditures over 10 years (= column G/(column C*10)). Column I is the ratio of column G to the expenditures calculated at US\$5/child/year (=column G/(column B*10)).

to potential benefit (as in columns E–I of table 5.1) are discussed in the next section.

Micronutrient deficiency control programs should be added on to local programs, with some additional central functions. The approximate costs are shown in table 5.2. The financial needs were first assessed from standard per capita cost estimates, (see chapter 2, tables 2.4A and 2.4B). In contrast to the community-based programs addressing general malnutrition, for micronutrients the current program coverages are substantial, so it was feasible to estimate gaps in resources (see table 2.5). Some country proposals gave direct estimates for micronutrient programs, in others this was budgeted as 20% of the overall budget. These figures are shown in the last column of table 5.3. By either calculation, the total for Bangladesh, Cambodia, Pakistan, Sri Lanka, and Vietnam is probably around US\$30m/year. This level of funding is such that a very significant impact on iodine and vitamin A deficiencies would be expected with efficient implementation. International goals have been for near-elimination of both these deficiencies, and indeed this is feasible (over ~10 years) with vigorous implementation of well-established methods.

Micronutrient deficiency control should thus be an attractive proposition. Nonetheless, it should be understood that while the nature of micronutrient deficiency control provides for more immediate effects than for general malnutrition, the interventions need to be kept up to maintain the effect, usually by sup-

TABLE 5.2. Estimates of resource needs for national micronutrient deficiency control programs

Country	Unmet needs, from standard costs (see table 2.5) US\$million/yr		From proposals US\$ million/yr
	Vitamin A	Iodine	Vitamin A, iodine, iron total
Bangladesh	1.1	3.2	18
India	18.4	29.9	200
Pakistan	11.4	12.3	5
Cambodia	0.4	1.0	1.8
Vietnam	2.2	2.8	1.6
Sri Lanka	0.8	1.0	1.8
Philippines	1.0	6.3	NA
China	NA	21.5	NA
Bangladesh, Pakistan, Cambodia, Vietnam, Sri Lanka	15.9	20.3	28.2

Sources and notes. Unmet needs are as in table 2.5 (as 'gap'), calculated from standard costs per population, as given in table 2.4B. The estimates from proposals are from [1–7], see also Annex table A2.1.

plementation, fortification, or both. This contrasts with general malnutrition, assessed as growth failure, which when prevented in early childhood maintains the benefit throughout the lifespan.

None of the studies have got to the point that realistic assessments have been possible as to likely sources of finance. In most cases this relates directly to the ADB's role: the financial negotiations will not get real and move beyond the present stage until the ADB and donors begin talks on possible financing. It is too early to consider efficiency questions, until it is known whether the sort of level of finance envisaged here is feasible. (Equity is likely to be adequate, as all the proposed programs are oriented towards the poor.)

In terms of process, it is crucial to avoid the chicken-and-egg position that began to emerge during preparation of the country studies. These studies went about as far as they could prior to serious discussion with donors. More detail on possible financing and financial sources would be generated in a vacuum before these discussions have begun. For now, the link between program costs and potential benefits is introduced below; more details specific to the country proposals are given in Annex 2.

Benefits and costs

Estimating costs and benefits of programs for improving nutrition involves the following steps:

- » formulating a strategy that is expected to reach specified malnutrition reduction goals, and estimating its *costs*;

TABLE 5.3. Estimates of needs for facilitators and mobilizers for national community-based programs

Country	Population (millions, 1999)	No. facilitators ('000s)	No. mobilizers ('000s)
Bangladesh	127	64	1,280
India	998	499	9,980
Pakistan	152	76	1,520
Cambodia	11	6	120
Vietnam	79	40	800
Sri Lanka	19	10	200
Philippines	75	38	760
China	1,267	634	12,680
Total	2,609	1,367	27,340
Bangladesh, Pakistan, Cambodia, Vietnam, Sri Lanka	363	196	3,920

Sources and notes: Population from ref. 14, p. 94. Facilitators and mobilizer data calculated from population data (facilitators:mobilizers 1:20, mobilizers:families 1:20, i.e. mobilizers:population 1:100).

- » estimating current and future losses (primarily in economic terms) from malnutrition; hence calculating the *benefits* (as losses avoided) from malnutrition reduction; and
- » comparing the costs and benefits.

In the country studies, these estimates were made in a variety of ways, with results that are insufficiently consistent to be brought together as they stand. They are given in Annex 2 and summarized in table A2.1. The link that precludes comparison is that, in most cases, the program proposals, with their associated budgets, were assumed to reduce underweight prevalences by 50% in 10 years, but in fact this impact was not related to the level of input in the proposed programs. The benefits were calculated, in all studies except Sri Lanka's, from the default estimates in the PROFILES process [8]. The benefit:cost ratios calculated were around 3 to 6, except for Sri Lanka (for which independent calculations were done) which gave a value of 1.3 (see Annex 2). The values of 3 to 6 are likely to be overestimates because the proposed levels of effort (leading to budgets) are generally not enough to suppose that they really would halve the prevalence of underweight in 10 years.

The estimates of benefit from the PROFILES routine are much the same as those in 'The Economic Analysis of Nutrition Projects' [10, p. 44–7, 87]. This uses standard estimates of the losses due to malnutrition (based on rather scarce data), with the same coefficients applied to all countries. While an approximation, this approach has the advantage of giving some comparability between estimates of losses due to malnutrition.

Some alternative estimates are described here, summarized in table 5.1, columns E to I. The losses from malnutrition given in the country studies (from PROFILES and the World Bank method [10]) provide the starting point (column E); the reduction in malnutrition is then calculated as 1.5 percentage points (pp) per year (column F). From these the accumulated savings, over 10 years, from reduction of the losses due to malnutrition is calculated (column G). The costs proposed in the country reports (column C, times 10 for 10 years) are then divided into the cumulated savings, to give a ratio of the savings to the expenditure over the 10 year period (column G). An alternative estimate, to standardize the program costs at US\$5/child/year, is given in column I. These ratios are similar to conventional benefit:cost ratios, without discounting. In fact, if both expenditures and benefits are discounted the ratios are not altered much—see Annex 2 for an example on Bangladesh, where the benefit:cost ratio becomes greater than 1 after the second year.

These calculations refer to budget and losses from protein-energy malnutrition (PEM). The calculation has many assumptions and is useful mainly to give

some sense of how the numbers stack up. Put another way, it may show that both numbers—losses from malnutrition and costs of effective programs—are of the same order. This may support the argument that tackling malnutrition is likely to be a reasonable investment. The numerator and denominator come from independent calculations, not sharing assumptions, and the answers could have been far different. Given the enormous uncertainty of all the estimates involved (in numerator and denominator) that is probably as far as it is justifiable to go for general malnutrition assessed by growth failure.

Micronutrient interventions are less problematic to assess in this way, at least on the cost side. In terms of losses, the basis again depends on a very few estimates and calculations, hence benefits are uncertain [for examples see 10, p. 68–9, 74–5]. Calculations in the reports from Pakistan, Cambodia, and Vietnam (Annex table A2.1) give high benefit:cost estimates (4 to 34), and it is certainly credible and widely accepted that micronutrient programs do produce extensive benefits at low cost.

It is important nonetheless to keep the probable high benefit:cost ratio of micronutrients in perspective. They cannot substitute for broad interventions aimed at general malnutrition (or PEM). First, micronutrient interventions are substantially local, and require community-based programs to work. Second, their effect is less persistent than for general malnutrition: a child who survives and reaches five years, healthy and well-nourished, will carry these benefits on through life. The same applies to a lesser extent for micronutrients. While cognitive development requires adequate iodine, iron, and probably other micronutrients early in life whose benefit will persist, deficiencies of these, and others like vitamin A, will recur readily if access falls. The interventions need to be maintained. Thus a direct comparison of benefit:cost between general and micronutrient malnutrition can be misleading. This is referred to again in Annex 2 (table A2.3). Third, micronutrients are synergistic with other interventions—through appetite, resistance to infection, catch-up growth, and so on, and therefore interact with broader programs.

A combination of interventions is needed for an effective strategy, and thus single benefit:cost calculations would tend to underestimate value. This means addressing micronutrients and general malnutrition as part of the overall effort.

The point was made earlier that the relation of costs to benefits was likely to be non-linear, and that if this is so the benefit per cost is likely to be reduced if too few resources are applied (if it is linear the *ratio* will remain the same, even if the impact is small). Thus at present it is particularly important to establish whether the right *level* of resources is being suggested. The budget seems too low to expect much impact in

the proposals from Vietnam and, probably, Pakistan, and these should be reviewed. The others (except India) are on the low side, but other aspects of design would probably warrant review prior to reassessing the budget.

In practice, investment projects for nutrition prepared in the region have recently given broad judgements on likely cost-benefit. For instance, the World Bank's Bangladesh Integrated Nutrition Project Appraisal Report justifies the investment thus: "Improving nutritional status of women and children is a critical objective of national development, without which the investments made by GOB, IDA and other development partners, in health, family planning, education, and women's development are unlikely to yield their full benefits" [11, p. 11]. Later, in the financial section, benefits are given qualitatively, costs in some detail (including the estimate of US\$10.37 as the unit cost per beneficiary screened and counselled); but for the benefit to cost, the only number quoted is ascribed to UNICEF: "A recent estimation by UNICEF based on productivity gains and on savings due to reductions in morbidity and mortality puts the benefits of a successful nutrition program at US\$6.92 for every dollar spent on it" [11, p. 34–35]. (Presumably this too is from PROFILES.) As another example, the Early Child Development Project in the Philippines does not estimate cost:benefit as such. Internal rates of return for education are assessed and found acceptable (more than 15%). Overall, "...for health and nutrition interventions, the net present value of wage gains for children benefitted by the project will increase from Pesos 9 billion to Pesos 30 billion" (1 US\$ = 50.85 pesos)[12, p. 17, 61].

In other words, even with full preparation of major investment projects use of benefit:cost ratios for nutrition interventions is not a central feature, and softer criteria are used. All these types of calculations tend to show very large ratios—so much so that almost any modification is still going to come out well above one. For India the point was made simply by Measham and Chatterjee: "When one considers that the cost of malnutrition in lost productivity, illness, and death is at least US\$10 billion annually, the cost-benefit ratio of these investments is readily apparent" [9, p. 47].

Other ways to measure benefit are available, and at some later stage may be worth pursuing. For example, nutrition as a general preventive public health measure has an extensive estimated benefit in terms of the global burden of disease estimates. Malnutrition as a risk factor for mortality and morbidity, both as growth (underweight) and micronutrient deficiency is beginning to be estimated in this way. Overall at least 18% of the burden of disease in developing countries is attributed to malnutrition as a risk factor; for Asia a reduction of more than 25% in the burden of disease, calculated as loss of disability adjusted life years,

(DALYs) would be likely to result from elimination of growth failure, with further additions from reducing micronutrient deficiencies.*

Steps to implement policies and programs for the next 10 years

The country studies have put forward two complementary types of approach, both needing support. *First, local programs through community organizations, with input from facility-based resources, must be massively expanded. Second, micronutrient deficiency control programs must be sustained and new approaches (including multiple micronutrient fortification and supplementation) researched and adopted; these are often linked to the local programs, but have central features as well.* Making the decisions to undertake these actions, and to support the steps leading to their successful planning and implementation, thus constitute the major recommendations here.

Decide to massively increase support for local programs

Nutrition programs presently cover a fraction of those in need, thus a huge expansion is a pre-condition for making significant inroads into the problem. It is known that programs can have this impact under the right conditions. A decision-in-principle to support an expansion of this magnitude, with appropriate intensity of resource application and concern for the most effective program content and organization, is thus an early necessary step. This no doubt will take into account resource implications, within which finance and personnel and training needs will be central, and the investment will need to be phased in.

Community-based programs require high proportions of local workers (often village volunteers, with minimal remuneration, known as mobilizers), and of staff (known as facilitators), employed by government line agencies or non-governmental organizations (NGO), to supervise and support these. The ratios used here are 1:20 of facilitators:mobilizers, and 1:20 of mobilizers:families; this latter is taken to be 1:100 population (1:120 would be more accurate on average). These ratios are for volunteer workers (based on Thai experience), and would be higher for full time workers; they would also depend on remuneration and employment policies. Based on the ratios given, the numbers of people who would need to be trained, motivated, and supported as mobilizers totals 3.9 million for Bangladesh, Cambodia, Pakistan,

* Overall data are given in [13], based on unpublished calculations by Mason, Habicht, Musgrove and Watson, 1996, which also gave the estimate of 25% for Asia.

Sri Lanka, and Vietnam (table 5.3). Bearing in mind that Thailand trained and recruited 500,000 people in this way, the number (1% of the population) has some precedent. Still, it is very substantial and the effort implied would indeed be unprecedented in these countries. For facilitators the overall numbers are also given in table 5.3, amounting to 196,000. A number of these are already working in the countries. An expansion in numbers, (re)training, and support are indicated. Their salaries constitute the major part of the estimated budgetary requirement. The question of remuneration of mobilizers—whether they should be volunteers or paid workers—remains open and needs to be resolved by trying out different approaches as programs develop. An attempt is under way to do this in the Early Child Development Project in the Philippines, supported by the ADB and World Bank.

Supplies and organization at the local level are required for community-based programs (table 4.2), which need input from more central administration.

The training of the village workers and their supervisors (facilitators) would be a major effort, requiring capacity-building of national (and perhaps regional) institutions. Personnel, materials, and procedures, would need to be developed. Launching an effort of sufficient magnitude will require resources and careful planning. Identifying the appropriate institutions will be crucial. Commonly, the institutions that can plan, launch, and support such actions are different from the line agencies or ministries [15, p. 83] responsible for service delivery.

Sustain and increase support for micronutrient programs

A balanced approach should address both micronutrient and general malnutrition interventions, the latter mainly through community-based programs. Micronutrient interventions should form an important part of the investments considered here. They are well within the category of those where the knowledge and decisions to proceed are in place, and additional resources can be successfully applied.

Most countries have policies decided, and programs under way, to address iodine deficiency through reaching full coverage with iodized salt; and vitamin A deficiency through distributing capsules to preschool children and mothers within one month of delivery. These programs need to be sustained and brought to, or kept at, universal coverage. For iodine, this must be permanent. For vitamin A, the programs are needed until there is no further need with successful increase in vitamin A intakes from fortified commodities—and these two approaches need to be phased together carefully. Research and development of vitamin A fortification, then implementation, should be a high priority.

Research and development for iron fortification is urgently needed. Meanwhile, supplementation should be sustained, e.g., with antenatal care. Multiple micronutrient supplementation during pregnancy, which includes iron, must be tested and established as rapidly as feasible.

These efforts will require adequate finances, capacity-building in the countries concerned and possibly regionally, and momentum to build on the substantial progress made in most of the countries in the 1990s.

Analyze capacity to define gaps and needs

The means of implementation must be to support and build the capacity of countries to carry out these programs, filling resource gaps as appropriate. This involves finding out where the difficulties in meeting the needs lie. This can be seen in a human rights or a governance perspective: the questions concern who can, may, and should take action, starting at the household level. UNICEF has put this forward in terms of analyzing capacity [16]. However formulated, the process is to decide who needs to be supported, and how, to bring about the needed changes. Concretely, the next steps in this process must build on the country reports and on considerations such as put forward here, to identify the key points of intervention. Support for local programs, and for micronutrient deficiency control measures, have been suggested as the main priorities.

Policy dialogue and supporting policies to affect context

Programs can be effective under the right conditions, and these conditions relate to fundamental causes—like social exclusion and women's status. These can be affected by policy decisions and their implementation. In the process of negotiating investment from international financial institutions in nutritional improvement, the basic requirements underpinning programs may prove feasible issues for modification. At the same time, the simple but crucial decisions to actually commit resources and implement the programs themselves must be made.

Beyond context, the concurrent existence of key programs must be fostered. Poverty alleviation facilitates nutrition improvements in two ways. First, the programs provide household resources for improving nutrition. Second, poverty alleviation program organization can provide the structure, outreach, and individual contact that nutrition activities can build on: this is the case in China and Sri Lanka where the poverty alleviation organizations provide the best prospect of extending and supporting local programs.

Direct effects of improvements, such as in education, particularly for women, and in water and sanitation,

have far-reaching effects on nutrition—usually these factors are associated with child growth, although the precise relations vary and need to be seen in specific circumstances (for examples see chapter 3). Nutrition considerations may help to target these. More contentious is the prospect of re-orienting resources currently used wastefully, ostensibly with nutrition aims, towards positive benefit. This refers primarily to the resources used for food subsidies and public food distribution programs. The resources spent on these are nearly enough, in some countries, to finance much of the local programs for nutrition, if they could be reallocated. This applies most clearly to the food subsidy programs in the Philippines, as well as to the public (food) distribution systems in South Asia.

Taking and implementing many of these decisions, by governments, international financial institutional, and agencies, are prerequisites for reducing malnutrition.

Meeting program needs

Implementing programs, when resources are committed, will take a number of practical steps. To summarize, the needs will be:

- » Organization: programs depend on local organization and decentralization of resources and decision-making; fostering community level organizations, by assigning budgets, legislation, and other means;
- » Training: the effort envisaged for training village level workers, and their support, is extensive, and will require multilevel structures for training, materials, incentives, supervision;
- » Bringing all this into being has requirements which can be specified as: advocacy and social mobilization; information; education; training; and support for service delivery;
- » Mobilizing resources: direct financial inputs will be required, especially for the large numbers of village workers and their facilitators who will need incentives and remuneration, likely beyond the capacity of communities and governments; for external finance, negotiations as to type and level will be needed, in conjunction with reallocation of governmental resources.

This is discussed further in Box 1.

Solve generic issues for planning and program design

A number of issues that affect all potential programs remain to be resolved, and being of general application can be approached generically. Most involve research that should be undertaken at an early stage, which would represent sensible investment in terms of more effective programs in the future. Some of the salient

issues are outlined here, based on the discussion in chapter 4.

The criterion for applying resources to a problem is to do so in such a way that the population can respond and the problem is alleviated. In nutritional terms this means identifying better which population groups can respond to which type of intervention. For example, behavioral change—child feeding practices, for instance, may not be possible by some methods in some groups, and this needs to be better defined or ineffective programs will be designed. A similar issue concerns defining the contextual factors and how these can be changed by policy, in relation to possible programs. These issues can be researched and guidance provided for country program design.

More specifically, knowledge of the relative roles and cost-effectiveness of different community- versus facility-based activities is not well laid out. This could be improved from compilation and synthesis of current knowledge. Of general application, such research would be most useful in advance of detailed program planning. In addition, the relative effects of using resources for supplementary feeding, compared with using the same resources for behavioral change, could also be worked out as a generic issue.

The question of remuneration of village level volunteers (mobilizers) is crucial, and needs study in a range of conditions. Some of this can be based on examining experience to date (e.g., in China, India, Indonesia, and Thailand). Interventions underway in Bangladesh and the Philippines (Early Child Development) aim to provide new data to compare volunteers with waged workers.

Population growth in Asia is in the cities and towns. As a result, the malnourished are found increasingly in urban areas. Yet most planning for improving nutrition refers to villages and rural communities. Research is needed on the most effective means to improve nutrition in urban areas, and to the extent that these have common features and problems, this research can be generic. We need to focus on nutrition-relevant programs and their evaluations from the cities, as well as understand the parallels with rural programs, especially regarding the appropriate forms of local organization.

The relationship of level of effort (for various activities) to impact needs to be understood better. This is likely to be non-linear, which as discussed earlier means that applying too low a level of resources is wasteful: the problem will not simply be solved more slowly, rather it will not be solved at all until a sufficient resource level is reached where change occurs. This has enormous implications for planning investments, and needs to be researched.

Finally, a number of technical issues need research, of which fortification is the clearest concern—most urgently iron fortification of staple foods. In more

Box 1. Synergies among nutrition, health, and education

Improving nutrition is not an isolated intervention, since the pivotal issue is how investments can produce better students and more productive citizens. Child nutrition is an essential element in human development, and is best improved in the context of coordinated investments in primary health care, early and basic education. Synergistic benefits include:

- » Nutrition impacts on health through immuno-competence and stronger resistance to life-threatening infection;
- » Health impacts on nutrition because reduced illness leads to weight and height gain;
- » Nutrition and health improve psychosocial development and learning through better psychomotor skills and socialized vitality; and
- » Well-nourished children who attend preschool are better socialized as preschoolers, less likely to drop out of primary school, adjust better to the social and academic environment of school, and do better especially in the early grades.

Two longitudinal studies in the INCAP villages in Guatemala (20 years) and Cebu, Philippines (15 years) provide evidence that the consequence of early childhood stunting is lower IQs, achievement scores, school attainments as teenagers, adult literacy, and wages. There were also behavioral effects such as poor attention and school performance, and poor interaction with adults. Conversely, early complementary feeding for undernourished children under two years of age (for about a year) has long-lasting benefits which reverse the intergenerational cycle of growth failure to a positive outcome and a hopeful future for poor children. The INCAP study showed improvement in IQs, achievement scores, adolescent intellectual performance, adult literacy and wage effects.

Benefits from integrating nutrition into early childhood development programs

A Global Conference on Investing in Young Children held in Atlanta, Ga, USA in April 1996 concluded that investment in early childhood is sound and linked to improved educability of children and ultimately to improved productivity of the labor force. Through investments in early childhood, human development is enhanced and contributes substantially to sustainable economic growth. Early childhood development (ECD) programs focus on the preschool years and integrate interventions in child health, nutrition, and early education (addressing both cognitive and psychosocial needs).

The Conference concluded that there are five good reasons for investing in young children.

- » Well-developed children will be more productive and contributing citizens.
- » Early childhood investments can reduce costs and improve the efficiency of primary and secondary schooling.
- » Investments in ECD can modify inequalities rooted in

poverty and social discrimination, including gender discrimination. Studies from diverse cultures show that girls who participate in early childhood programs are more likely to attend and continue in school.

- » Improvements designed to benefit children in terms of sanitation, health, nutrition, and education often benefit the whole community and allow mothers to pursue earning and educational goals.
- » Scientific research demonstrates that the early years are critical in the development of intelligence and most of the child's potential is developed by age four. The impact of ECD investments on personality and behavior is long lasting.

Successful early childhood programs integrate the needs of mothers and preschoolers

- » They support social mobilization at the community level, using variants on the Triple A process made famous globally by UNICEF, and sustained through partnerships with local governments. Countries that have applied the community model, like Thailand, have reduced underweight malnutrition sustainability. The best results come from linking service delivery providers, know as facilitators, to community nutrition workers, know as mobilizers, and to community-based organizations.
- » They integrate nutrition with appropriate child care and primary health care for better results. Even better, programs for preschoolers that integrate child health, nutrition, psychosocial and cognitive development are very successful in reducing school dropouts and preparing children for life. These are among the most cost-effective interventions in public health, and the payoffs are healthier and better adjusted children, who grow into productive adults.
- » They design community programs to systematically focus on nutrition for mothers and children under two years of age to avert low birthweight, growth faltering, and stunting. Interventions to support these two critical groups are antenatal care, safe delivery, breastfeeding promotion and protection, growth-monitoring and promotion, targeted nutrition education for mothers of at-risk infants, and targeted maternal and complementary feeding with age-appropriate, energy-dense foods and interactive emotional and cognitive stimulation during frequent feedings.
- » They sustain health and nutrition status of 3- to 6-year-old children, while providing early education through home-based care (and center-based services, if affordable) to enhance language acquisition, social skills, and communication, all of which predict the level of reading achievement in the early primary grades; and
- » They provide an "ECD-enriched" curriculum in the early primary grades to ensure the child is ready for schooling and the school learning environment can adjust to the child with special needs.

general terms, it was stressed earlier that there are situations where what to do is not clear, thus research is essential. Fortification with iron is one such issue. Multiple micronutrient supplementation in pregnancy is another, which can now build on recommendations from WHO and UNICEF [17].

Looking 10 years ahead

This review leads to extensive proposals for finance, and even more for recruitment and training of millions of people. Better nutrition and development for children is a powerful outcome objective, with implications for society and development overall. But the process proposed is important too. What will change and what will be in place in 10 years if these recommendations are adopted, financed, and implemented?

Most communities would have a structure of trained local workers—‘mobilizers’ in villages and urban areas—and supervisors in direct contact with families, helping to solve nutrition and health problems, raising better children, and assisting with community development, supporting women, and providing a range of benefits. Programs should be multi-faceted at the local level, and although the structure might start (at least here) with nutrition as a main concern, the

benefits would be wider still. In particular, problems of social exclusion, discrimination by class and gender, would have some counteracting forces.

For individuals, specific nutritional problems would be well on the way to solution. Micronutrient deficiencies would become a thing of the past: goiter and iodine deficiency would vanish, vitamin A deficiency would no longer be visible and sub-clinically would be much reduced. Anemia would likely be in retreat with successful fortification. Pregnant women, in particular, would get regular multiple micronutrient supplements. Low birthweight and early child growth failure, and associated sickness and death, will be reduced—the next generation will be larger, healthier, benefit more from education, and become smarter and more productive.

The intergenerational perpetuation of malnutrition will have been cut into, and a process of steadily improving pregnancies and child survival and development promoted. Human capital, development, and rights will all benefit.

In fact, governments have committed themselves to this scenario already: the Convention on the Rights of the Child enshrines the agreement of governments to vigorously support such a process. Adopting these measures will be a significant contribution to meeting governments’ obligations to implement the Convention on the Rights of the Child.

References

1. Institute of Nutrition and Food Science, and Department of Economics, University of Dhaka, and Dhaka Urban Community Health Program. Strategies for Bangladesh. Mimeo. Manila: Asian Development Bank, February, 1998.
2. Government of Cambodia. Cambodian nutrition investment plan. Mimeo. Manila: Asian Development Bank, May, 1998.
3. Administrative Staff College of India. National strategy to reduce child malnutrition; Investment plan. Final report. Mimeo. Manila: Asian Development Bank, December, 1997.
4. Applied Economic Research Centre, University of Karachi. Final report. Pakistan country strategy paper on programmes and investment strategies to reduce the incidence of child malnutrition in Pakistan. Vol. I and II. Mimeo. Manila: ADB and UNICEF, May, 1998.
5. Asian Development Bank. China study on strategies for reducing child malnutrition. Report for ADB-UNICEF RETA project. Mimeo. Manila: Asian Development Bank, November, 1998.
6. Government of Sri Lanka. Vitamin A deficiency and selected world summit goals for children in Sri Lanka. Mimeo. Colombo: Ministry of Health/Medical Research Institute/UNICEF, March, 1998.
7. Government of Viet Nam. Investment for child nutrition in Viet Nam. Mimeo. Hanoi: UNICEF, December, 1998.
8. Ross JS. PROFILES guidelines: Calculating the effects of malnutrition on economic productivity and survival. Mimeo. Washington, DC: Academy for Educational Development, 1996.
9. Measham AR, Chatterjee M. Wasting away. The crisis of malnutrition in India. Washington, DC: World Bank, 1999.
10. Phillips M, Sanghvi TG. The economic analysis of nutrition projects. Washington, DC: World Bank, 1996.
11. World Bank. Staff appraisal report, Bangladesh Integrated Nutrition Project. Population and Human Resources Division, South Asia Region. Report No. 13193-BD. Mimeo. Washington, DC: World Bank, April, 1995.
12. World Bank. Project appraisal document, Early Child Development Project. Health, Population and Nutrition Sector Unit, East Asia and Pacific Regional Office. Report No. 17176-PH. Mimeo. Washington, DC: World Bank, February, 1998.
13. Murray C, Lopez A. Global mortality, disability, and the contribution of risk factors: global burden of diseases study. *Lancet* 1997;349:1436–42.
14. UNICEF. State of the world’s children. New York: Oxford University Press, 1998.
15. Gillespie S, Mason J, Martorell R. How nutrition improves. Based on an ACC/SCN workshop on “Nutrition-Relevant Actions in Developing Countries—Recent Lessons” held at the XV IUNS Congress, 25–27 September 1993, Adelaide, Australia. Geneva: ACC/SCN, 1996.

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16. UNICEF. Towards a new programming approach for UNICEF in ESAR. UNICEF Regional Office for Eastern and Southern Africa. Mimeo. Nairobi, Kenya: UNICEF, 2000.
 17. UNICEF/WHO/UNU. Report of a workshop on composition of a multi-micronutrient supplement to be used in pilot programmes among pregnant women in developing countries. New York: UNICEF, July 1999.