

# **Attacking the Double Burden of Malnutrition in Asia and the Pacific**

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*with contributions from*

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The ADB Nutrition and Development Series, begun in 2001, covers the impact of malnutrition in Asia and the Pacific on poverty and depressed human and economic development. The Series stresses three themes: targeting nutrition improvements at poor women and children, with benefits to families, communities, and nations throughout the life cycle; reviewing and applying scientific evidence about nutrition impact for policies, programs, and developmental assistance that will raise the quality of human resources; and creating opportunities for public, private, and civil sector partnerships that can raise the dietary quality of the poor, and enhance the learning and earning capability of poor children. The Series is intended for ADB member countries, development partners, and scholars interested in applying science and technology to investment decisions.

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# FOREWORD

Malnutrition is both a cause and a consequence of poverty. Overcoming malnutrition is integral to liberating Asia's poor from a shortened life replete with illness, disability, and diminished capacity to learn and earn. Indeed, human development, social equity, and poverty reduction in Asia and the Pacific cannot be achieved without improving nutrition.

The pay-off to turning the tide of malnourishment is immense. Reducing malnutrition improves intellectual capacity, raises productivity and lifetime earnings, and frees private and public health care expenditures to meet other urgent needs. While no economic analysis can fully capture the benefits of sustained mental, physical, and social development, we know with certainty that long-term, sustainable, poverty-reducing economic growth is simply not possible without improving nutrition.

This book represents the first comprehensive assessment of nutrition in the region with the largest concentration of global malnutrition. The product of a two-year collaborative effort between the Asian Development Bank (ADB), International Food Policy Research Institute, and other partners, it sheds light on the emerging "double burden" of underweight and overweight malnutrition, and the linkages between them. And it provides clear evidence-based options for practical and affordable remedial action in different contexts.

We now know a lot more about what works, where. But the first step is to understand the nature of the problem. The book summarizes the prevalence, consequences, and causes of the main nutritional problems in Asia and the Pacific, and then turns to solutions, starting with the evidence on efficacy, and the actual effectiveness and impact of nutrition programs. The book stresses indirect actions that improve nutrition, including investment in poverty reduction, agriculture, women's development, microfinance, housing, and infrastructure. There is a useful summary of demographic, social, economic, political, and cultural factors that determine the feasibility of specific nutrition-relevant actions.

What sets this book apart, for the development community, is the clear link between evidence on what works to implementation strategies.

It also considers how to bring about necessary changes—in terms of resources, capacity, policy, and institutional arrangements—for effective implementation of appropriate policies and programs. The rationale for public investment in nutrition is justified because of market failures that make public sector intervention necessary. The book concludes with recommendations for direct and indirect actions that derive from the needs of countries, and suggestions on how development agencies, such as ADB, can support these actions.

The evidence and experience brought together in this book provide a powerful arsenal for our struggle to break the vicious life cycle of malnutrition and poverty. We hope that this material will be used widely by our development partners in this region and beyond. Asia is the crucible for eliminating malnutrition and raising the hopes of humanity.

Tadao Chino, President  
Asian Development Bank

Per Pinstrup-Andersen, Director General  
International Food Policy Research Institute



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# EXECUTIVE SUMMARY

## A MASSIVE PROBLEM WITH DIRE CONSEQUENCES

The concentration of malnutrition in Asia is greater than anywhere else on Earth. One in three preschool children is stunted, rising to one out of every two children in South Asia. If the prevalence is disturbing, the numbers are shocking. Seventy percent of the world's malnourished children reside in the region. This includes low birthweight babies, and underweight and stunted preschoolers. Also, three quarters of all micronutrient-deficient persons live in Asia: vitamin A, iodine, and iron deficiencies cause preventable deaths and brain damage to children and adults, and impede learning throughout life.

The continent is extremely heterogeneous—culturally, politically, and economically. The countries of South Asia are the poorest; those of East Asia, less so. There are several small but influential high-income states as well as a cluster of small islands in the Pacific. The face of malnutrition is different in each of these countries and regions. In some regions it is characterized by undernutrition, in some by overnutrition. In an increasing number of areas it is characterized by both. This is the double burden that Asia now faces.

Malnutrition occurs at all stages of life. In the areas marked by high undernutrition, malnourished women or adolescent girls give birth to babies who are born stunted and thin. These children do not experience much catch-up growth in subsequent years. They are more likely to get sick; they enter school late, they do not learn well, and they are less productive as adults. As adults, they are also more likely to suffer from the diet-related diseases that were formerly thought to be associated with increasing affluence such as diabetes, coronary heart disease, and hypertension. Undernutrition is thus also a terrible time bomb that paves the way for overnutrition later in life. Moreover, babies born to such underweight and/or stunted women are themselves likely to be underweight and/or stunted. In this way, undernutrition is handed down from one generation to the next as a grim inheritance. And so the cycle turns.

Combating malnutrition is a mandate for the region because Asian and Pacific nations have endorsed both the World Summit for Children goals and the International Development Goals, which target reduction of maternal and child mortality and rising education levels. Malnutrition at current levels will negate both goals.

## HIGH AND PREVENTABLE COSTS OF MALNUTRITION IN ASIA

In the region where malnutrition has the most devastating impact on quality of life and economic growth, this is the first assessment that has quantified the various costs of the different forms of malnutrition

One massive cost is the loss of young lives. Nearly three million preschool children from nine low-income Asian nations die every year. Over half of these deaths are due to undernutrition. Reducing vitamin A deficiency improves survival of young children by up to 23 percent and costs as little as 50 US cents per child per year. Some 65,000 Asian women die every year in childbirth due to anemia.

Averting such preventable mortality is not only an ethical imperative, it is an economic one. Economic losses to nations derive from the enormous drain on people's productivity and educability. Malnourished adults have lower work output in physical labor than better-nourished adults, earn less at piecework jobs, are less productive, and are less likely to be hired as daily wage labor. A country like Bangladesh loses three billion dollars each year as a result of lower productivity and treatment costs due to malnutrition. Sustained elimination of micronutrient deficiencies alone could increase a country's GDP by up to 5 percent, at a cost of less than 0.3 percent of GDP. Sustained poverty reduction without nutrition improvement is inconceivable.

With regard to education, children—particularly girls—malnourished during the first two years of life are less likely to enroll in school than their well-nourished peers, and if they do enroll, have worse educational performance. Universal salt iodization can eliminate the severe mental retardation associated with iodine deficiency, and adds as many as 14 IQ points, on average, to every person in a country, thus contributing to higher returns on investment in education.

### CONCERTED PUBLIC ACTION IS ESSENTIAL

Public action to reduce malnutrition is both a moral imperative and an excellent investment. Reductions in malnutrition improve intellectual capacity, raise productivity and lifetime private earnings, and reduce private and public health care expenditures in ways that reverberate throughout the life cycle. The potential gains are massive. No economic analysis can fully capture the benefits of such sustained mental, physical, and social development.

Nutrition-fuelled growth promises to reduce income inequality and accelerate poverty reduction. Investing in nutrition is one of the most effective and sustainable pro-poor economic growth strategies.

### SOLUTIONS EXIST

First, the evidence is clear, economic growth will absolutely not be enough to make a significant dent in malnutrition rates. Historical growth rates for the region, if maintained, would lead to malnutrition reductions of just one third of the international goals for 2020. Direct nutrition interventions supported by pro-nutrition indirect actions are essential. This book distils the key findings of an exhaustive review linking evolving knowledge of intervention efficacy with large-scale programmatic effectiveness—the first time this has been done.

Much is known about how to combat the different forms of malnutrition in the region, and interventions produce benefit-cost ratios that are competitive with other investments: in the range of 4 to 8. When discounted at the more appropriate social-sector rate of 3 percent, the benefit-cost ratios are much higher.

The menu of effective direct action is clear. For children, this includes growth promotion, comprising growth monitoring, protection, and promotion of breastfeeding, and the promotion of appropriate complementary feeding practices; disease management, including feeding during and after diarrhea and oral rehydration therapy; micronutrient supplementation including vitamin A megadoses for children from 6 months of age, and possibly iron supplements where anemia is prevalent; the promotion of consumption of iodized salt; deworming; and targeted food supplementation, where found to be relevant, feasible, and cost effective. For women,

activities within ante- and postnatal care strategies comprise tetanus toxoid immunization, micronutrient supplementation, including iron and folic acid tablets for pregnant women, and possibly a postpartum vitamin A megadose where vitamin A deficiency is known to be a problem; iodized salt consumption; food supplementation during pregnancy; malaria chemoprophylaxis in endemic areas; and reproductive health education, including the need to delay conception until after adolescence and ensure safe birth intervals.

Adequate care is of fundamental importance. Psychosocial stimulation is but one of several caring practices that have been increasingly recognized as key child development strategies. Integrated early childhood care and nutrition interventions including, for example, simple messages for parents on how to facilitate psychological development; the promotion and support of home-based, group child care; parent education courses; and breastfeeding support groups, have been shown to be effective.

But this is just the menu. The particular choice of interventions is context specific, deriving from an understanding of the nature, distribution, and causes of the problem and the existing context, including infrastructure, resources, and capacity for implementation. Some prioritizing will be required initially with regard to population target groups and the mix and phasing of actions. Under-two-year-old children and pregnant women are priority groups. As well as targeting, significant coverage is required to achieve large-scale impact. And intensity—or the concentrations of resources or person-power per unit target group—is a fundamental issue, albeit often neglected. Many programs have failed in Asia because, in going for coverage without the requisite degree of intensity, they are effectively “spread too thin” for impact.

Success in Asia has been demonstrated where community-based programs are linked operationally to service delivery structures, which are often village-based primary health care outlets. Government employees at such levels may be oriented to act as facilitators of nutrition-relevant actions that are coordinated and managed by community-based mobilizers, often volunteers selected by local communities. The mobilizer-facilitator nexus should be supported and managed by a series of organizational structures from the grassroots to national levels, and underpinned by broad-based social mobilization and communication strategies. The experience of Thailand is a powerful reminder of what can be done: here, dynamic partnerships of national and local governments with communities were forged within a poverty reduction rubric. Through such sustained, broad-based support to focused community action, Thailand achieved unprecedented declines in child underweight rates, year after year, for most of the last two decades—gains that proved resilient to the recent financial and economic crisis.

Many lessons learned relate to the way things were done, not what was actually done—more “how” than “what.” Both process and outcome orientations have merit over different time spans, but for maximal long-term sustainable impact they need to be integrated. Community ownership and empowerment are fundamental to success, both with respect to means and ends.

Context is important. The shifting backdrop of macro-level forces—social, economic, political, cultural, and technological—determine the environment in which the basic causes of malnutrition operate. Many of these dynamics are enabling, such as decentralization and democratization; many are disabling, such as the HIV/AIDS pandemic.

Why then, does malnutrition persist in the region? One major reason is that not enough resources are put into such interventions. For financing direct actions, rough estimates presented in this report suggest that the cost of meeting the unmet

direct nutrition needs of children in the region is equivalent to 5 percent of current public-sector health budgets. The diversion of resources from less-effective food assistance programs through improved targeting toward direct nutrition programs would have a strong impact on the current generation of infants, and on the infants they themselves will eventually parent. Moreover, the shift from a curative public health approach to a pro-poor public nutrition approach based on prevention and promotion, will have a major enduring impact.

But more than extra financial resources are needed. Sufficient levels of technical and managerial capacity are also identified as key constraints. A recent study found that only 18 percent of World Bank health, nutrition, and population projects underway during the 1990s achieved their institutional development objectives. Failure to take capacity development seriously usually results in failure to achieve or sustain results. A fundamental component of capacity is the ability to gather and use relevant, timely information to improve decisions and actions. Greater priority needs to be attached to building and supporting decentralized management information systems that transparently track both processes and outcomes. In addition to better monitoring, there is an urgent requirement for better evaluations that encompass the myriad benefits of improving nutrition over different time spans. In order to achieve these changes, support needs to be channeled toward strengthening policy-program-research-training networks, grounded in apex nutrition-relevant institutions at the national and regional levels.

Finally, with regard to problems of overweight—the other burden—there is an urgent need to pilot program and policy initiatives aimed at combating diet-related noncommunicable diseases. Development of food and nutrition and health policies for countries where problems of dietary excess and deficit exist side by side represents a new and pressing agenda. Currently, efforts are being made in the preparation and use of food-based dietary guidelines, although less has been done systematically to promote consumption of a healthful diet. Pilot programs in the area of behavior change need to be developed and evaluated for effectiveness and cost effectiveness.

#### NEED FOR A NUTRITION-FRIENDLY POLICY ENVIRONMENT

In themselves, direct interventions will not be enough, at least not in the long term. The multifaceted nature of malnutrition means that it may be effectively addressed only when several sectors and strategies are brought to bear. Combining improved infant feeding, better household access to food, and improved and more accessible health services and sanitation is more effective than any of these measures taken alone in reducing malnutrition where food, health, and care are all problems. Given the well-documented synergies between many such actions, the combined effects are often not merely additive, but multiplicative.

Moreover, benefits may be mutual. Attention to nutrition in the design of policies and programs that impact on some of the more basic causes of malnutrition will also have direct pay-offs for these sectors. A well-nourished population is better able to learn, and is more productive and healthier. It is thus important for policies and programs that can indirectly affect malnutrition to do so in a positive manner. Agriculture and agricultural research, aside from their important income-generation impact, can have a large positive effect on nutrition through productivity increases that lower the price of micronutrient-rich crops and on efforts to improve the bioavailable micronutrient

content of cereals and other essential foods. Food price policy can also be used to influence dietary shifts away from fats and added sugars.

Policies to promote the status of women and protect their economic, social, and political rights are key to more informed decisions about the age of first marriage, fertility, food allocation within the household, the provision of care to infants and mothers, and the accessing of education and health care systems for female infants and children. Health, water, and sanitation systems must be relevant, accessible, affordable, and of adequate quality. Legislation that is nutrition focused and enforceable is critical to efforts to establish food fortification systems that serve the malnourished and to efforts to promote exclusive breastfeeding.

### WHAT DEVELOPMENT PARTNERS CAN DO

What then are the roles of development organizations such as the Asian Development Bank?

First, there is a need for development partners to provide sustained support for appropriate policies and programs aimed at attacking the double burden of malnutrition in Asia and the Pacific. The size of the problem and its massive consequences demand this. But there is another justification: applied science has clearly demonstrated what works and why in different situations, so that a strong regional impact is likely if this knowledge is brought to bear in the form of concerted nutrition-relevant policies and programs. Development partners, including ADB, can use the above menu for action, linking indirect and direct options with levels of in-country capacity as starting points in assessing their specific roles in policy and program support.

Second, development organizations should promote the formation of strategic alliances between and within countries—with communities in agriculture, health, education, governance, trade, and infrastructure—so as to enhance the effectiveness of regional support to nutrition-improving country processes. New forms of subnational partnership are required, including partnerships between local governments and community organizations, which worked so well in Thailand, between governments and civil society, and between the public and private sectors, particularly with regard to micronutrient fortification.

Third, ADB and its partners can make a powerful contribution through advocacy and support for national ‘nutrition champions’ who actively engage in the policy-change and public-sector-reform processes. The crux of a new advocacy strategy should be that the widely endorsed International Development Goals on poverty, education, and health *cannot* be achieved and sustained without a concerted attack on the pernicious life-cycle effects of different forms of malnutrition. There has to be better recognition of the fact that advocacy is not just information dissemination. A greater understanding is required of the values, interests, beliefs, and goals of all stakeholders, including those of nutrition actors themselves. Only through such a better understanding of the political economy ‘black box’ will the opportunities for positioning nutrition effectively in the new development arena become apparent.

Fourth, capacity development should be integral to country support, not something tacked on as an extra component. The review of nutrition-relevant capacity in this book has led to clear recommendations for development partners. The traditional project cycle, predicated as it is on the assumption that solutions to known problems can be fully determined at the outset and that projects can be fully designed, costed in advance, and successfully implemented to a fixed timetable, is not well

aligned with a learning-by-doing approach that is the foundation of true capacity development. Ongoing decentralization processes further back the need to provide more flexibility in planning.

Fifth, and related to capacity, monitoring and evaluation system development needs prioritizing. Key data empower decision makers—from the mother discussing her child's growth that month, to the government official in the planning commission weighing the costs and benefits of different options. Processes as well as outcomes need to be tracked, and the strengthening of such processes viewed as a fundamental indicator of both quality and sustainability. One such process indicator would be the degree to which capacity gaps identified in the causal analysis are being closed. Development partner performance too needs evaluating from this perspective. In recent years, ADB has played an important role in gathering, generating, and disseminating useful knowledge and experience on what works in nutrition. Such a role of building the evidence base and broadcasting success stories is extremely important in fostering change.

Sixth, development partners should support relevant operations research, which is fundamental to improved programs. As with capacity development, it should not be thought of as an ad hoc exercise, but rather as a fundamental component of the management information system, and one that has a clear budget line. While the funds should be allocated to support such research, the actual research questions will only become known as the program evolves.

Overall, ADB now has a major opportunity to operationalize its emerging commitment to nutrition in the above ways. In so doing, it could help pave the way to realizing the common vision uniting all actors in these pursuits—that is, a world in which children are no longer being born malnourished.

# 1. Introduction

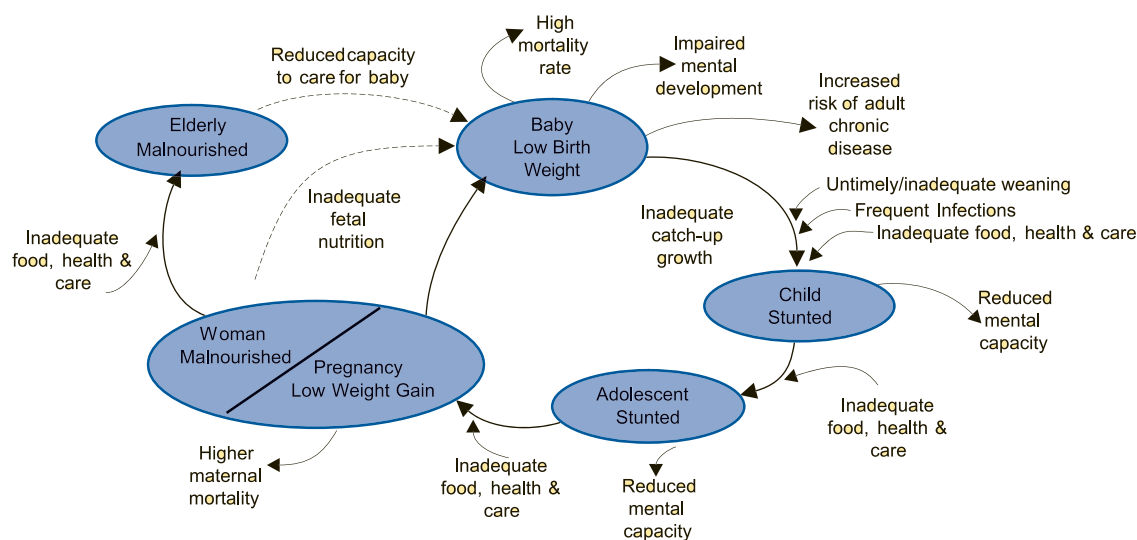
## BACKGROUND

**T**he concentration of malnutrition in Asia is greater than anywhere else on Earth. One in three preschool children is stunted, rising to one out of every two children in the countries of South Asia such as India, Bangladesh, and Nepal. Seventy percent of the world's malnourished children reside in the region (ACC/SCN-IFPRI 2000). The continent is extremely heterogeneous—culturally, politically, and economically. The countries of South Asia are the poorest. There are several small but influential high-income states as well as a cluster of small islands in the Pacific. The face of malnutrition is different in each of these countries and regions. In some regions it is characterized by undernutrition, in some by overnutrition. In an increasing number of areas it is characterized by both. This is the double burden that Asia now faces.

Malnutrition occurs at all stages throughout the life cycle (Figure 1.1). In the areas marked by high undernutrition, malnourished women or adolescent girls give birth to babies that are born stunted and thin. These children do not experience much catch-up growth in subsequent years. They are more likely to get sick, they enter school late, they do not learn well, and they are

less productive as adults. As adults, they are also more likely to suffer from the diet-related diseases that were formerly thought to be associated with increasing affluence such as diabetes, coronary heart disease and hypertension. Undernutrition is thus also a terrible time bomb that paves the way for overnutrition later in life. Moreover, babies born to such underweight and/or stunted women are themselves likely to be underweight and/or stunted. In this way, undernutrition is handed down from one generation to another as a terrifying inheritance. And so the cycle turns.

Malnutrition occurs at a proximal level due to interactions between inadequate dietary intake and disease, a vicious cycle that accounts for much of the high morbidity and mortality in developing countries. Three groups of interacting underlying factors contribute to inadequate dietary intake and infectious disease: household food insecurity, inadequate maternal and child care, and poor health services and an unhealthy environment. These underlying causes are in turn underpinned by basic causes that relate to the amount, quality, control, and use of various resources and other elements of capacity (UNICEF 1998). This conceptual model of malnutrition is referred to as the food-care-health framework (Figure 1.2).



Source: Modified from ACC/SCN-IFPRI (2000).

**Figure 1.1 Nutrition Throughout the Life Cycle**

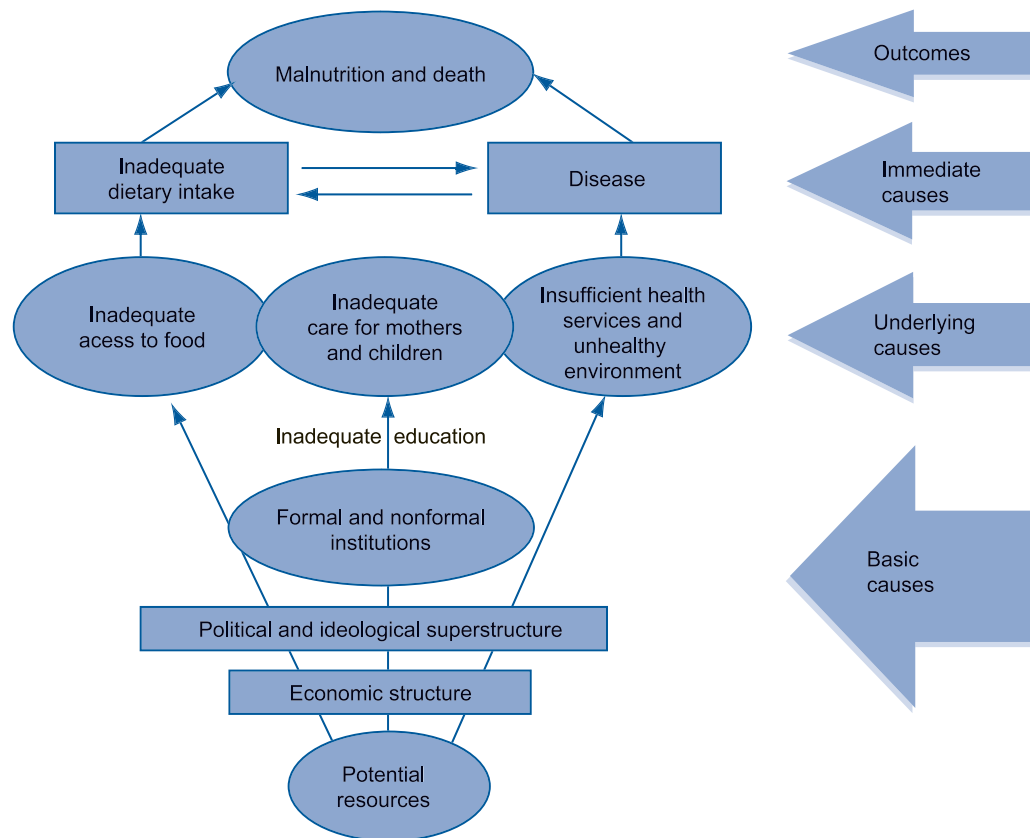
In some of the regions characterized by overnutrition, undernutrition has been largely defeated. Rather it is the incidence of diet-related chronic diseases such as coronary heart disease, cancer, diabetes, hypertension, and stroke that dominates the landscape. In an increasingly large number of countries however both of these phenomena are occurring simultaneously, and often in the same households.

The case for public action to eradicate malnutrition is a strong one—and one that can be forcefully made using either ethical or economic arguments. Food and nutrition are human rights, enshrined in various conventions (most recently the 1989 Convention on the Rights of the Child). Governments have a duty to ensure that these dimensions of human well-being are realized. Often private markets for health, education, and sanitation are thin and in any case are beyond the reach of the poor. Moreover, access to whatever services are available is likely to be unequal, particularly along gender lines. Women—the key to good nutrition throughout the life cycle—tend to face discrimination in the region and, indeed, globally.

If public action to reduce malnutrition is a moral imperative, it is also an excellent investment. Reductions in malnutrition improve intellectual capacity, raise productivity and lifetime private earnings, and reduce

private and public health care expenditures in ways that reverberate throughout the life cycle. The potential gains are massive. No economic analysis can fully capture the benefits of such sustained mental, physical, and social development. Investments in reducing malnutrition generate the ultimate positive externality—children who themselves are less likely to become overnourished in adulthood and are less likely to give birth to undernourished children.

As we will show, the partial and lower-bound estimates of the economic losses from malnutrition include foregone human productivity in the range of 10–15 percent, foregone gross domestic product (GDP) in the range of 5–10 percent, and losses in children's disability-adjusted life years (DALYs) of 20–25 percent of the total from all causes. Not only is economic growth foregone, but it is foregone for those who need it the most, the poor. Therefore nutrition-fuelled growth promises to reduce income inequality. It also promises to have stronger impact on poverty reduction than it does on average income growth. Moreover, improved nutrition is a particularly powerful antipoverty intervention because it can be achieved at low cost and it has a lifelong impact. In terms of a pro-poor economic growth strategy that is sustainable, an evidence-based program of investment in nutrition is one of the best around.



Source: ACC/SCN-IFPRI (2000).

**Figure 1.2 Causes of Child Undernutrition**

In a globalizing world, the premium on innovation and creativity is higher than ever, and malnutrition undercuts both in a most savage way. Malnutrition is also fertile ground for conflict. Conflict, whether civil or international, destroys people's lives and their livelihoods. Moreover, as countries become more connected than ever, instability in one country can quickly spill over to others.

While better nutrition empowers people, the process through which malnutrition is reduced is also likely to empower communities. Most nutrition programs are community-based. Community organization builds capacity, trust, and a shared set of values. These elements of social capital may well prove to be important to individuals in spheres beyond malnutrition. They may also

prove to be crucial in empowering communities to hold increasingly decentralized government to account.

What is the best way to turn the vicious cycle of malnutrition into a virtuous one? This is the question addressed in this book. The food-care-health conceptual framework and the life-cycle perspective illustrate the complexity of the task. These constructs also demonstrate the potential for bringing resources to bear on the problem from a number of sectors, levels, and partners. One of the main challenges for those who want to accelerate progress in nutrition within the next generation is to draw up a strategy that creates a space for these actors and forces their efforts as a whole to be greater than the sum of their parts.

## ORGANIZATION OF THE SYNTHESIS

The first step in combating malnutrition is to understand the nature of the problem. This is undertaken in Chapter 2 in a contemporary and historical context with summaries of the prevalence, consequences, and causes of the main nutritional problems—both under- and overnutrition—in the region.

Chapter 3 considers solutions, starting with a review of the evidence on the efficacy, or potential effect, and large-scale effectiveness of direct nutrition interventions. For some nutrition problems, interventions have been found that work in controlled settings. For other problems, the search is ongoing. Moving beyond efficacy, the actual effectiveness and large-scale impact of these direct interventions when they are implemented in real-world contexts is reviewed and process factors such as community involvement that have proved crucial to success are outlined.

Chapter 4 reviews indirect actions to improve nutrition. What are the roles of various supporting sectors such as agriculture (e.g., breeding crops for improved nutrition, food price policies that support healthy diets), the status of women (e.g., improved education for girls), microfinance (e.g., to allow poor people to combat seasonality), housing and infrastructure (e.g., to allow poor people to get access to clean water of sufficient quality that saves them time and energy in its collection, and sanitation to help child growth), and poverty reduction (e.g., cash transfers tied to behavior that builds up human capital)? Apart from their own impact on nutrition, such policies, when designed appropriately, can provide an immense amount of support to direct nutrition interventions—by increasing the impact of existing interventions or by increasing resources for their expansion.

Chapter 5 focuses on the social, economic, political, and cultural factors that determine the type of environment for nutrition-relevant action. A number of phenomena, e.g., globalization, urbanization, decentralization of governance, aging of populations, and the surge in new HIV/AIDS cases, are changing the context within which even the basic determinants of malnutrition function. Many of these contextual changes are enabling; some are

disabling. They provide new opportunities and new challenges to policymakers and program designers as to when and where the public sector should intervene in the nutrition sector and how it should best do so. For example, globalization has many facets, but the increasing density of exchanges between nations fuelled by increasingly liberalized markets and new technologies poses real dangers to nutrition status (e.g., the Asian financial and economic crisis that began in 1997) and real opportunities for accelerating reductions in malnutrition (e.g., more effective media for interventions promoting behavior change).

Public policies and interventions require capacity and resources for their effective implementation. Chapter 6 reviews the potential for using existing resource flows more effectively and explores strategies for raising additional resources through advocacy efforts. This chapter considers how to bring about the necessary changes—in terms of resources, capacity, policy, and institutional arrangements—that are required for appropriate policies and programs to be effectively implemented.

Chapter 7 revisits the rationale for public investment in nutrition interventions. It notes the market failures that make public-sector intervention plausible. The large human and economic costs involved have already been discussed in Chapter 2. The allocation of health and education expenditures is then examined by income group, by sector, by region, and over time. The lack of national nutrition accounts for the countries in the region is noted. Methods for understanding whether a particular intervention should be financed by the government (cost-benefit analysis) and how it should be designed (cost-effectiveness analysis) are described and estimates are presented for the countries of the region—both for existing and hypothetical interventions for addressing under- and overnutrition. Options for additional investments are then described and their costs are outlined in the context of existing resource flows.

Chapter 8 concludes the paper with recommendations for priority action in the areas of undernutrition and overnutrition. In particular, a typology of countries in the region is developed based on income level, and priorities for action in terms of direct and indirect interventions are outlined.

## 2. Malnutrition in Asia and the Pacific

**T**his review focuses on the following six major nutrition problems in the Asian and Pacific region: low birth weight, early childhood growth failure, anemia, vitamin A deficiency, iodine deficiency disorders, and overweight/obesity. When judged with respect to prevalence and consequence, these problems represent not only nutritional priorities but also human development priorities in the region.

These problems differ with respect to their prevalence, distribution, causes, and consequences and pose different risks at different stages in the life cycle. The food-health-care framework is used here to organize thinking about the nature of the problem and its causes.

Limitations of existing prevalence data for most of these problems in the region preclude many international comparisons. Stunting data and some national data for iodine deficiency disorders are available, but data on iron deficiency anemia, vitamin A deficiency, low birth weight, and overweight remain patchy.

### LOW BIRTH WEIGHT

Low birth weight (LBW) is defined as weighing less than 2,500 grams at birth. Although there are two main causes of LBW—being born small for gestational age or being born prematurely—in developing countries, the majority

of LBW infants are the former, that is, they are born small as a result of intrauterine growth retardation (IUGR).

Asia has a higher prevalence of LBW than any other continent (Table 2.1), ranging from well over 30 percent in the Central Asian Republics and South Asia to less than 10 percent in the People's Republic of China (PRC), Malaysia, Philippines, and Thailand.

LBW is probably the main reason why over 50 percent of the children in Asia are underweight. Other consequences of LBW include heightened morbidity and mortality risks, poor neurodevelopmental outcomes, reduced strength and work capacity, and increased risk of chronic disease in adulthood.

The prevalence of LBW is strongly associated with the relative undernutrition of mothers in the region; about 60 percent of women in South Asia and 40 percent in Southeast Asia are underweight (i.e., <45 kg). One estimate is that about 50 percent of all IUGR in developing countries is attributable to small maternal size at conception (low weight and short stature) and low gestational weight gain (or energy intake during pregnancy) (Kramer 1987; ACC/SCN-IFPRI 2000). Other important causes include malaria in endemic areas (Tomkins et al. 1994) and maternal infections that can cause loss of appetite, higher nutrient losses or

**Table 2.1 Estimated Incidence and Expected Number of LBW and IUGR-LBW in 2000**

United Nations Regions and Subregions	LBW		IUGR-LBW	
	Incidence (%) (<2,500 g) <sup>a</sup>	Total No. (thousand) <sup>b</sup>	Incidence (%) (<2,500 g; ≥ 37 weeks) <sup>a</sup>	Total No. (thousand) <sup>b</sup>
<b>Africa</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>
Eastern	n.a.	n.a.	n.a.	n.a.
Middle	21.3	853	14.9	597
Northern	n.a.	n.a.	n.a.	n.a.
Southern	n.a.	n.a.	n.a.	n.a.
Western	17.2	1,451	11.4	962
<b>Latin America and the Caribbean</b>	<b>11.5</b>	<b>1,329</b>	<b>6.5</b>	<b>755</b>
<b>Asia<sup>c</sup></b>	<b>18.0</b>	<b>13,774</b>	<b>12.3</b>	<b>9,344</b>
Eastern <sup>c</sup>	5.8	1,250	1.9	409
South Central	28.3	10,917	20.9	8,062
South-Eastern	10.3	1,190	5.6	647
Western	8.3	417	4.5	226
<b>Oceania<sup>d</sup></b>	<b>15.0</b>	<b>29.2</b>	<b>9.8</b>	<b>19</b>
Melanesia	15.4	29	9.9	19
Micronesia	n.a.	n.a.	n.a.	n.a.
Polynesia	4.0	0.2	0.2	0.03
<b>All Developing Countries</b>	<b>16.4</b>	<b>17,436</b>	<b>11.0</b>	<b>11,677</b>

<sup>a</sup> Source: de Onis, Blossner, and Villar (1998).

<sup>b</sup> Total live births for 2000 are based on the *World Population Prospects* (UN 1998).

<sup>c</sup> Excludes Japan. Eastern Asia includes PRC; Republic of Korea; Macau, China; Mongolia; and Korea DPR. South Central Asia includes the Central Asian republics and South Asia. South-Eastern Asia is equivalent to ADB's category of Southeast Asia.

<sup>d</sup> Excludes Australia and New Zealand.

n.a. = not applicable because coverage of live births is less than 80 percent.

IUGR = intrauterine growth retardation; LBW = low birth weight.

requirements, abnormal placental blood flow or structure, or fetal infections (Tomkins and Watson 1989).

In developed countries, where maternal undernutrition is relatively uncommon, the majority of LBW is caused by premature delivery. Cigarette smoking during pregnancy is quantitatively the most important factor causing IUGR, followed by low gestational weight gain and low body mass index at conception (Kramer 1998).

#### EARLY CHILDHOOD GROWTH FAILURE

Early child growth failure is manifested by growth stunting. The World Health Organization (WHO) has established ranges that can be used to classify populations on the basis of the prevalence of stunting. Stunting is defined as more than two standard deviations ( $>-2$  Z) below the median value of the National Center for Health Statistics/World Health Organization International Growth Reference for

length or height for age (WHO 1995). For children less than five-years old, a low prevalence of stunting is less than 20 percent, 20–29 percent indicates a medium prevalence, 30–39 percent a high prevalence, and 40 percent or more a very high prevalence.

South Central Asia (See footnote to Table 2.1 for countries included) has the second highest prevalence of growth stunting in the world (44 percent), and the prevalence in Southeast Asia is also high (33 percent), as shown in Table 2.2. An estimated 70 percent of the world's stunted children live in Asia and there has been little recent improvement in the situation. Table 2.3 shows the most recent national-level data available for underweight and stunting prevalences in the Asian and Pacific region. The correlation between national economic status and stunting prevalence is clear. Figures 2.1 and 2.2 plot the trends in child underweight (low weight for age, or W/A) in several countries in the region. The nutritional situation in most countries has

**Table 2.2 Estimated Prevalence (percent) and Number (million) of Stunted Children from 1980 to 2005**

UN Regions and Subregions	1980		1985		1990		1995		2000		2005	
	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
<b>Africa</b>	<b>40.5</b>	<b>34.78</b>	<b>39.2</b>	—	<b>37.8</b>	<b>41.68</b>	<b>36.5</b>	<b>44.51</b>	<b>35.2</b>	<b>47.30</b>	<b>33.8</b>	<b>49.40</b>
Eastern	46.5	12.88	46.9	14.83	47.3	17.13	47.7	19.28	48.1	22.03	48.5	24.41
Northern	32.7	6.01	29.6	6.01	26.5	5.55	23.3	4.90	20.2	4.44	17.0	3.86
Western	36.2	9.034	35.8	10.51	35.5	11.99	35.2	13.47	34.9	14.74	34.6	16.03
<b>Asia</b>	<b>52.2</b>	<b>173.37</b>	<b>47.7</b>	<b>169.72</b>	<b>43.3</b>	<b>167.66</b>	<b>38.8</b>	<b>143.49</b>	<b>34.4</b>	<b>127.80</b>	<b>29.9</b>	<b>110.19</b>
South Central	60.8	89.36	56.5	93.45	52.2	93.36	48.0	83.62	43.7	78.53	39.4	72.28
South-Eastern	52.4	27.71	47.5	26.47	42.6	24.24	37.7	21.51	32.8	18.94	27.9	15.78
<b>Latin America and the Caribbean</b>	<b>25.6</b>	<b>13.19</b>	<b>22.3</b>	<b>11.87</b>	<b>19.1</b>	<b>10.38</b>	<b>15.8</b>	<b>8.59</b>	<b>12.6</b>	<b>6.82</b>	<b>9.3</b>	<b>5.11</b>
Caribbean	27.1	0.92	24.4	0.86	21.7	0.81	19.0	0.71	16.3	0.61	13.7	0.51
Central America	26.1	3.87	25.6	3.81	25.0	3.87	24.5	3.94	24.0	3.92	23.5	3.82
South America	25.1	8.38	21.1	7.35	17.2	6.05	13.2	4.55	9.3	3.16	5.3	1.84
<b>Oceania</b>	Data not available											
<b>All Developing Countries</b>	<b>47.1</b>	<b>221.35</b>	<b>43.4</b>	<b>220.10</b>	<b>39.8</b>	<b>219.73</b>	<b>36.0</b>	<b>196.59</b>	<b>32.5</b>	<b>181.92</b>	<b>29.0</b>	<b>164.70</b>

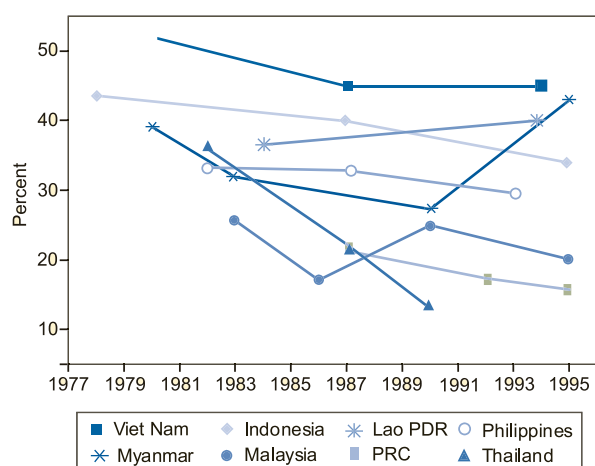
Source: WHO (1999a).

**Table 2.3 Latest National Prevalence Data on Stunting and Underweight in Preschool Children and National GNP Per Capita**

Country	Year of Survey	1998 GNP Per Capita (US\$)	Stunting (%)	Underweight (%)
Afghanistan	1997	< 760	47.6	-
Bangladesh	1996–1997	350	54.6	56.3
Bhutan	1986–1988	< 760	56.1	37.9
PRC	1992	750	31.4	17.4
Fiji	1993	2,110	2.7	7.9
India	1992–1993	430	51.8	53.4
Indonesia	1995	680	42.2	34.0
Kazakhstan	1995	1,310	15.8	8.3
Kiribati	1985	1,180	28.3	12.9
Kyrgyz Rep.	1997	350	24.8	11.0
Lao PDR	1994	330	47.3	40.0
Malaysia	1995	3,600	-	20.1
Maldives	1995	1,230	26.9	43.2
Myanmar	1994	< 760	44.6	42.9
Nepal	1996	210	48.4	46.9
Pakistan	1990–1991	480	49.6	38.2
Papua New Guinea	1982–1983	890	43.2	29.9
Philippines	1993	1,050	32.7	29.6
Solomon Islands	1989	750	27.3	21.3
Sri Lanka	1993	810	23.8	37.7
Thailand	1987	2,200	21.5	25.3
Tonga	1986	1,690	1.3	-
Uzbekistan	1996	870	31.3	18.8
Vanuatu	1983	1,270	19.1	19.7
Viet Nam	1994	330	46.9	44.9

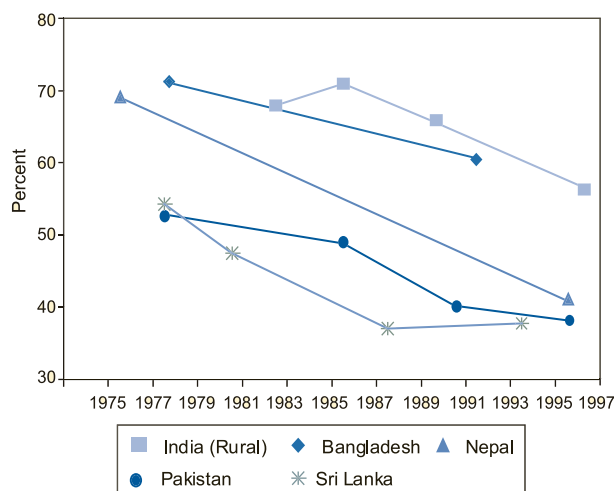
Source: WHO (1999a).

Note: Darker colored cells (stunting) show the countries with the highest rates of stunting (>40 percent) for which 1990s data are available, while the darker colored cells (GNP) show the poorest countries (GNP per capita < US\$760). There is clearly a strong association.



Source: Smith and Haddad (2000).

**Figure 2.1 Trends in Proportion of Low Weight for Age, East and Southeast Asia (percent)**



Source: Smith and Haddad (2000).

**Figure 2.2 Trends in Proportion of Low Weight for Age, South Asia (percent)**

improved during the last two decades albeit fairly slowly. Exceptions are the Lao People's Democratic Republic (PDR) and Myanmar on the negative side and Thailand on the positive. Thailand's progress has been both dramatic and steady.

Growth stunting in childhood is a risk factor for increased mortality, poor cognitive and motor development, and other impairments in function. Children who have been severely undernourished in early childhood suffer a later reduction in IQ of as much as 15 points, significantly affecting schooling

achievement and increasing the risks of drop-out or repeat grades. Moreover, stunting usually persists, leading to smaller size and poorer performance in adulthood (see Figure 1.1).

Stunting, along with LBW, is also a risk factor for adult chronic disease. There is an increasing amount of evidence of the fetal and early childhood origins of adult chronic disease (Popkin, Horton, and Kim 2001). The so-called Barker Hypothesis posits that maternal dietary imbalances at critical periods of development in the womb can trigger an adaptive redistribution of fetal resources (including growth retardation). Such adaptations affect fetal structure and metabolism in ways that predispose the individual to later cardiovascular and endocrine diseases.

The correlation between LBW or early childhood stunting and later cardiovascular disease and diabetes may arise from the fact that nutritional deprivation in utero or in early childhood, "programs" a newborn for a life of scarcity. The problems arise when the child's system is later confronted by a world of plenty. A marker for this heightened risk is overweight or obesity. Recent studies have also suggested a possible link between immune system development in utero and subsequent risk of infection-related mortality in adulthood (Moore 1998).

The most common causes of poor growth in developing countries at the immediate level include poor maternal nutritional status at conception and in utero undernutrition; inadequate breastfeeding; delayed complementary feeding for infants and/or inadequate quality or quantity of complementary feeding; impaired absorption of nutrients due to intestinal infections or parasites; or usually a combination of these problems. Underpinning these factors lie various inadequacies with respect to household and community-level access to food, health, environmental, and caring resources (as depicted in Figure 1.2).

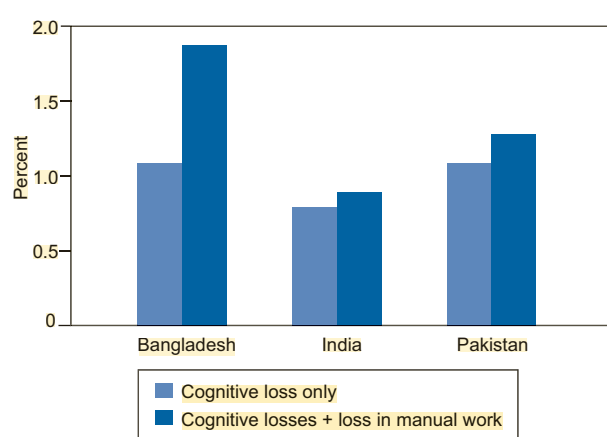
## IRON DEFICIENCY ANEMIA

Asia has the highest prevalence of anemia in the world. About half of all anemic women live in the Indian subcontinent where 88 percent of them develop iron deficiency anemia (IDA) during pregnancy (WHO 1998). Vast numbers of infants and children are also affected. At certain periods of the life span, iron requirements are particularly high and, therefore, less likely to be met, e.g., during pregnancy and infancy. Anemia is usually defined as a low hemoglobin (Hb) concentration in blood.

Anemia impairs human function at all stages of life. Severe anemia during pregnancy increases the risk of maternal mortality: by up to 23 percent in Asia according to one meta-analysis (Ross and Thomas 1996). Pregnancy anemia has been reported to be associated with preterm delivery and subsequent LBW in many studies. Associations between Hb concentration and psychomotor performance have been demonstrated at all stages of life. Although iron is required for the function of several brain neurotransmitters, an expert consultation concluded that only anemia, and not iron deficiency without anemia, impairs the mental and motor development and behavior of infants (Draper 1997), with significant effects on schooling achievement. Another concern for anemic children is that they have a higher absorption of toxic heavy metals such as lead and cadmium, so they are at greater risk in polluted environments (Clark, Royal, and Seeler 1988). Anemia has long been known to impair work performance, endurance, and productivity (Basta et al. 1979). Iron deficiency does not have to progress to anemia to affect work performance (Zhu and Haas 1997).

Except where it is caused by infections such as hookworm and malaria, inadequate absorption of dietary iron is the main explanation for the much higher prevalence of anemia in regions of the world such as Asia. The best sources of dietary iron are meat, fish, and poultry.

Intakes of these foods are low when people have inadequate resources to buy food or when the foods are avoided for religious or cultural reasons.



Source: Horton (1999).

**Figure 2.3 Percentage Loss in GDP Due to Iron Deficiency**

## IODINE DEFICIENCY DISORDERS

Iodine deficiency is a serious problem in Asia, with the prevalence in Southeast Asia exceeding that in all other regions of the world. The prevalence of iodine deficiency disorders (IDD) is estimated using various indicators, including total goiter rate (TGR). A TGR prevalence of 20-30 percent among school-aged children indicates a moderate IDD problem; more than 30 percent, a severe problem. In 1993 the estimated TGRs in schoolers in Southeast Asian countries were, in descending order of prevalence, Nepal (44 percent), Indonesia (28 percent), Bhutan (25 percent), Myanmar (18 percent), Republic of Korea (15 percent), Sri Lanka (14 percent), Thailand (12 percent), Bangladesh (11 percent), India (9 percent), and Mongolia (7 percent) (WHO/UNICEF/ICCIDD 1999).

In 1999, WHO, the United Nations Children's Fund (UNICEF), and the International Council for the Control of Iodine Deficiency Disorders (ICCIDD) classified 130 of the 191 countries as having a current IDD problem, 20 countries as having eliminated the problem, and the remainder as having an unknown level of problem (ACC/SCN-IFPRI 2000). Of the 10 countries in Southeast Asia, IDD is a public health problem in 9 and there are insufficient data on the other. About 172 million people, or 12 percent of the region, are affected by goiter and 41 percent are at risk of goiter and probably affected by marginal iodine status. There has been little change in this situation in the past decade although improvement is anticipated now that 70 percent of households in Southeast Asia consume iodized salt (ACC/SCN-IFPRI 2000).

IDD has multiple serious adverse effects, including retarded psychomotor development, impaired growth, cretinism where IDD is extreme, and higher infant mortality, on a large proportion of the world's population. The degree of impairment in function is related to the severity of iodine deficiency and even marginal degrees of deficiency have a measurable impact on human development.

A meta analysis of 18 studies, on 2,214 subjects, showed that mean cognitive and psychomotor performance scores were 13.5 IQ points lower in iodine-deficient individuals (Bleichrodt and Born 1994).

The main cause of iodine deficiency is leaching of iodine from soil by glaciation, floods, or high rainfall. Mountainous regions, such as in the PRC and the Himalayas, therefore, have some of the highest prevalences of iodine deficiency. Iodine deficiency due

to flooding occurs in Bangladesh and around the Ganges in India. In regions of endemic iodine deficiency, water and foods (plants and animals grown in the region) have low iodine content.

Many staple foods consumed in developing countries, e.g., cassava, contain glucosides that can liberate cyanide. In the body, cyanide is converted to thiocyanate, which is a goitrogen, blocking the uptake of iodine by the thyroid.

### VITAMIN A DEFICIENCY

Vitamin A is required for the normal function of several components of the eye. The clinical signs of deficiency include night blindness, xerophthalmia, Bitot's spots, corneal xerosis, and corneal scars or ulcers. The prevalence of clinical deficiency is estimated by combining night blindness and eye changes, primarily Bitot's spots, to form a "total xerophthalmia" prevalence (ACC/SCN 1997). The prevalence of these clinical signs is quite low; for the last years in which information is available on children in Asia it ranged from 0.5 percent in Sri Lanka to 4.5 percent in Bangladesh (ACC/SCN-IFPRI 2000). Other age groups are affected as well, especially pregnant and lactating women. A prevalence of more than 1 percent indicates a public health problem.

Subclinical vitamin A deficiency (VAD), defined as the prevalence of serum retinol concentrations below  $0.70 \mu\text{mol/L}$  minus the percent of individuals with clinical VAD, is much more common, although the actual prevalence is uncertain owing to a paucity of reliable national-level data. The only national-survey prevalences of subclinical VAD in Asian countries are 18 percent for the PRC, 50 percent for Pakistan, and 10 percent for the Philippines (ACC/SCN-IFPRI 2000). These are only estimates for preschoolers and it is highly likely that the prevalence is now less than these estimates where there are national supplementation programs. It is not, however, clear that supplementation programs alone can eliminate subclinical VAD linked to child mortality, unless food-based approaches to increase consumption of beta-carotene-rich foods are also encouraged.

VAD causes increased morbidity and mortality of infants, children, and pregnant women; poor growth of children; and possibly increased mortality and morbidity of infants infected with HIV. It also contributes to anemia by interfering with iron transport and utilization for Hb synthesis.

The main cause of VAD is a low intake of animal products, many of which contain a large amount of retinol. Beta-carotene is the main provitamin A in plant sources of the vitamin, and although some plants are very high in beta-carotene, it is generally less well absorbed than retinol. Beta-carotene in fruits, including squashes, is substantially better absorbed than that in leaves and vegetables in general. Populations with the highest prevalence of VAD consume low amounts of animal products and fruits rich in beta-carotene. Breast milk is the main source of vitamin A for infants. Clinical symptoms of VAD are rare in breastfeeding infants during the first year of life even where the prevalence of VAD is high (Sommer 1982). Poor maternal vitamin A status, and subsequently low breast milk retinol content is a risk factor for the earlier onset of VAD in infants, as is early cessation of breast feeding (Tarwotjo et al. 1992).

Infection with *Ascaris* lowers serum retinol concentrations and deworming has improved the values. Poor absorption of vitamin A may also occur in some types of diarrhea and fever, during which there is also a higher rate of utilization and disposal of the vitamin. In severe protein-energy malnutrition, retinol-binding protein synthesis is impaired. Zinc and iron deficiencies also interfere with the utilization and transport of stored retinol.

Unlike iodine, VAD is linked much more to the nature of foods available and feeding practices than to geochemical or other conditions affecting the whole population of geographic areas. Many studies suggest that, like iron, VAD has strong socioeconomic associations and, indeed, IDA and VAD often coexist in the same subpopulations.

Box 2.1 and Figure 2.4 present some evidence for the human and economic costs of undernutrition in low-income Asia.

### OVERWEIGHT AND OBESITY

Obesity represents an emerging nutrition problem in this region. Most research on the prevalence, trends, and health consequences of obesity has been among adults. Moreover, most research to date indicates a far greater level and rate of increase among Asian adults in obesity than among children.

A decade ago, overweight would have been considered a minor problem in Asia and a major concern in the Western Pacific. Recent national surveys from several Asian countries have shown that the problem

### Box 2.1 The Costs of Undernutrition in Low-Income Asia

#### Human costs

Undernutrition is associated with adverse human outcomes, with premature death as the most serious. The relative risks of infection increase exponentially as stunting increases (Pelletier et al. 1994), such that malnutrition is associated with an estimated 2.8 million child deaths each year in nine low-income Asian countries, or 51 percent of child deaths. (The countries included are Bangladesh, Cambodia, PRC, India, Lao PDR, Nepal, Pakistan, Sri Lanka, and Viet Nam [Horton 1999]). Meta analyses suggest that subclinical VAD is a risk factor for infection and mortality (Ross 1996). If subclinical VAD were 10 percent throughout the region (likely an underestimate), it would be associated with 0.36 million child deaths annually throughout the same region. IDA is associated with 23 percent of maternal deaths (Ross and Thomas 1996), i.e., an estimated 65,000 maternal deaths per year in these same nine countries. There may be additional mortality costs due to iodine deficiency, but these cannot be precisely estimated.

The global burden of disease estimates in 1993 attribute 20–25 percent of the burden of disease in children to undernutrition (World Bank 1993). WHO attributes 15.9 percent of total global DALYs to “malnutrition.” This figure is 18 percent of total developing-world DALYs, 22.4 percent of Indian DALYs, 5.3 percent of PRC DALYs and 14.5 percent in other Asian and Pacific countries (Murray and Lopez 1996, p. 312). The definition used for malnutrition in both of these estimates is narrow, however. For example, the direct impact of deficiencies in micronutrients other than iron, vitamin A, and iodine, such as calcium, zinc, and vitamin C, is not included, nor are the direct health consequences of overnutrition. Moreover, the estimates of the indirect impact of malnutrition as a contributing risk factor for illness and death were partial (restricted to children, and to protein energy malnutrition and VAD) and conservative. Were these to be

included they would not be perfectly additive, but one would expect them to add substantially to malnutrition’s overall contribution of 15.9 percent. Some commentators have made informal estimates that suggest the complete contribution of malnutrition could be as high as 50 percent of the global burden of disease (World Watch 2000), although this is considered to be an overestimate (S.H. Horton, personal communication).

#### Economic costs

Undernutrition involves serious economic costs, which make investments in nutrition an urgent priority. Both stunting and anemia are known to lower productivity in physical labor. Adults who are moderately stunted are 2–6 percent less productive, and those who are severely stunted, 2–9 percent less productive than those of normal stature (Horton 1999, using estimates in Haddad and Bouis 1991 and Alderman et al. 1996). Iron deficiency anemia is associated with a loss of productivity of 5 percent in light blue-collar work, and of 17 percent in heavy manual labor (see references in Ross and Horton 1998).

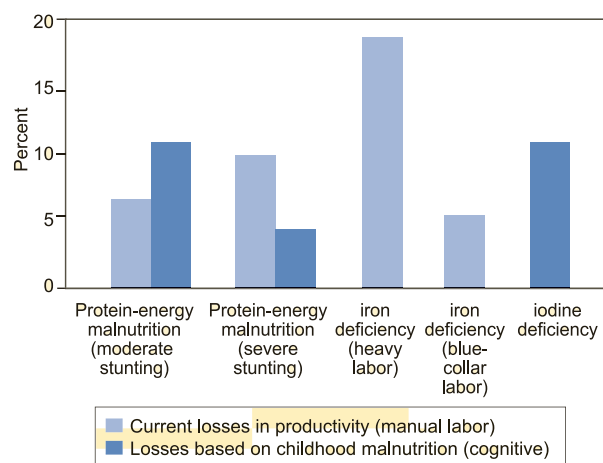
Evidence suggests that childhood stunting and iron deficiency, and maternal iodine deficiency, are associated with lower cognitive outcomes in children and hence lower adult productivity, which are likely to become ever-more important in future knowledge-based economies. The effect on adult earnings and productivity is estimated at 10 percent for stunting (from an older study by Selowsky and Taylor 1973), 4 percent for childhood anemia (Ross and Horton 1998), and 10 percent on average per child born to a mother with goiter (Ross 1996).

These losses are conservatively 2–3 percent of GDP in low-income countries. In South Asia, the estimated losses associated with iron deficiency alone are estimated as \$5 billion per annum (Ross and Horton 1998).

is increasing markedly in prevalence. Overweight signifies a heightened adult risk of diabetes, hypertension, and coronary heart disease. Generally most of the overweight in this region is found in adults with a body mass index (BMI) of between 25 and 30, which is termed overweight or pre-obesity by many (e.g., WHO 1995; IOTF/WHO 2000).<sup>1</sup>

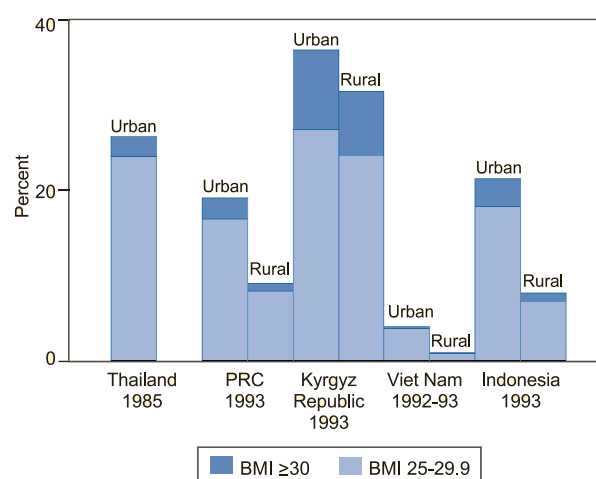
There is extensive evidence that Asian adults face a significantly elevated risk of these adult health problems at a BMI below 25. Moreover, a BMI of 25 in an Asian adult appears to have a far greater adverse metabolic effect than it would in a Caucasian adult (Deurenberg, Yap, and Staveren 1998). In fact, WHO and the International Obesity Task Force formed a group of

<sup>1</sup> In adults, body mass index (BMI) calculated by dividing weight in kilograms by the square of height in meters is used to define underweight or overweight. The WHO Expert Committee on Anthropometry (WHO 1995) has suggested the following classifications: mild underweight (BMI 17.0–18.49 kg/m<sup>2</sup>), moderate underweight (BMI 16.0–16.99), and severe underweight (BMI < 16.0). These three groups are considered as chronic energy deficient (CED). For overweight, the categories are as follows: Grade 1 (BMI 25.00–29.99), Grade 2 (BMI 30.00–39.99), and Grade 3 (BMI ≥ 40.00). Each of these adult measures has been related to morbidity and mortality. However, similar relationships are not well established among children. The measurement of obesity among children, in particular preschoolers, is controversial. However, there is now a consensus from the US Government and international groups that BMI is the best measure we have (e.g., Cole et al. 2000). The standard to which the BMI is referred for children must be based on their age and gender (Cole et al. 2000).



Source: Horton (1999).

**Figure 2.4 Percentage Loss in Labor Productivity Due to Malnutrition: Estimates from the General Literature**



Source: Popkin and Doak (1998).

**Figure 2.5 The Prevalence of Obesity and Overweight in Urban and Rural Areas in Asian Countries**

scientists and agencies in Asia to review this topic. This group held international meetings and has proposed a lower BMI cutoff of 23 for overweight and of 25 for obesity for Asians (IOTF/WHO 2000).

Available Asian country data, aside from the anomaly of the Kyrgyz Republic, suggest a direct association between obesity and current level of economic performance. In most cases, the gender differences in Asia are small. In island nations, such as Samoa, Nauru, Fiji Islands, and elsewhere in Melanesia, nearly half the populations have at least Grade 2 obesity (see footnote 1). In most cases, female obesity is much greater. Trends in obesity for many Asian countries do not exist. In the PRC, however, there is evidence of rapid increase in overweight prevalence. In 1989, 5.0 percent of men and 10.5 percent of women had a BMI of 25 or greater; by 1997, this tripled in men to 14.1 percent and doubled in women to 20.7 percent. This agrees with studies of the shifts in dietary behavior that have shown a marked increase in the rate of change of consumption of pork, oil, and other sources of fat in the diets of these same Chinese adults (Guo and Chumlea 1999). It is fair to predict that 33–39 percent of Chinese adult women and 30–35 percent of Chinese men will be overweight in 2020 (Popkin, Horton, and Kim 2001). In India, it is estimated that 20 percent of females and 16 percent of males will be overweight in 2020. Obesity levels are higher in urban than rural areas in the countries with data (Figure 2.5) and there is a gradient with regard to

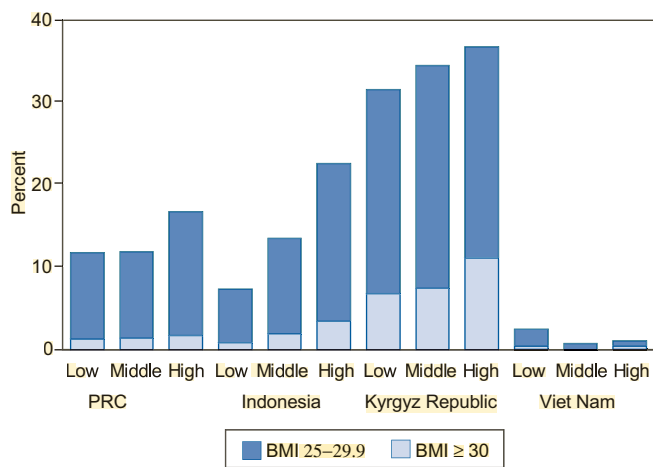
socioeconomic group, although not as marked (Figure 2.6). These differences relate to marked shifts both in dietary intake patterns and activity patterns.

High BMI in children under five-years old is an increasing public health problem and may be indicative of the increase in overweight and obesity found among adults.

In developed countries, several studies (Ogden et al. 1997) report increasing prevalence of obesity at different stages during childhood. In developing countries, such studies are scarce.

Using recent WHO data, it is estimated that by 1995 around 17.6 million children in the developing world had a high BMI that might be indicative of being overweight. For Asia, Eastern Asia (United Nations classification) showed prevalences higher than expected for 1995. South Central and South-Eastern Asia did not show overweight problems (ACC/SCN-IFPRI 2000). Since these data were published, two new sets of international standards have been established (e.g., Cole et al. 2000).

The few studies on trends in child overweight status in Asia, mainly from smaller samples, indicate rapid increases in BMI among older children and adolescents with the largest changes occurring among adolescents (Wang, Monteiro, and Popkin 2000). For example, in the PRC, there is more urban than rural overweight among children; in fact, it is among urban residents that the ratio of overnutrition to undernutrition exceeds 1 and is growing most rapidly (in contrast to greater overweight



Source: Popkin, Horton, and Kim (2001).

**Figure 2.6 The Prevalence of Obesity in the PRC, Indonesia, Kyrgyz Republic, and Viet Nam, by income tercile**

than chronic undernutrition among urban and rural adults in the PRC). The BMI trend in the PRC indicative of overweight status is greater among older primary-school children than adolescents in the last decade (Wang, Monteiro, and Popkin 2000).

The coexistence of undernutrition with overnutrition in Asian households is also increasing, inducing a double burden of disease (Popkin 1998). These countries will have to develop and implement simultaneously plans and

programs to address problems associated with both undernutrition and overnutrition.

There are major consequences of being overweight or obese (see Box 2.2). Overweight is associated with an increased prevalence of such cardiovascular risk factors as hypertension, unfavorable blood lipid concentrations, and diabetes mellitus (Manson et al. 1992). It is also a major risk factor for the development of gallstones and is related to osteoarthritis in several joints. Overweight and the risk of endometrial cancer increase in direct proportion (WHO 1995). Mortality for both men and women begins to rise among individuals with a high BMI (Stevens et al. 1998). Figure 2.7 shows some trends in proportion of deaths due to cancer and cardiovascular disease for various countries; they present a mixed picture.

There are also life-cycle effects. In higher-income countries, extensive evidence indicates that obesity during childhood is related to adult obesity (Garn et al. 1985; Rolland-Cachera et al. 1987; Rolland-Cachera, Bellisle, and Sempe 1989; Mossberg 1989; Guo et al. 1997; Power, Lake, and Cole 1997; Whitaker et al. 1997; Guo, Popkin, and Zhai 1999). Epidemiological literature shows that about one third of obese preschool children and about half of obese school-age children become obese adults (Serdula et al. 1993). In the PRC, overweight children are 2.8 times more likely than normal-weight children to become

### Box 2.2 Comparing Consequences and Causes of Diet-related Chronic Disease in the PRC and Sri Lanka

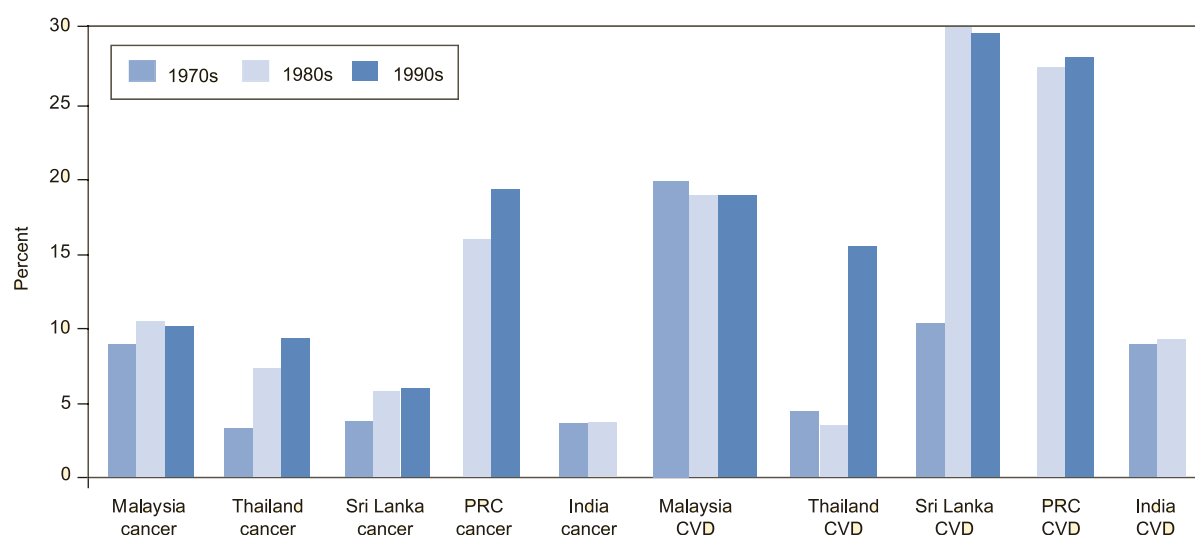
In the PRC, it has been estimated that diet-related chronic disease accounted for 43.2 percent of all deaths in the mid-1990s (rising to 52 percent in 2025) costing about 2.4 percent of annual GDP in terms of lost productivity due to premature deaths and hospital costs (Popkin, Horton, and Kim 2001). This does not include the effects of reduced work outputs of survivors, or of those individuals who were debilitated but treated as outpatients. Overall, the figure is likely to be more than 3 percent of GDP now and this will rise considerably.

Around 20 percent of this chronic disease can be traced back to dietary causes, rising to 25–45 percent in 2025. LBW alone in 1995 was estimated as accounting for at least 10 percent of stroke and coronary heart disease (CHD), one third of diabetes, and almost half of all hypertension cases (Popkin, Horton, and Kim 2001). By 2025, overweight will be the main underlying cause, predicted to account for one quarter of CHD and 45 percent each of diabetes and hypertension. Childhood stunting will then be the main risk factor, accounting for 5–20

percent of the four chronic conditions—stroke, CHD, diabetes, and hypertension (excluding cancer where childhood factors have not been studied).

In Sri Lanka, diet-related chronic disease accounted for 18.3 percent of all deaths in the mid-1990s (rising to 20.9 percent in 2025), with an estimated overall loss to productivity of 0.25 percent annual GDP; less than in the PRC, yet still with policy significance. In 1995, in Sri Lanka, dietary factors accounted for more than 20 percent of cancer, 16 percent of CHD, and almost 10 percent each of stroke, diabetes, and hypertension. In 1995, LBW was the most important single risk factor (accounting, for example, for 18 percent of diabetes prevalence) and its importance will grow to 2025.

In Sri Lanka, problems of undernutrition are more significant at present. This is the case in other South Asian countries, although many countries have higher LBW prevalences than Sri Lanka.



Source: Popkin, Horton, and Kim (2001).

**Figure 2.7 Trends in the Proportion of Deaths Due to Cancer and Cardiovascular Disease (CVD)**

overweight adolescents; underweight children are 3.6 times more likely to remain underweight as adolescents (Wang et al. 2000). In comparison with developed-country studies, there is much less tracking in the PRC, most likely related to the rapidity of changes in diet and activity there. This tracking of obesity from childhood into adulthood and its contribution to adult obesity-related morbidity and mortality should be the focus of prevention, given that clinically significant obesity-related morbidities are rare in children.

There is a growing body of literature centered on the work of David Barker and others linked with research—termed either the effects of fetal origins on health or early programming—that asserts that poor nutrition during fetal and infant development (measured by LBW status

and stunting) with later periods of positive energy balance are risk factors for overweight. This effect becomes very important in Asia (Popkin, Horton, and Kim 2001), due to the rapid acceleration of the nutrition transition among populations who faced severe undernutrition only decades earlier. Longitudinal studies from the Philippines provide strong support for this hypothesis. Girls who are relatively thin at birth, but who grow rapidly in the first six months, have earlier menarche, an important marker of obesity (Adair 2000). Similarly, girls who were relatively thin at birth but relatively fat as adolescents have higher blood pressure and total cholesterol than those who stayed thin or those who are relatively heavy at adolescence but not thin at birth (Adair and Kuzawa 2000).

### 3. Direct Nutrition Interventions

#### INTRODUCTION

**T**he efficacy of an intervention is essentially its potential effect, or its impact under ideal conditions, when the components of the intervention are delivered directly to all individuals in the target group. Efficacy trials are research studies in which there is a high level of supervision regarding delivery of the program and careful measurement of outcomes. Any new approach to controlling a particular nutritional problem should be subjected to such trials initially to determine whether a biological impact is actually possible in ideal conditions before taking steps to introduce the intervention as part of a large-scale program. This chapter starts by reviewing the evidence concerning efficacy of the most common direct nutrition interventions.

In contrast to efficacy, effectiveness refers to the impact of an intervention under real world conditions, when programs are scaled up to reach large populations. Small-scale efficacy does not easily translate into large-scale effectiveness and impact for a variety of reasons.

A direct nutrition intervention is defined here as one that has malnutrition prevention or reduction as at least one of its primary objectives. Such interventions are usually intended to impact on the main immediate

and some of the underlying causes of malnutrition (as shown in Figure 1.2), such as inadequate dietary intake and disease (immediate) and care for children and women (underlying).

The most common types of nutrition intervention are breastfeeding promotion, growth monitoring and promotion, communications for behavioral change (including improved complementary feeding), supplementary feeding, and micronutrient supplementation. These are primarily community-based interventions, although they may or may not be community-driven. Fortification is another approach—in this case, to control micronutrient deficiency—which is direct, albeit not community based.

Nutrition-relevant interventions are also designed to impact at the underlying level to combat inadequacies in one or more of the food-health-care preconditions, usually at the household and/or community levels. Care is central. Although certain caring practices such as breastfeeding and complementary feeding are clearly “direct” actions, others—that focus on improving the *capacity* to care—are classified here as “indirect” actions and are discussed in the next chapter. Approaches to improve household food security, health, and environmental conditions and services are also discussed in the following chapter as indirect actions.

## EFFICACY OF NUTRITION INTERVENTIONS

Following are the main conclusions, based on an extensive literature review described in Allen and Gillespie (2001), on the efficacy of direct interventions targeting the main undernutrition outcomes—IUGR, stunting, and the three main micronutrient deficiencies. There is little information on the efficacy of approaches to overweight, obesity, and diet-related chronic disease, beyond what is known about approaches to preventing or reducing IUGR and stunting. Also, there is very little experience with policies and programs in this area anywhere in the developing world. Most of what has been done has been implemented on a large scale and is more appropriately discussed in the next section on effectiveness.

### Intrauterine Growth Retardation

The following paragraphs outline conclusions that can be drawn from randomized, controlled efficacy trials of prenatal supplementary feeding.

- Only supplements that provide more energy cause a significant improvement in birth weight. While the protein in these supplements provides up to 25 percent of the energy, the results of at least one study suggest that supplements containing no protein can increase birth weight. (In that study the supplement did contain some micronutrients, the intake of which covaried with energy intake.) In populations where protein intake is adequate, providing high-protein supplements (>25 percent of energy) to pregnant women may even increase neonatal death rates.
- Maternal supplementation can also increase maternal weight gain, infant head circumference, and, when there is a serious energy shortage, the length of the newborn infant.
- The magnitude of the expected benefit from maternal supplementation in Asia remains to be determined but is expected to be considerable. The largest, best-designed trial was conducted in The Gambia. From mid-pregnancy, locally produced biscuits providing 1,017 kilocalories and 22 grams of protein per day reduced LBW prevalence by 39 percent, and increased birth weight by 136 grams. In the “hunger” season when maternal energy intake was most inadequate, supplementation reduced LBW by 42 percent and increased birth weight by 201 grams. The infant mortality rate fell by about 40 percent. Women in The Gambia are generally heavier (53 kg on average at enrollment) than those in many regions of Asia, which may provide some protection against LBW, but may be more seriously energy deficient during the hungry season.
- For undernourished women or those who have a low body weight (<40 kg), these improvements in pregnancy outcome could be obtained by encouraging them to consume more of their normal diet where possible, and/or providing appropriate energy-containing supplements. The supplements should ideally be formulated from local foods. Clearly any supplements should be consumed by the mother and not by other family members.
- Where the normal diet is particularly low in protein, or as is often the case, low in micronutrients, it is important to ensure that these nutrients are also provided as supplements.
- If targeting is desired, women with the lowest weight (at conception through early pregnancy) and/or lowest energy intakes are most likely to benefit. Targeting interventions based on maternal BMI, skin-fold thickness, or height is unlikely to be more useful than targeting based on weight.
- There are conflicting data on whether supplementation is more effective during the second or third trimester for improving birth weight. However, it is clear that supplementation during either trimester can reduce the prevalence of LBW. In The Gambia, supplementation did not start until 20–24 weeks of gestation and the biscuits were consumed for only 82 days on average. The total amount of energy provided by supplements during pregnancy is likely to be the most important factor, so that supplementation for the longest possible time becomes more critical where the amount of daily energy provided by supplements is low. Continued supplementation of the mother during her subsequent lactation and pregnancy may cause an even greater improvement in the birth weight of her next child.
- Young maternal age at conception is an additional risk factor for poor pregnancy outcome; it is important to target interventions to those who are still growing.

- Whenever possible, attention should be paid to improving the quality as well as the quantity of food consumed during pregnancy. There is little evidence from randomized controlled trials that supplementation with individual nutrients (including iron, zinc, folic acid, vitamin A, and calcium) can improve birth weight unless this is through a reduction in preterm delivery. However, supplementation of underprivileged pregnant women with micronutrients is certainly extremely important and can lead to substantial reductions in maternal anemia; may reduce maternal mortality, birth defects and preterm delivery; and improve breast milk quality and infant nutrient stores. Trials are ongoing to test the efficacy of providing supplements containing balanced amounts of multiple rather than single micronutrients.
- In areas of endemic iodine deficiency, adequate maternal iodine status is critical for the prevention of neonatal deaths, LBW, and abnormal cognitive and physical development of the infant (see below, Iodine Deficiency).
- Nonnutritional interventions that can improve pregnancy outcome include reducing energy expenditure in physical work, increasing age at conception, malarial prophylaxis, and cessation of cigarette smoking.

### Stunting

The main direct interventions aimed at preventing or reducing stunting comprise breastfeeding and complementary feeding promotion, supplementary feeding, and micronutrient supplementation. Efficacy trials on these interventions suggest a number of conclusions and recommendations, outlined in the following paragraphs.

- Exclusive breastfeeding is strongly recommended for the first 6 months of life. Breastfeeding should be continued when other foods are added to the infant's diet. In general, the quality of complementary foods is poor compared to breast milk.
- There is probably no advantage to the infant of introducing complementary foods prior to 6 months, especially where the quantity and quality of such foods are inadequate.
- The energy density of many gruels, soups,

broths, and other watery foods fed to infants is often below the recommended 0.6 kilocalories/gram. Energy intake can be increased by reducing the water added to foods where possible, and/or providing additional feedings. At present there is insufficient evidence to promote the use of amylases to lower the viscosity of cereals. Adding extra energy in the form of oil or sugar can adversely affect the density of protein and micronutrients in the diet.

- Even where breast milk intake is relatively low, in most situations the amount of protein in complementary foods will be more than adequate; adding protein alone or improving protein quality will not improve growth.
- Randomized controlled trials of the effects of processed complementary foods have shown a mixed impact on growth. Of nine trials, most included infants aged 6–12 months. In three trials, the supplement increased weight and length; in two (including Indonesia) only weight was improved; in the other four (including Thailand) there was no effect on growth. In no study did children attain the expected growth velocity for age.
- Intervention after age 12 months was less effective than between 6 and 12 months. However, there was an increased risk of displacement of breast milk when intakes of complementary foods were high, especially before 6 months of age.
- Limitations of these trials include variability in the age at which the intervention started, the composition of the foods and the amounts provided, the extent and replacement of breast milk, and the baseline nutritional status and morbidity of the infants. Few of these complementary feeding trials supplied enough micronutrients to permit the child to consume recommended intakes from the diet plus supplements.
- In most developing countries and even in wealthier regions, the micronutrient content of unfortified complementary foods is inadequate to meet infant requirements. It is particularly difficult for infants to consume enough iron, zinc, or calcium; and vitamin A, riboflavin, thiamin, and vitamin B<sub>6</sub> intakes are often low.

- Interventions with single micronutrients have shown the following benefits for children with low intakes and/or a deficiency of the respective nutrients: vitamin A prevents eye lesions, causes a substantial reduction in mortality from measles and diarrhea, and increases Hb synthesis; iron improves cognitive and motor development of anemic infants and children; zinc improves growth of children who are stunted or have low plasma zinc; iodine reduces infant mortality and goiter prevalence and improves motor and mental function; vitamin B<sub>12</sub> improves growth and cognitive function.
- Because multiple micronutrient deficiencies tend to occur simultaneously, there is interest in the benefits of providing supplements that contain multiple micronutrients. Multiple micronutrient supplements caused some improvement in height growth rate in stunted Vietnamese children and in Mexican infants aged less than 12 months, but had no impact on growth in Peru or Guatemala. Additional trials are underway to confirm whether multiple micronutrients improve child nutritional status, health, and development more than single micronutrients. Novel approaches to providing multiple micronutrients include a fat-based spread that improved growth and Hb in one trial in stunted children, and encapsulated “sprinkles,” which are undergoing further trials.
- Micronutrient intake can also be improved by targeting animal products to young children. The consumption of higher amounts of animal products was associated with better growth and micronutrient status in several studies. A review of 15 complementary feeding trials in which dried milk was included as at least one ingredient revealed that growth in length was significantly increased in 12 of these. The control groups either received no intervention, energy, or some micronutrients. The one trial with dry fish powder showed no benefits of adding it to fermented maize. Increasing meat intake improved Hb levels in Danish infants. Meats such as chicken liver could be rich micronutrient sources for infants and children, but controlled trials of their efficacy are lacking.
- Micronutrient fortification of cereal staples is especially important where these are major constituents of complementary foods.

## Iron Deficiency

Intervention trials have demonstrated a number of benefits from improving iron status and reducing anemia, as outlined below.

- Randomized, controlled clinical trials show that iron supplementation of pregnant women improves Hb and iron status, even in industrialized countries. Efficacy increases with iron doses up to 60 mg/day. Where iron supplementation has not been effective, this has been due predominantly to programmatic constraints such as lack of available supplements and poor compliance.
- No conclusions can be made about the benefits of iron supplementation during pregnancy on maternal or fetal health, function, or survival. Most trials have been conducted on relatively small numbers of women in industrialized countries. Severe anemia during pregnancy is thought to increase the risk of maternal mortality but there have been no controlled intervention trials on this question. An association between anemia and preterm delivery has been reported in several large studies but most placebo-controlled trials have been unable to confirm that anemia causes prematurity. Maternal iron supplementation during pregnancy can improve both maternal and infant iron status for up to about six months postpartum.
- A recent meta analysis comparing the efficacy of daily and weekly randomized controlled iron supplementation trials concluded that daily iron supplementation is most effective for preventing anemia—and especially severe anemia—during pregnancy. The total amount of iron consumed is the most important predictor of pregnant women’s Hb response. Antimalarial prophylaxis combined with iron supplementation is particularly important for preventing maternal anemia and LBW in malaria-endemic areas.
- LBW infants are born with very low iron stores, which are depleted by 2–3 months postpartum. Because breast milk cannot meet their iron requirements, they should be supplemented with iron starting at two months of age.
- Anemia during infancy could result in long-term or permanent impairment of psychomotor function, although more studies are needed on

this question. Iron supplementation of anemic preschoolers improves their cognitive and physical development. Improved growth of iron-supplemented preschoolers and schoolers was observed in some studies but not in others.

- Anemia is associated with lower productivity, even in tasks requiring moderate effort such as factory work and housework. Iron deficiency that has not yet progressed to anemia may also reduce work capacity. Efficacy trials have shown iron supplements to improve work performance of anemic individuals.
- Except for iron fortification, there have been few attempts to assess the effectiveness of food-based strategies to improve iron status. Increasing ascorbic acid intake through local foods is probably an inadequate strategy to improve iron status where iron deficiency is prevalent. Targeting animal products to those with highest iron requirements, and supporting the production of small animals and fish, would increase the intake of absorbable iron and other micronutrients. There are strategies available to increase iron absorption through plant breeding but the efficacy and effectiveness of this approach have not been evaluated.
- Fortification of foods with iron has produced improvements in iron status in several countries. Iron fortification of maize and wheat in Venezuela is one such example. Electrolytic iron reduced anemia and iron deficiency when added to a complementary food in Ghana. Double fortification of salt with iodine and iron has the potential to prevent both iron and iodine deficiencies and has been effective for improving Hb concentrations in India. Fortification of nationally distributed dry milk with ferrous sulfate and ascorbic acid in Chile lowered the prevalence of anemia in infants from about 27 percent to close to zero.
- The search for better fortificants continues, and sodium-iron-EDTA has good potential. When added to sugar it increased hemoglobin and ferritin concentrations in a community trial in Guatemala. Iron added to soy sauce as sodium-iron-EDTA appears to be well absorbed and is being tested in large-scale production and fortification trials in the PRC.
- Weekly delivery of iron supplements does improve iron status, almost as well as daily

delivery in the case of children and adolescents. This programmatic approach may be a cheaper, more effective way to prevent iron deficiency. Ways should be sought to deliver weekly iron through schools, community-based programs, and other situations. However, daily supplements are still more effective for pregnant women.

- Supplements containing multiple vitamins and minerals could be more effective for improving Hb response than iron alone; multiple micronutrient deficiencies often occur simultaneously and several nutrients are required for Hb synthesis. Multiple micronutrient supplements are now being formulated and tested by international organizations.

### Iodine Deficiency Disorders

Efficacy trials, summarized in Allen and Gillespie (2001), suggest the following:

- Salt iodization is by far the most important population-based intervention for IDD control and has been shown to be efficacious in alleviating IDD, assuming that iodine concentrations in the salt are at appropriate levels at the time of consumption.
- Efforts toward establishing and sustaining national salt iodization programs have accelerated over recent years. Effective partnerships have been forged between relevant UN agencies, national and international nongovernment organizations (NGOs), and the salt industry. Globally, 68 percent of households in countries with IDD consume iodized salt. Iodization rates are 70 percent in South-Eastern Asia and 76 percent in the Western Pacific (WHO regions; see Table 8.1). Central Asia is the lowest consumer at 24 percent. These figures reflect household survey data where these are available; otherwise production-level data are used as a proxy.
- Cretinism, which results from maternal iodine deficiency during pregnancy, can be prevented by supplementing the mother during pregnancy, preferably during the first trimester but no later than the second trimester. Supplementation in late pregnancy, if that is the first time the mother can be reached, may provide some small benefits for infant function.

- Iodine deficiency during early life adversely affects learning ability, motivation, school performance, and general cognitive function. It is not yet clear whether iodine supplementation benefits cognitive function if started during childhood. More studies are needed on this question. Neither is it clear whether supplementation improves growth of children.
- In an iodine-deficient region, iodine supplementation, even in the last half of pregnancy, substantially reduces infant mortality and improves birth weight.
- Giving iodized oil to six-week-old infants caused a 72 percent reduction in mortality in the first two months. This suggests that it may be useful to administer iodized oil in WHO's Expanded Program on Immunization (EPI), in areas where iodine deficiency is prevalent.

### Vitamin A Deficiency

- Most countries where VAD is known to be a major public health problem have policies supporting the regular supplementation of children, an approach of known large-scale effectiveness that can reach the subpopulations affected by, or at risk of being affected by, VAD.
- Supplementation of women during pregnancy reduces the higher prevalence of night blindness that occurs in such women in areas of endemic VAD. Night blindness carries a higher risk of maternal morbidity and mortality. Maternal mortality from pregnancy-related causes was reduced by 40 percent with weekly vitamin A supplements and 49 percent with weekly B-carotene supplements, in a study conducted in a region with a high prevalence of vitamin A deficiency in rural Nepal. While these results are exciting they need to be confirmed by the two ongoing studies related to this question. High-dose vitamin A supplements cannot be given safely to pregnant women due to possible teratogenic effects.
- A high-dose supplement given on the day of birth lowered total infant mortality during the subsequent four months, but a multicenter trial of the efficacy of high-dose vitamin A given in the EPI program failed to find an impact on mortality or morbidity during the first year of life. It is likely that the dose given was too low to improve infant vitamin A status for long. Maternal supplementation postpartum can improve both maternal and infant vitamin A status, the latter through higher breast milk content of the vitamin.
- A meta analysis revealed that high-dose vitamin A supplementation reduced mortality from diarrhea and measles by 23 percent in infants and children aged six months to five years. Severe diarrhea was reduced by low-dose vitamin A in one study of severely malnourished children, but the reported benefits of high-dose vitamin A on diarrhea-related outcomes have been variable. Little impact on recovery from acute lower respiratory tract infections has been found.
- Ongoing research will clarify the benefits of vitamin A supplementation in HIV-infected populations. Evidence to date suggests that supplementation of HIV-positive women may improve pregnancy outcome and that supplementation of infected infants and children can reduce mortality.
- Food-based strategies have good potential for preventing VAD. A number of food-based interventions have been implemented on a large scale but few have been evaluated adequately. Significant progress has been made in understanding how to effect behavior change in such programs, and about which food-based strategies are likely to be effective for improving vitamin A status. Food-based approaches need to be pursued more vigorously so that they become a larger part of the longer-term global strategy for alleviating VAD.
- The recent finding that the bioconversion of pro-vitamin A in dark-green leafy vegetables is less than one quarter of that previously thought (Castenmiller and West 1998) has raised doubts about the degree of efficacy of certain diet modification approaches to improving vitamin A status.
- Innovations include the promotion of egg consumption by small children in Bangladesh, which has shown promising results (HKI 1997).
- Breastfeeding promotion, protection, and support remain an essential component of control programs for young children, as does infectious disease control, not only through immunization, but also via complementary hygiene and sanitation interventions.

- There is an urgent need to expand efforts in fortification where foods reaching the target population groups are processed or where local fortification is feasible. Oil fortification with vitamin A is mandatory throughout most of South Asia although often not enforced.
- Control approaches based on improved availability of vitamin A-rich foods and possibly genetic modification of staple foods to enhance vitamin A availability, as with iron, have been slower to develop and more difficult to implement, but progress is being made.

### EFFECTIVENESS OF NUTRITION PROGRAMS

Although various nutrition interventions have been shown to work under certain controlled conditions, the crucial question remains: are such interventions actually *effective* on a large scale? Do they have an impact at the national or subnational level? A number of large-scale programs, generally with substantial external input, have been studied. Many of the better-known examples have been described in various ACC/SCN publications (e.g., Gillespie and Mason 1991; Jennings et al. 1991; Gillespie, Mason, and Martorell 1996). More recently, detailed descriptions of existing nutrition interventions in seven Asian countries have been compiled as part of the ADB-UNICEF Project “Investing in Child Nutrition in Asia” (see *Asian Development Review* (ADR) Vol. 17, Nos. 1, 2, 1999). These are summarized in a series of country profiles (Allen and Gillespie 2001) and discussed in several papers in the ADR supplement (Engle 1999; Mason et al. 1999; Tontisirin and Gillespie 1999).

Evaluations with varying degrees of rigor have been done on these and other programs, although there remains an extraordinary dearth of well-designed evaluations of community-based nutrition interventions in the literature (see Chapter 6 on evaluation research). A recent review of attempts to improve complementary feeding, for example, stated that very few of the large-scale programs have been adequately evaluated in terms of nutritional impact and, even when they have, it is difficult to isolate the effects of the complementary feeding components (Dewey 2000).

This is a common finding. It is rare to find a rigorous evaluation of a community-based nutrition intervention that has plausibly demonstrated net effects clearly attributable to the program. The Tamil Nadu Integrated Nutrition Project (TINP) is one example of a program

that has been carefully evaluated (Shekar 1991; Gillespie and Measham 1998) (Box 3.1). Another commonly cited example is the Iringa Program in Tanzania (Kavishe 1993).

Most of the efficacy findings discussed above relate to single interventions, while many large-scale programs are implemented as multicomponent integrated programs. Even if an evaluation has been done, it is unlikely that it has also differentiated or quantified the relative effects of the various program components. This is not necessarily a major constraint as there are likely to be positive synergies in combining many single interventions. Such positive interactions mean that the impact of the whole program is likely to be greater than the sum of its parts. The main focus therefore should be on measuring the overall impact of the complete program.

Unless otherwise stated, the programs discussed in this chapter are community-based programs that aim to prevent or reduce general malnutrition, including LBW and early childhood growth failure. The first ADB-UNICEF RETA (5671) had earlier concluded that the community-based nutrition program approach (with a strong emphasis on early childhood growth and development) in parallel with certain macro-level micronutrient interventions such as fortification, and backed up by relevant supportive policies, was the model most likely to yield results in the Asian context. Programs aimed at specific micronutrient deficiencies and overweight and obesity are also discussed (see Boxes 3.2–3.5).

This section draws upon the available evidence to outline the main features of the design of effective large-scale programs—their content, coverage, targeting, intensity, and phasing. Lessons concerning implementation and management of programs follow, including a detailed description of community-government partnerships and approaches to maximizing active community involvement and ultimately ownership of community-based programs. The use of information for program design and management is then discussed.

Most of the interventions for which efficacy was assessed in the previous section can potentially affect the majority of the problems discussed in earlier chapters, namely, LBW, young child growth failure, and the three main micronutrient deficiencies. In one of the background papers (Allen and Gillespie 2001) for this project, a series of best-practice guidelines for improving the effectiveness and ultimately the impact of key nutrition interventions is provided. These are derived from past experience in large-scale programmatic

### Box 3.1 The Tamil Nadu Integrated Nutrition Project

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

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

While the project was successful in achieving reduction of severe malnutrition and infant mortality rates, malnutrition

and LBW prevalences were not significantly reduced, although some progress was made (Gillespie and Measham 1998).

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

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

Source: Tontisirin and Gillespie (1999).

settings, some of which have been compiled as parts of various recent program design manuals (e.g., Dicken, Griffiths, and Piwoz 1997; Klemm, Puertollano, and Villate 1997; Bhattacharyya et al. 1998; BASICS/WHO/UNICEF 1999; Gillespie 1999; Griffiths, Dickin, and Favin 1999; Manoff Group 1999; Miller del Rosso 1999; WHO/LSHTM 2000). These guidelines—covering growth monitoring and promotion, communications for behavioral change, integrated care and nutrition interventions, supplementary feeding for young children and women, school feeding, health services, and micronutrient supplementation—are reproduced in this report as Annex I for easy reference.

#### Program Design

##### *Program content*

As discussed in Chapter 1, activities that are regarded as nutritional are similar across countries and indeed continents in most cases. They generally involve growth

monitoring and promotion, promotion of breastfeeding and appropriate complementary feeding, communications for behavioral change (nutrition information-education-communication or nutrition education), supplementary feeding, health-related services, and micronutrient supplementation (Gillespie, Mason, and Martorell 1996). One distinct variation, with important resource implications, is whether or not supplementary feeding is included in a program.

There are numerous options for community-based action to address problems of malnutrition that depend on the actual nature and distribution of the malnutrition problem, its causes, and the type of resources that are available or can be mobilized. There is no blueprint design. No one intervention or mix of interventions should ever be prescribed in isolation from a participatory process of problem assessment, causal and capacity analysis, and program design (the “Triple A cycle”; see Figure 3.1).

Because malnutrition is usually the result of many factors, it is not surprising that it has been attacked most

### Box 3.2 Key Success Factors in Community-based Nutrition Programs in Asia

#### Contextual Success Factors

- Political commitment at all levels of society was considered essential for social mobilization at the start of the program or project and for future sustainability. The integration of nutritional goals in development programs in general is a clear manifestation of genuine awareness and political commitment.
- A culture in which people, particularly women, are involved in decision making was prerequisite for people's participation and the articulation of bottom-up demands. A high level of literacy, especially among women, was also associated strongly with participation and organizational capabilities.
- Community organizations, e.g., women's groups, people's organizations, credit associations, youth clubs, or peasant associations, along with good infrastructure for the delivery of basic services, including committed and capable staff, should be present.
- Charismatic community leaders, who can mobilize and motivate people to do more for themselves in a genuine self-reliant way, were a major asset.
- Poverty-reducing programs, particularly those integrated with nutrition-oriented programs/projects, should be implemented in parallel.

#### Program Success Factors

- An awareness was created of the high prevalence, serious consequences, and causes of malnutrition, including the hierarchy of immediate, underlying, and basic causes, and the need to address causes at all three levels.
- A process was initiated, promoted, and supported whereby individuals and communities participated in assessing the nutrition problem and decided on how to use their own and additional outside resources for actions.
- There was clear identification and definition of time-bound goals (targets) at all levels of the program/project. Young children from birth up to two- to three-years old, pregnant and lactating women, and adolescent girls were normally the focus.
- Facilitators and community mobilizers were identified and supported, providing a sense of joint ownership of the program/project by the community and the government.
- There was good management of the program/project, including effective leadership, training, and supervision of facilitators and mobilizers; an appropriate balance between top-down and bottom-up actions; and effective community-based monitoring.
- Local NGOs, which often provided excellent facilitators as well as culture-relevant training, were involved. They were usually accountable to the community, which facilitated sustainability.

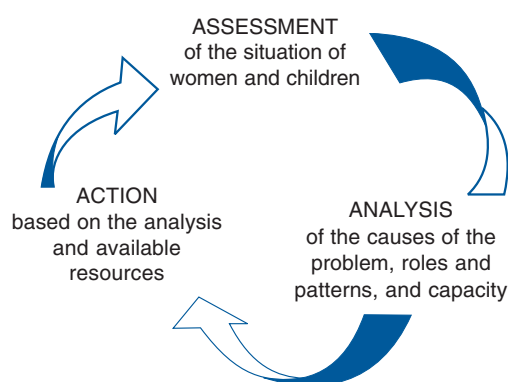
Source: Jonsson (1997).

effectively in situations in which several sectors and strategies have been brought to bear. Combining improved infant feeding, better household access to food, and improved and more accessible health services and sanitation is clearly more effective than any of these measures taken alone in reducing malnutrition where food, health, and care are all problems. Given the well-documented synergies between many such actions, the combined effects are often not merely additive, but multiplicative. Actions can be initiated to impact on different levels of the problem—immediate, underlying, or basic (see Figure 1.2).

Community-based programs proposed as part of the ADB-UNICEF RETA 5671 multicountry, investment planning process in 1998 included a range of activities. For children, these comprised any mix of the following: growth promotion, comprising growth monitoring,

protection and promotion of breastfeeding, and the promotion of appropriate complementary feeding practices; disease management, including feeding during and after diarrhea and oral rehydration therapy; micronutrient supplementation including vitamin A megadoses for children from age 6 months and possibly iron supplements where anemia is prevalent; promoting consumption of iodized salt; deworming; and targeted food supplementation, where found to be relevant, feasible, and cost effective.

For women, activities within ante- and postnatal care strategies comprised tetanus toxoid immunization; micronutrient supplementation, including iron and folic acid tablets for pregnant women and possibly a postpartum vitamin A megadose where vitamin A deficiency is known to be a problem; iodized salt consumption; food supplementation during pregnancy; malaria



**Figure 3.1 The Triple A Cycle**

The Triple A process or cycle, pioneered by UNICEF (UNICEF 1990), is a participatory decision-making process whereby the problem of malnutrition is *assessed* (in terms of its nature, extent, distribution, etc.), its causes *analyzed*, along with the available resources to combat it, followed by a decision on an appropriate mix of *actions*. The process is cyclical and iterative in that once the actions have been initiated, they are subsequently monitored and evaluated (*re-assessment*).

chemoprophylaxis in endemic areas; and reproductive health education, including the need to delay conception until after adolescence and ensure safe birth intervals.

In any situation of significant malnutrition, there will be a series of questions that need to be addressed in deciding on an appropriate action or mix of actions. Such questions concern the relevance of potential interventions to the problem situation and to the existing context, including infrastructure for implementation and other existing resources and capacity. The most efficacious approach to combat a particular problem may not be the most appropriate. Some nutrition interventions may be essential, some merely desirable.

Answers are to a large extent situation-specific. Participatory problem-solving approaches (e.g., the Triple A cycle) will reveal the main causes of malnutrition and the type and amount of resources available to combat it. The target groups and actions will require prioritization. Target groups may need to be narrowly defined to focus on those who are most needy and most responsive. For example, despite evidence to suggest that malnutrition is a problem throughout the life cycle, only 6- to 24-month-old children may initially be targeted, or 6- to 36-month-old children if resources permit; these are both the most

responsive and the most vulnerable age groups. Pregnant women will also usually be included, given their relative nutritional vulnerability, the known links between their nutritional status and birth weight, and the fact that they may be more accessible than at other times. Adolescent girls, albeit often at nutritional risk, may perhaps only be targeted later in the evolution of a program.

#### *Program coverage, targeting, and intensity*

Along with program content and organization, coverage, targeting, and intensity are also key considerations (see Tables 3.1 and 3.2). Coverage relates to the percentage of the at-risk population participating in the program, while targeting concerns the degree to which this coverage is oriented toward the most needy among those who are able to respond.

The issue of intensity concerns resource use per participant, either expressed as dollars per participant per year or in population and worker ratios, e.g., number of children per community-level worker or mobilizer, or number of facilitators or supervisors per mobilizer. Past experience has suggested that effective programs require around US\$5–15 per participant per year excluding additional food, which about doubles the cost. With regard to personnel ratios, the ADB-UNICEF RETA followed the successful Thailand example and adopted the benchmark ratio of 1:20, that is, one community mobilizer per 20 households, and one facilitator/supervisor per 20 mobilizers as a working model.

Most existing large-scale nutrition programs in Asia are significantly constrained by their limited intensity compared to the Thai system. The world's largest nutrition program, the Integrated Child Development Services (ICDS) in India, operates at ratios approaching 1:200 at the community level: one community-based *anganwadi* worker has to manage activities designed to cover around 200 households. Not surprisingly, the program is very center-based and oriented to handing out food to individuals who attend. The critically important human dimensions of counseling to improve home-based care and nutrition, tailored to the specific needs of individual children, are neglected. In the case of the ICDS, many principles on paper make sense, but the level of resources (particularly human resources) is too low to have an impact. As Mason et al. (1999) suggest, the relationship between intensity and impact is almost certainly not linear. Below a certain resource threshold it is likely that a negligible effect, if any, occurs. Intensity is thus a crucial issue.

### Box 3.3 Successful Micronutrient Deficiency Control Programs

#### Salt iodization

There are several spectacular examples of successful iodization programs, where the salt industry has taken leadership and made strides toward IDD elimination. The PRC is one; most provinces have more than 90 percent coverage with iodized salt. The national median urinary iodine is 314 mcg/L and all provinces have a median concentration greater than 100 mcg/L (denoting iodine adequacy), except Tibet. Adjusted for population, the national total goiter rate is estimated as 10.9 percent by palpation and 9.6 percent by ultrasonography, as compared to just over 20 percent in 1995. Key elements of the program are effectively iodized salt, enforcement of regulations, strong commitment by government at all levels, an intensive education program, and monitoring of salt quality and biological impact (ICCIDD Newsletter, November 1998).

#### Vitamin A supplementation

Supplementation coverage has increased significantly in the last few years, spurred on by the linkage of supplementation to immunization. Integrating the administration of vitamin A supplements with immunization services, which contact 80 percent of the world's children, has been WHO/UNICEF policy since 1994, although progress has been slow and somewhat limited. In contrast, the addition of vitamin A to polio vaccination campaigns has been quick to catch on and is proving to be one of the most successful implementation strategies for reaching large numbers of at-risk children. National immunization days (NIDS) offer a ready-made delivery infrastructure and unparalleled reach—in 1997 alone, more than 450 million children were immunized during polio NIDS. In 1998, about 90 percent of the

countries where VAD was a severe to moderate public health problem conducted NIDS, two thirds of which included vitamin A, benefiting more than 24 million at-risk children. This success was the result of a coordinated strategic effort between UNICEF, WHO, major international donors, NGOs, and academic institutions (UNICEF 1998).

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

#### Iron fortification

In the 1980s, Venezuela underwent an economic crisis that adversely affected the quality and quantity of food consumed by the lower socioeconomic classes. This caused a deterioration in the iron status of the population. In 1993, the Government started a national fortification program in which precooked maize and wheat flours—which together provided 45 percent of the daily energy of the low-income population—were enriched with 20 and 50 mg/kg iron, respectively. Both flours contained added thiamin, riboflavin, and niacin, and the maize flour was also enriched with vitamin A. By 1994, the prevalence of anemia in children age 7 to 15 years in Caracas had dropped from 19 to 9 percent, and iron deficiency from 37 to 16 percent (Layrisse et al. 1996). There was no control group.

In other cases, well-conceived programs may be ineffective simply because their coverage is too low to have a broad impact on the problem, or they do not reach those most in need. Coverage and targeting often work in opposite directions. Large-scale programs have wide coverage but are often poorly targeted, while small-scale programs—often run by NGOs—are sufficiently “intense” to ensure good targeting, yet impact is limited by their low coverage. It is important to remember that the target groups should not necessarily be the most needy (e.g., the most severely malnourished) but rather the most needy *among those who can respond to the particular intervention*. The mother of a child who is severely

dehydrated from diarrhea should not be taught about complementary feeding; she first needs oral rehydration salts to rehydrate her child. This relates to the point about actions being relevant and appropriate to the problem, its causes, and context, a common sense proposition, but one that is frequently ignored.

Answers to questions concerning *what* to do necessarily flow from an assessment and analysis of the particular problems being addressed and the nature of the capacity and resources available to deal with them. Beyond such *what* questions lie critically important considerations of *how* these activities should be initiated, implemented, managed, and monitored. Indeed, it is these *how* questions

### Box 3.4 Food-based Approaches to Vitamin A and Iron Deficiency Control

A recent review (Ruel and Levin 1999) explores the latest evidence of the impact and effectiveness of food-based strategies to reduce vitamin A and iron deficiencies, in an effort to reexamine the potential of food-based strategies to reduce micronutrient malnutrition. The main strategies reviewed were food-based interventions that aim at 1) increasing the production, availability, and access to vitamin A and iron-rich foods through the promotion of home production; 2) increasing the intake of vitamin A and iron-rich foods through nutrition education, communication, social marketing, and behavior-change programs to improve dietary quality among vulnerable groups; and 3) increasing the bioavailability of vitamin A and iron in the diet either through home preservation or processing techniques. Plant-breeding strategies were also briefly discussed because of their potential to increase the content of vitamin A and iron in the diet.

With regard to vitamin A, there is potential in home gardening combined with promotional and education interventions. However, few of the projects that were

evaluated quantified the impact of home gardening on home production, income, market sales, and women's control over income. And only a few of these studies actually measured their impact on vitamin A and other micronutrient status indicators.

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

Continued next page

that have proved to be the main stumbling blocks to realizing the potential of nutrition interventions shown in efficacy trials. (Within the *how* comes the question of *who* does what?) These issues are considered in the next section.

### Program Implementation and Management

Success in nutrition requires not only the achievement of certain desirable *outcomes*, such as reduced child malnutrition, but also that they be achieved by way of a good *process*. Both the means and the ends are important, not least because outcomes achieved to date are unlikely to endure without an appropriate process having been established.

What is a good process? Increasingly it is defined as one in which participation, local ownership, and empowerment are the driving forces. A focus on process thus aligns with the human rights rationale for action, whereby beneficiaries are considered as subjects of their own growth and development rather than passive recipients of welfare-oriented transfers.

Top-down, outcome-focused service delivery or nutrition interventions have tended in the past to dominate the field of nutrition. With limited community ownership and little attention, if any, to the strengthening

of local nutrition-improving processes, long-term effectiveness is consequently weak and sustainability dubious.

Process-focused development projects are more bottom-up in their emphasis on participation and empowerment, often supported by NGOs, and often fairly small scale. While they may be sustainable and effective, their impact may nonetheless be constrained by their limited coverage.

How then can the outcome and process orientations be effectively integrated?

Effective processes clearly already exist, in the form of coping and survival strategies that have evolved in communities over generations. In these internal processes, nutritionally vulnerable individuals themselves are the prime movers or key actors. When an individual becomes aware of the nature and causes of malnutrition, she or he will normally reallocate available resources so as to improve nutritional outcomes.

An ideal process would consist of correct assessment of the problem followed by an appropriate analysis of its causes and the resources available to combat it. Based on these causal and resource analyses, actions will follow and the result, including the achievement of a particular desirable outcome, is measured. This will in turn provide

**Box 3.4 (Cont.)**

The review highlights two contrasting facts. On the one hand, it is clear that some technologies and strategies reviewed have the potential to address many of the concerns about both the intake and the bioavailability of vitamin A and iron among impoverished populations. On the other hand, critical information gaps still exist in relation to both the efficacy (with respect to new information on vitamin A bioavailability from plant sources) and the effectiveness of many of the strategies reviewed, even for approaches as popular as home gardening. There is potential for existing home-processing technologies to address some of the concerns about the bioavailability of vitamin A and iron. Cooking, preservation techniques, home-processing techniques, and food-to-food fortification (to increase promoters or reduce inhibitors of iron) were reviewed. Many of these technologies are simple and low-cost home-processing techniques, which in some cases are part of traditional food practices of the target populations. However, there has been a limited effort to promote, implement, and evaluate such technologies in community trials. Plant-breeding strategies are at a very early stage compared to other approaches

and the information is not yet available on their potential efficacy and effectiveness. Additional studies on human bioavailability are needed to understand the full potential of plant breeding.

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

Source: Ruel and Levin (2000).

an opportunity for further analysis and better action. As this “Triple A” process of assessment-analysis-action iterates, outcomes progressively improve (Figure 3.1).

The use of a conceptual framework, showing the causes of malnutrition and how they relate to each other (see Figure 1.2), is essential for problem analysis within the Triple A process.

In sum, outcome and processes should be viewed as dual objectives. In a sense, the process should not merely be seen as a means to an end, but as part of the end itself. The Triple A cycle provides guidance in strengthening or facilitating nutrition-improving decisionmaking processes in communities, while the conceptual framework—as a hierarchical structure of causes and outcomes—provides another tool to guide and focus the problem analysis and choice of appropriate actions.

*Experience from South Asia*

The most directly relevant study of success factors in community-based nutrition in South Asia was commissioned in 1995 by UNICEF’s Regional Office for South Asia. The study aimed to appraise 21 community-based nutrition programs or projects from five countries: Bangladesh, India,

Nepal, Pakistan, and Sri Lanka, in order to distil commonalities in their success (Jonsson 1997). A carefully drawn-up protocol was used to structure the appraisals that divided success factors into those that were contextual or pre-existing, and those that were programmatic, i.e., brought about by the program or project.

These factors, outlined in Box 3.2, also provide guidance in what to look for in design, implementation, management, and evaluation of a community-based nutrition project. Not all these factors are present in every situation, nor are they all necessary to reduce malnutrition at any one time. Yet it is likely to be difficult to design effective nutrition programs where few of the indicated contextual factors exist. Indeed, many interventions are context specific, such as education or women’s status, which impact on certain groups (e.g., the educated) or under certain conditions, such as when women are empowered. In such cases, interventions must be targeted to take this into account; the context itself must be changed by other policy measures; or strategies must be designed in light of the contextual constraint. Often the policy and strategy approaches are used together: in the short run, interventions work within the constraints, while policy measures to remove the constraints are being pursued.

### Box 3.5 Possible Preventive and Promotional Interventions for Diet-related Chronic Disease

#### Food price policy

Governments engage in numerous direct and indirect methods to affect food prices, from direct subsidies that lower the purchase price to subsidies and taxes on various inputs (e.g., fertilizer, insecticides, credit programs). Import and export policies, research programs, and many other activities have profound effects on the cost of each food item. Moreover, because many foods either complement or substitute for others, a change in the price of one item may change the consumption of other items considerably, e.g., reduced cost of pork in the PRC caused increased consumption of pork and reduced intake of other major sources of protein such as wheat and rice.

#### Mass media

The media may be able to play a role in nutrition education; however, in the diet-related non-communicable disease area there is so little experience that countries need to develop pilots and evaluate them to determine what will work in Asia. Brazil is the only low-income country for which obesity rates have declined for large segments of the adult population. It is impossible to clearly ascribe causality to this trend but the most likely causal agents are the media. The first consistent mass intervention aiming to control obesity in Brazil was launched only in 1997 after the recorded decline (1989-1996).

#### Dietary guidelines

In 1993, the PRC State Council issued the first document that addressed future food production and marketing in terms of its significance for nutritional well-being. These dietary guidelines focus on undernutrition and overnutrition, and explicitly attempt to increase considerably the production and consumption of fish, seafood, poultry, and soybean. The guidelines point out many difficulties the Chinese face; large pockets of undernutrition exist, but they do provide a clear basis for developing and implementing a food and nutrition policy that would shift the composition of the diet. What is unique about this proclamation and the ongoing government effort in the PRC is the Ministry of Agriculture's recognition of the need to achieve a more balanced diet for the Chinese people and the role that the nutrition community is playing in this activity.

#### Regulation

Food regulation has been little used in Asian countries relative to nutrient content of the diet, except for work in the areas of food fortification. Food labeling and controls on supplements and additives and processing are elements of regulation that have been used in other countries. Scandinavian countries used food-regulation legislation as a component of their nutrition efforts but little research has been done to evaluate this aspect alone.

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### Forging a Community-Government Partnership

Given such a focus on processes, what type of human infrastructure is most appropriate for implementation and management?

The operational nexus of many successful community-based nutrition projects (see Box 3.2) is a fully functional link between service-delivery outlets and the communities themselves. This link tends to be forged through a partnership between frontline government employees as facilitators and community-level workers as mobilizers, although titles will differ.

The community mobilizers are usually respected members of the community, most often volunteers or at least not remunerated from outside. Facilitators are usually paid frontline primary health care workers, NGO employees, or even staff from universities or other institutions of learning, who may support, supervise, and train mobilizers. They normally do not live in the

community but visit the community frequently; they know the local language and are familiar and interact positively with the local culture.

The ratios of mobilizers to households and of facilitators to mobilizers, as discussed above, are important factors. Drawing on the Thai experience, 1:20 at each link is taken as a benchmark. Figure 3.2 portrays the nature of the linkage between service-delivery structures and the community, mediated by the facilitators and mobilizers, and the type of work done at the interface.

The selection and training of facilitators and community mobilizers are key elements of the approach. Facilitators should not train mobilizers in what to do, but rather strive to empower them. This requires both participatory training methods and a power shift from the outside supporter to the facilitators and the mobilizers. Outside support channeled through facilitators includes advocacy, information, education, training, and direct service delivery (see Figure 3.2).

### Box 3.5 (Cont.)

#### Extension

Part of the effort by the Republic of Korea Government to preserve the country's traditional low-fat diet is reflected in a unique training program offered by the Rural Development Administration. Since the 1980s, the Home Management Division of the Rural Living Science Institute has trained thousands of extension workers to provide monthly training sessions in cooking methods for traditional Korean foods, such as rice, *kimchi* (pickled and fermented Chinese cabbage), and fermented soybean food. These sessions are open to the general public in most districts in the country, and the program appears to reach a large audience. This experience is a unique one that may be difficult to replicate in the era of global food trade and mass media.

#### School-based efforts

School-based initiatives offer important possibilities for improving diet and activity patterns and many other elements of a healthy lifestyle; however, few initiatives have made a marked improvement in this area and surprisingly few have been carefully evaluated. One exception is Singapore's Trim and Fit Scheme, a comprehensive 10-year program that commenced in 1992,

that included a variety of components, including education and training of teachers, assessment of students, reduced sugar in beverages, and increased school workouts for children. The result has been a marked improvement in fitness and some evidence of a meaningful reduction in the obesity level.

#### Agricultural research

Agricultural research is very important in its ability to shift the nutrient composition, be it macro- or micronutrient composition, of the food supply. In the US, differences attributable to food-processing modifications (e.g., changes resulting in differing fat absorption), as well as shifts in breeding, feeding, and market trim practices in the livestock sector have contributed to lower levels of fat in meat over time. A major review of this area by the US National Academy of Science showed a wide range of ways through which the agriculture sector could improve the healthfulness of its products. (Committee on Technological Options to Improve the Nutritional Attributes of Animal Products 1988). As noted in Chapter 4, shifts in agriculture research also may lower the relative prices of healthier foods such as fruits and vegetables. Increased availability of healthier foods in the market is an important factor in promoting healthier food choices.

Source: Popkin, Horton, and Kim (2001).

The empowerment of community mobilizers is enhanced by the existence of community organizations, an important contextual success factor identified in the UNICEF South Asia study. If such organizations do not exist, they need to be created to represent the nutritionally vulnerable people in the community. Women's groups or organizations are often the most committed and efficient organizations to address nutrition problems. Indeed, the involvement of women is another prevalent contextual success factor, although it is important to combat the perception that solving the nutrition problem is the sole responsibility of women. Successful programs are thus "gender-focused" not "women-focused" (as discussed in Haddad 1999).

#### Community Participation and Community Ownership

Active community participation leads to community ownership. However, the concept has been abused in the

past whereby "community participation" was covertly viewed as a way of coopting local people to undertake certain tasks cheaply, so as to further goals set by external programmers. In such approaches, community participation in implementation was usually not matched with power over decisionmaking or control over the use of resources. Consequently, there was little sustainability. Active (or proactive) community participation should thus be differentiated from passive (or coerced) participation. Only when participation is active do community-based programs become community driven.

In addressing malnutrition, there is no substitute for assessment and analysis done with the full and active participation of the families most threatened by nutritional problems and most familiar with their effects and causes. Not only does this make sense with regard to efficiency, effectiveness, and long-term sustainability (Bamberger 1988), it is also an imperative from a human rights perspective (see Chapter 6). The rights of

**Table 3.1 Characteristics of Selected Current Programs Addressing General Malnutrition**

Project	Type, Content	Coverage, Target Groups	Resources/Intensity
<b>Bangladesh</b>			
Bangladesh Integrated Nutrition Project (BINP)	Community-based nutrition; including supplementary food	Under 2s, pregnant and lactating women. 8M people (7% of population)	1 mobilizer (community nutrition promoter) per 1,000 population. \$14M/yr. About \$18/person/yr
Family Welfare (FW)	Family planning	Pregnant and lactating women. 49% of couples	1 FW assistant per 7,000 population
Control of Diarrheal Disease	Diarrheal disease control	Children in centers with diarrhea; about 50% of areas covered	ORT, about 1 unit per 40,000 children
Overall: 10 large programs/service delivery systems are in the country study (most governmental); coverage usually <50 percent, esp. rural areas; in area covered, resources of trained and supported staff low. Expansion of coverage and increased intensity needed.			
<b>India</b>			
Integrated Child Development Services (ICDS)	By <i>anganwadi</i> worker (AGW) in centers in villages; includes supplementary food, health and education services	Children 0-3, 3-6 yr, pregnant and lactating women. In 3,900 of 5,300 blocks (74%). Less coverage of 0-3-yr olds	1 AGW/1,000 persons i.e. 200 children; 1 supervisor/20 AGWs. Suppl. food takes substantial resources. Nonfood costs about \$2/yr
Public Distribution System (PDS)	Subsidized food and basics via fair price shops (FPSs)	Poor are targeted, but much leakage. Coverage 85% of areas	350,000 FPSs, 1/2500. About 20kg/person/yr cereals distributed
Tamil Nadu Integrated Nutrition Project (TINP)	Via paid community nutrition workers (CNWs). Feeding for underweight, plus services	Children 6-36 mo, pregnant and lactating women; those with growth failure. 40% of blocks, 20% children participated in 1990. TINP II, 0-6-yr children	\$9/person/yr ('85), + \$3 on food, was estimated. TINP II supervision ratio 1:10. 1 CNW: 300 children
Others: many programs, e.g., poverty alleviation (IRDP, NREP-employment guarantee-JRY) are relevant; coverage usually poor for worst-off, and \$/head low.			
Overall: In a country this size, state level analysis is needed. Generally a considerable number of relevant programs with incomplete coverage (<50 percent often), usually targeted away from the most needy and under-resourced. Some content issues arise, e.g., ensuring that youngest children and pregnant women are reached; food distribution, via ICDS as supplementary, or PDS noon meals, etc., have not been evaluated for cost effectiveness and may not be optimal for nutrition.			

Continued next page

**Table 3.1 (Cont.)**

Project	Type, Content	Coverage, Target Groups	Resources/Intensity
<b>Pakistan</b>			
Prime Minister's Programme for Family Planning and Primary Health Care	Lady health workers (LHWs) at village level, link with health, provide services including nutrition education	LHWs in 110 of 120 districts. Mothers and children targeted	Supervision 1:33, approx 1 LHW:500 children
Health and Nutrition Development Society (HANDS)	Community-based, small scale, to learn from. Social mobilization, improving women's status are components	50 villages, 35,000 children under 12	
Overall: Not many large-scale programs, perhaps building on the LHWs program may be promising. A number of smaller-scale projects can provide positive (and negative) experiences that can be drawn on.			
<b>Cambodia</b>			
Community Action for Social Development (CASD)	Supported by a range of agencies, esp. UNICEF, through village development committees (VDCs); several hundred local programs. Education, food, water, health, protection of women and children, credit, employment	400,000, especially women & children, 20%. 550 villages/2,000	\$4M/yr = \$11/person/yr
NGO Programs	534 projects in all, in agriculture, capacity building, community organization, food security, health, water/sanitation. ADB supports some	All provinces covered, but targeted to central areas	Not given
Overall: Many small-scale, often NGO-supported, activities are in place. Opportunity for increased resources and expanded coverage to have impact. Program content probably enlightened.			
<b>Viet Nam</b>			
National Programme of PEM Control for Children (CPCC)	Community-based with village collaborators (paid). Nutrition education, growth monitoring (GM) rehabilitation, referral	Children <5yrs and pregnant women. 53 provinces. 2M children (15%) weighed in GM	1 collaborator/450 children (1994). \$0.8/child/yr
Pilot Community-based Child Nutrition Project	More intensive than CPCC, links to micro credit, commune steering committees	14 communes (out of 500). 10,000 covered	15-20 children/mobilizer; \$2.6/child/yr
CDD, ARI, Food Security, FP, Health Educ., Evt. Sanitation, Poverty & Hunger Alleviation, Credit, and other such programs	Many such focused programs exist or are planned. All may benefit from increased resources and coordination.		

Continued next page

**Table 3.1 (Cont.)**

Project	Type, Content	Coverage, Target Groups	Resources/Intensity
<b>Sri Lanka</b>			
<i>Thripasha</i>	Supplementary food distribution, fortified via (?) health system	Pregnant women (2nd+3rd trimester), 6-12 mo, 12-48 mo children meeting eligibility criteria. 32% covered	\$2/person/yr 200 kcals/person/day
<i>Samurdhi</i>	Income-support program, with eligibility, countrywide; also includes some nutrition work, and could be basis for wider nutrition program	Poor households (hh), from income criteria. <i>Samurdhi</i> workers are in all areas	Not given, but income support can be around \$100/hh/mo
Participatory Nutrition Improvement Project (PNIP)	Pilot community-based project, with local mobilizers and external facilitators (EFs); education, referral, community development	All hhs in pilot areas, with focus on preschoolers, pregnant and lactating women	1 EF per 300 children; 1 CF/30 children Evaluation needed of cost-effectiveness
Overall: Extensive health infrastructure (e.g., 95 percent of babies delivered in facilities) and poverty alleviation ( <i>Samurdhi</i> ) system give great opportunity for effective nutrition work, which is still much needed even with good services. Pilot exercises need evaluation lessons to be drawn for strengthened program design.			
<b>Philippines</b>			
BIDANI	Pilot: supplementary feeding, nutrition education, village development	514 villages, with emphasis on poor hhs	Approx \$2/child/yr
LAKASS	National nutrition/poverty program, community-based. Policy top-down	Nutritionally depressed municipalities targeted	\$0.4/child/year in targeted municipalities
National Food Authority (NFA)	Rice subsidy with public distribution	Mainly covers (40%) capital and nearby regions, <5% of poor	\$100M/yr = about \$7/person/yr of those benefiting
Overall: Supplementary feeding also quite extensive. Resource availability at local level and support for village workers and activities are insufficient for impact. Structure exists that with more resources and review and possible reorientation of activities in relation to causes, programs could have effect.			

Source: Mason et al. (1999).

malnourished people give them valid claims on society. In order for households and communities to carry out their duties toward such people, they must be recognized as key actors rather than as passive beneficiaries. The right to participate is enshrined in several human rights conventions.

Community participation has been defined as having three main elements: the sharing of power and resources, deliberate efforts by social groups to control their own destinies, and the opening up of opportunities from below (Dillon and Steifel 1987; Ghai 1988). In the long run,

active community participation, almost by definition, is essential for real community-based nutrition programming to succeed and sustain itself. It routinely emerges as a key success factor in many reviews of nutrition programs (e.g., Jennings et al. 1991; Gillespie, Mason, and Martorell 1996).

Participation should be monitored. Shrimpton (1995) has provided an analytical framework that enables the following ingredients of participation at different stages of program planning, implementation, and monitoring to be graded according to the degree to which the community actively participates: needs assessment and choice of

**Table 3.2 Characteristics of Selected Current Programs Addressing Micronutrient Malnutrition**

Project	Type, Content	Coverage, Target Groups	Resources
<b>Bangladesh</b>			
VAD: Nutritional Blindness Prevention Program	VAC distribution with National Immunization Day and EPI; home gardens; education	85% coverage of children with VAC. Postpartum supplementation also, coverage not known	\$0.8M/yr for VAC for children
IDA: with ANC	Fe-folate given at ANC visits. Fortification: not yet	ANC coverage 20% (R) - 50% (U); compliance not known	
IDD: Control of IDD Program (CIDD)	Salt legislation enacted 1995; mass communication. Iodized-oil injections phased out	Highly variable iodine content in salt; 265 refineries	Monitoring and quality control are issues
<b>India</b>			
VAD: Massive Dose; Fortification	Vitamin A in oil dispensed. Vegetable oil fortified but limited outreach	68% of 6–12 mo, 25% of 12–60 mo reported covered. Fortified oil reported not to reach poor	
IDA: National Nutritional Anemia Control Program	Fe-folate, supplements. Diet promotion. Rehabilitation	Pregnant and lactating women targeted. Supplements low coverage and variable supply	
IDD: Universal Salt Iodization Program (USI)	650 salt iodization plants established; mobile labs; quality still highly variable	In principle all areas should have access, but remote areas vulnerable	Quality control major issue
<b>Pakistan</b>			
VAD IDA	No national program No national program. Iron presumably in ANC		
IDD: National Program	Social marketing to create demand; support to producers (600+). Iodized Salt Support Facility	70% of producers iodizing (1996), 50% hhs with iodized salt. Endemic IDD areas in north targeted	About \$1.5M/yr. 4 cents/beneficiary
<b>Cambodia</b>			
VAD Control: HKI & UNICEF	VAC with Nat'l Immunization Day, changing to EPI	99% of target children reported, survey shows 47%	
IDA: no national program. Fe-folate available in health centers, use probably low.			
IDD: Control Programs	Salt iodization programs beginning; salt production is mainly in one area. Iodized capsules in interim in bad areas. Well-water iodization also tried	Coverage low now, programs starting	\$0.5/person/yr

Continued next page

**Table 3.2 (Cont.)**

Project	Type, Content	Coverage, Target Groups	Resources
<b>Viet Nam</b>			
VAD: National VAD Control Program	VAC distribution, nutrition education, dietary improvement. VAC postpartum	VAC 6-60 mo. 98.5% coverage reported. Mothers 53%	878 commune workers, 940 districts, 106 provinces. \$0.08/person/yr
IDA: National IDA Control Program	Iron tablets, deworming, fortification planned, diet diversity	Pregnant women, children <2yrs, girls >15 yrs. 425,000 pregnant women reached with tablets in 1995 (20%?), now <25%. Impact reported	200 commune workers (1/10,000) women. \$0.55/person/yr
IDD: National IDD Control Program	Salt iodization	Hhs using iodized salt: 40–90% by area (1996). 86% salt produced iodized	\$0.05/person/yr
<b>Sri Lanka</b>			
VAD: no policy, but recent survey demonstrated problem; VAC postpartum to start; supplementary food for poor mothers and children ( <i>Thripasha</i> ) fortified with vitamin A and range of micronutrients			
IDA: in ANC	Fe-folate given with ANC, which has high participation. Fortification of wheat flour being considered	ANC covers most pregnant women Wheat flour mainly in urban areas	
IDD: Salt Iodization	Law enacted in 1995. Quality highly variable, only 30% adequately iodized	National program	
<b>Philippines</b>			
VAD Control Program (ASAP)	VAC with National Immunization Day Several foods fortified with VA	Preschoolers, 100% reported, 80% on survey	VAC \$0.4/person/yr including program costs
IDD Control	Iodized oil capsules, with VAC (ASAP). Salt iodization	Capsule targets? Salt: whole population	Oil capsules: \$0.1/person/yr Iodized salt: \$0.3/person/yr

Source: Mason et al. (1999).

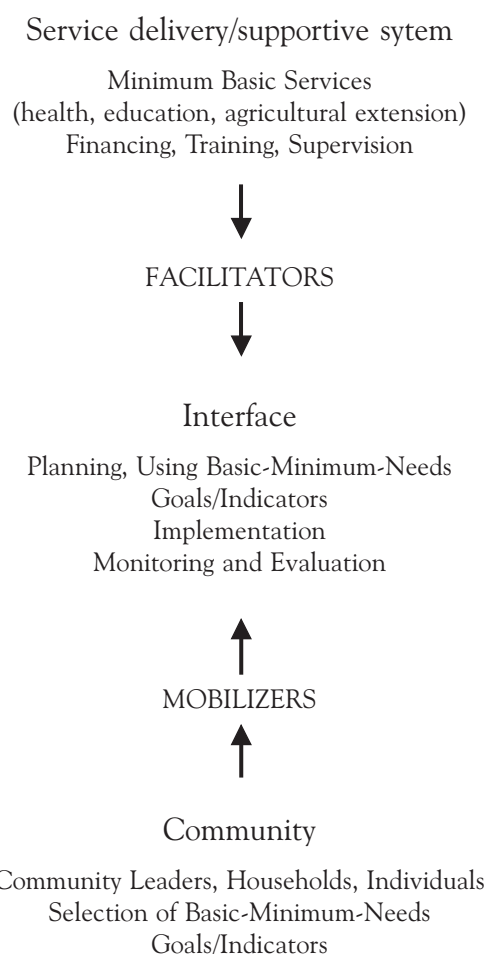
action, organization, leadership, training, resource mobilization, management, orientation of actions, and monitoring evaluation/information exchange.

### INFORMATION SYSTEMS FOR PROGRAM DESIGN AND MANAGEMENT

Solving nutrition problems requires improved management of resources at all levels of society. The provision of information and its systematic use are essential parts of any resource management and decision-making process.

The design of a strategy for generating and using nutrition-relevant information should start by considering factors that influence decision-making processes. A main aim should be to strengthen the interaction between individual and institutional decision-making processes for the improvement of nutrition, and to rationalize and enhance the use of information to improve nutrition-related decisions at all levels of society. There are usually three main objectives of any nutrition information system (NIS) (Jonsson, Shrimpton, and Pelletier 1998):

1. improved decisions about targeting of nutrition-relevant services;



Source: Tontisirin and Gillespie (1999).

**Figure 3.2 Community-based Nutrition Operational Nexus**

2. improved decisions on use of existing resources for nutrition improvement; and
3. improved availability and access to resources for nutrition improvement.

The relative importance and feasibility of each objective will be determined by the particular context. Each objective calls for a different mix of the four major communication strategies, i.e. advocacy, training, education, and information systems. Program information is most important for objective (1) above, education and training for objective (2), while objective (3) often requires advocacy and social mobilization (as described in Chapter 6).

NISs should be considered as subsets of an overall nutrition information strategy that broadly specifies the means through which information gets translated into action. NISs are essentially variations of the Triple A cycle (Jonsson, Shrimpton, and Pelletier 1998). Their main objectives are:

1. growth monitoring and promotion;
2. program design;
3. program management;
4. policymaking; and
5. crisis management (including surveillance).

NISs of types 1–3 are described here (as they aim to maximize the use of existing resources for nutrition improvement), while 4 and 5 are covered in Chapter 6, because they further aim to gather and use information to *increase* the resources allocated to nutrition.

### Growth Monitoring and Promotion

Growth monitoring and promotion (GMP; often more appropriately referred to as “growth promotion”) is a specific communications approach aimed at behavioral change, by making the impact of preventive actions visible to families and to others in the community and health services. Through monthly weighing of a child and plotting its weight on a growth chart, adequate or inadequate changes in weight can be revealed. These changes can then be discussed and used to reinforce positive practices, motivate changes in harmful ones, reward and sustain new behavior, and target nutrition and health advice and services to particular individuals, households, and communities.

Growth monitoring is effective only when the information is actually used in this way, hence the switch to the term “growth promotion,” which is the ultimate objective. It is usually only effective when carried out at the community level by community mobilizers (e.g., trained mothers, adolescent girls) who can weigh accurately, understand and interpret growth, and use the information in counseling or in advocating for more community resources for nutrition. Its *raison d’être* is one of prevention through identifying faltering growth early on.

In 1990, UNICEF conducted a multicountry evaluation using a common protocol that viewed GMP programs as an effort to incorporate a Triple A cycle into existing decisionmaking processes at household and community levels (Pearson 1995). The main findings were as follows:

- GMP has been viewed as an objective in its own right, rather than an important tool to facilitate a process. Weighing and plotting technologies have often been disseminated (for assessment) without proper attention or support to the other components of the GMP-based Triple A cycle (analysis of causes, communication with decisionmakers, linkage to action).
- The weakest stages of GMP have been analysis and action. Analysis has been impaired by the lack of a well-understood conceptual framework to guide the search for causes and solutions, and often by the lack of time for the health worker to conduct the analysis with the child's caretaker. This problem is particularly acute in clinic settings where time is short and action is limited to what can be done in the clinic (e.g., supplementary feeding), actions that may not be appropriate for the causes of malnutrition in every child.
- Most GMP programs have not forged effective links with the individuals and institutions that control resources for action. The separation of clinics from relevant community institutions and decision makers is a particularly acute problem.
- The successful introduction of a 'new' Triple A cycle, in the form of GMP, requires a significant effort to sensitize household or community decision makers to the existence of a broad social problem, to relate it to familiar aspects of life that concern them (including consequences of illness and death), and finally to mobilize a demand for the information and action that can be derived from GMP.

Transmitting data from GMP to higher administrative levels often has a negative impact on their use at lower levels. This is partly because of the time required to make use of the data, but also, and equally importantly, because transmitting data elsewhere gives the impression that the data—indeed, the entire exercise—is for 'someone else' in those higher levels. In any event, GMP data are seldom used at higher levels, except for monitoring attendance, and are seldom communicated back to the communities. Best-practice guidelines for GMP are provided in Annex I.

### Information for Program Design

Program design, as mentioned, involves consideration of coverage, intensity, targeting, and content. The first three issues require straightforward results from a few

measurements, although usually requiring a large sample. However, deciding on program content requires more advanced analysis, including small-scale but in-depth studies (Mock and Mason 1999).

Indicators appropriate to program design may be grouped into outcome, process, and context. Outcomes refer to population-level changes in behavior and health/nutrition status, usually the immediate causes and consequences within the UNICEF conceptual framework. Processes refer to the host of program-related activities such as coverage, targeting, intensity of services, and quality of services. These indicators track the efficacy and efficiency of transforming inputs to outputs. Finally, context indicators reflect basic and underlying causes that may not be directly targeted by country programs, but that represent either important constraints or mediating influences on the results of country programs.

### Information for Program Management and Quality Assurance

Program management requires regular data on the process of program implementation—hence management information systems—data that are usually derived from routine program monitoring. Measuring outcomes over time using growth-monitoring data is a high priority, but should only be promoted when it is first useful as part of the community-based actions.

Program management information does not generate evaluation of impact (meaning net effect attributable to program activities). Impact evaluation (and cost-effectiveness analysis) entails more complex and less common evaluation research, typically involving probability surveys and comparison groups. For this reason, evaluation research is discussed in Chapter 6.

With regard to best practices in program monitoring, a prevalent problem is that monitoring systems are often mainly designed to serve the information needs of senior managers, thus reinforcing a top-down rather than bottom-up, community-based management system. The drive for more and better information for management often leads to more data being collected and sent upwards than is usable by managers, delays in processing data and providing feedback to the field, too much fieldworker time spent on recording and reporting, and marginalization of fieldworkers, supervisors, and local communities as primary information users.

A management information system (MIS) is essentially a system of collecting, analyzing, and using

key monitoring data to improve the management and ultimately effectiveness of a program (see Mock and Mason 1999; Tontisirin and Gillespie 1999). The two main principles for the use of information for action are to firstly, collect the minimum feasible amount of data required to inform and improve decisions leading to action, and secondly, maximize the use of data at the level at which they are collected. A MIS should specify the

- purpose of data collection—who needs to know what, to do what;
- type, quantity, and quality of data to be collected, by whom, and how frequently;
- level of aggregation required (regions, communities, households);
- type of minimum analysis to be carried out at each level;
- types of action envisaged on the basis of such analysis, at each level;
- means of transmitting such data, to whom, and how frequently;
- types of feedback (including qualitative) to those responsible for these actions;
- system to be adopted for data validation and data quality improvement;
- the communities' role in monitoring and in targeting at-risk households;
- the role of qualitative information, and means of collection and analysis; and
- indicators that are valid, reliable, sensitive, and feasible as well as acceptable to beneficiaries.

A simple streamlined MIS should be constructed as part of the initial program design process to monitor performance (see Gillespie 2001, Annex III, for an example of a core monitoring proforma and Box 3.6 for a country example of an action-oriented system). A simple guideline matrix linking options for action with different types of information could be drawn up including all levels from community to central government. This might include the specification of “trigger points” or critical thresholds for action with respect to certain indicators.

Qualitative monitoring should be incorporated in the MIS through periodic social assessment or participatory rural appraisal (see Gillespie 2001, Annex II, for more details), e.g., using focus-group sessions to provide valuable qualitative information to supplement quantitative data and highlight possible operational research priorities. There will be a

### **Box 3.6 An Indonesian Nutrition Management Information System**

In Indonesia, the Community Nutrition Improvement Program (UPGK) used a system known as “SKDN” where S is the number of under-five-year-old children; K, the number with growth charts; D, the number who have attended a weighing session and been weighed; and N, the number who have gained weight. Each *posyandu* (or community health post) examined and reported its coverage at first contact (K/S); participation in weighing (D/S); and outcome (N/S). Monitoring of the participation in weighing (D/S) was considered a measurable indicator of community participation. Such information could be provided on a community growth chart so that the community is aware of and involved in the progress made.

This system fell into disuse during the 1990s. Recognition of its unrealized potential for targeting poverty alleviation efforts following the recent Asian financial and economic crisis has led to recent efforts to revive it.

particular need for information about caregivers' changing perceptions and behavior, and the quality of worker/caregiver interactions, especially with regard to community mobilization and information-education-communication. Typically, such information, if gathered at all, has been collected as part of infrequent evaluation exercises. Yet, if behavioral change and community empowerment are key objectives of community nutrition programs, qualitative monitoring of progress in these areas is as important as quantitative monitoring of input and output indicators. Sentinel sites may be used for such monitoring with periodic rotation to ensure that they are not changed by the monitoring process itself.

The MIS is fundamentally a quality assurance tool. The findings of whatever analysis is undertaken at more central levels should be promptly fed back in a clear format to lower levels. Such analyses could compare performance in different project areas, which in turn permits 1) workers to see how they are doing relative to others; 2) managers to use competition between project areas as a performance incentive; and 3) supervisors and higher-level managers to practice management by exception. An example is given in Box 3.7. But for the MIS to improve program quality, its own quality needs to be taken into account. Simple data quality-control checks should be incorporated in the training of MIS managers at different levels.

### Box 3.7 Data for Decision Making: An Example from the Philippines

Information systems can be used to identify populations to be targeted for assistance, assist in decision making about the nature of services required, support advocacy to create demand and local ownership for nutrition programs, and provide the basis for assessing impact and sustainability of the program.

The Philippine Early Childhood Development Program (Heaver and Hunt 1995) provides an excellent example of an integrated information system that effectively uses microcomputer-based information technologies at the subnational level. Enabling conditions include decentralized resource management to local governments and a 10-year investment program for early childhood development that mandated the development of local programs.

Census data and agency service statistics were combined to rank municipalities according to the severity of the problems facing children (e.g., high population ratios for each school, health facility, or day care center, or high rates of malnutrition and school dropout) and the number of children needing targeted services in health, nutrition, and early education. Some 170 municipalities were targeted in three regions in the southern Philippines. These areas represented over half of the nation's at-risk children.

Local cost sharing was an element of the national program, and fiscal data on municipalities were used to develop a set of sliding-scale cost-sharing rules. Each

municipal plan is tailored to the children's health, nutrition, and educational profile. Unless the mayor and municipal council agree to balance all the needs of children and provide appropriate integrated services, national subsidies will not be forthcoming and the municipality will not participate.

The third important use of information is for advocacy, social mobilization, and local empowerment. Several methods of data analysis and presentation link nutrition, health, and developmental indicators. These include community data boards relating minimum basic needs to child development, creation of community plans for accessing child development funding, and integrated planning and budgeting that link resource use to child development outcomes.

The vertically integrated system permits the national apex agency, the Council for the Welfare of Children (CWC), to identify problem areas in reaching program goals. From the *barangay* (village) captain to the CWC Director and the President's Cabinet Office, data are the key to planning, managing, and sustaining a highly devolved program that is viewed as a model for accountable governance for children. Microcomputer-based software enhances the decision-support qualities of the information system by permitting easy integration of outcome, process, and context data and easy-to-interpret graphical output.

Source: Mock and Mason (1999).

## SUSTAINABILITY

Sustainability is conventionally defined as the durability of positive results. But it is more than this. For nutrition programs to make a difference in the long term, sustainability of positive outcomes and positive processes is crucial. Programs may deliver services that improve nutrition and it will be important that such services and benefits continue—at least so long as they remain relevant, effective, and efficient when compared to other options. But the long-term aim should be to facilitate or strengthen community-based nutrition-improving processes. It is ultimately the sustainability of the process, not the program per se that is most important, with the link between the two being community ownership. Program sustainability, considered in this way, is a merely a milestone along the road to process sustainability.

Sustainability must be built in from the planning stage when nutritional interventions are designed. Building on local nutrition-improving processes helps

to assure support and promote commitment as well as the mobilization of local resources. Sustainability analyses need to be long term because the objectives for such programs involve changes in community and household decision making that require time to take hold. Both external and locally mobilized support will need to match these long-term objectives.

Sustainability relates to 1) the stability and strength of support of a program from key stakeholders (including the community, local and national government, and other external agencies); 2) the coverage, intensity, targeting, quality, and effectiveness of actions; 3) the status and condition of program infrastructure, the systems for its maintenance, and the adequacy of the operating budget; and, finally, 4) long-term institutional capacity, including the capacity and mandate of operating agencies, the stability of staff and budget of the operating agency, adequacy of coordination between agencies and between community organizations and beneficiaries, and the flexibility and capacity to adapt the project to changing circumstances (Valdez and Bamberger 1994).

## 4. Indirect Actions for Improving Nutrition

**N**utrition interventions do not operate in a vacuum. As described in the previous chapter, the transition from nutrition interventions that are efficacious to those that are effective, large scale, and sustainable is a difficult one. There is a wide range of policies that can support or undermine this scaling-up process. When designed appropriately, they can do one or more of the following: (1) directly contribute to accelerations in malnutrition reduction, (2) increase the impact of a given direct nutrition intervention, or (3) increase resource flows to effective nutrition programs.

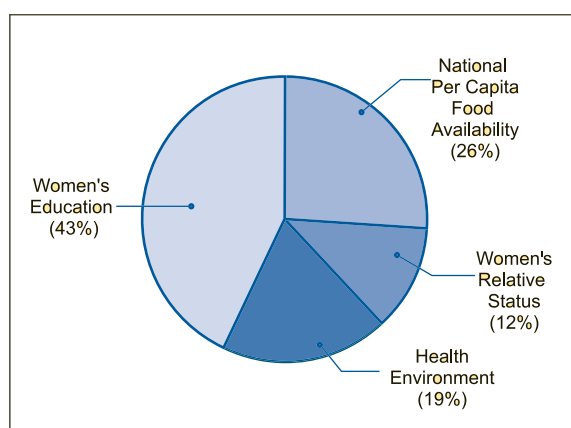
For example, a vibrant small-scale agriculture sector, women with the same ability as men to own land and earn income, widespread access to clean water, and access to high-quality health and education services dramatically increase the chances of observing an impact on malnutrition from a well-designed nutrition intervention. In addition, social programs that are well-targeted to the poor and needy, institutions and organizations that do not exclude the poor and malnourished, and legislation that secures property rights for private-sector investments that work for the malnourished will increase the resources that can be marshaled for the fight against malnutrition.

This chapter identifies policies that, when designed appropriately, can provide an immense amount of support to direct nutrition interventions—either directly, or by increasing the impact of existing interventions, or by increasing resources for their expansion. These policies are organized around the food-care-health conceptual framework (see Figure 1.2).

Policies are examined first from the perspective of the underlying determinants of malnutrition—household food security, care, and the health environment—with suggestions being made for policy changes that should increase their impact on reducing malnutrition. The next chapter considers policies that affect the basic determinants of malnutrition—economic, political, and institutional—and some important macro-level trends that condition the environment for nutrition action.

The definition of policies that is used is broad. It includes not only actual policy documents, but also the institutions and processes through which they are generated and transmitted.

Analysis of data for 1970–1995 for 63 developing countries indicates that all three underlying factors—food, care, and health environment—have played an important role in the reductions in child underweight



Source: Smith and Haddad (2000).

**Figure 4.1 Contributions of Underlying Determinants to Reductions in Child Underweight in 63 Developing Countries, 1970-1995**

rates observed over this period (Figure 4.1). Note however, that this analysis focused only on the underlying and basic-level determinants of malnutrition and did not measure the effects of immediate-level factors, nor of the types of programs that have been designed to deal with them, e.g., direct community-based nutrition programs discussed in Chapter 3.

For Asian countries, a similar analysis, but disaggregated over time (Figure 4.2), shows that in South Asia, (1) in the 1980s, food availability played the largest role in reducing child underweight, (2) the influence of women's education on reductions in child underweight grew steadily throughout 1970–1995, and (3) improvements in the health environment made a large contribution in the late 1980s. For East Asia, the main contributing factor to the reductions in underweight rates in the last 10 years has been girls' education. In the 1970s, it was food production increases that contributed most significantly to reductions in child underweight.

Priorities for future action at the underlying and basic determinant level must come in areas that have had a strong impact on child underweight but are still a long way from attaining desirable levels. For South Asia, the priority should be on women's education and increasing agricultural productivity. For East Asia, the implied priorities are women's education and status, with improvements in food productivity a close third (Table 4.1).

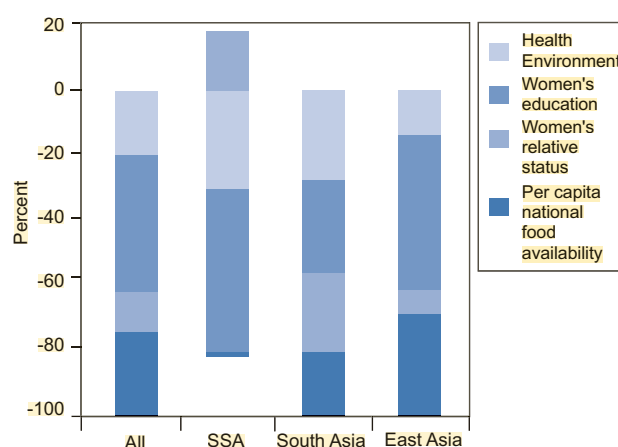
## HOUSEHOLD FOOD SECURITY

A household is food secure if it can reliably gain access to food in sufficient quantity and quality for all household members to enjoy a healthy and active life. Urban households are highly dependent on markets for food access. Rural households rely on some combination of production and purchase. The food security of both types of household is reliant on food prices and household income level, flow, and variability.

The concept of food security has spawned more than 200 definitions as outlined in Smith, Ponting, and Maxwell (1992), 32 of which are reproduced in Maxwell (1996). In general, the focus has shifted from the macro to the micro and from production to consumption. Global food production was very much the focus of the World Food Conference of 1974. The shift in focus toward the household occurred close to the time that Sen (1981) was popularizing the concept of entitlements to food, most vividly drawn in the context of famine. The move toward individuals was formalized by the World Bank (1986) definition of food security, which is still the one most widely quoted:

*Food security is access by all people at all times to enough food for an active healthy life.*

This definition opened the door for intrahousehold considerations and nutrition concerns. The former was



Source: Smith and Haddad (2000).  
SSA = Sub-Saharan Africa

**Figure 4.2 Relative Contributions to Reductions in Child Malnutrition in Selected Regions, 1970-1995**

**Table 4.1 Strength and Potential for Impact of Underlying Determinants**

Underlying Determinant	Percent Increase in Underlying Determinant to Produce a 1% Reduction in Child Underweight as Percentage of the Developing-Country Range of that Underlying Determinant	Percentage that Underlying Determinant is Below Desirable Level
<b>South Asia</b>		
Safe Water Access	13.2	-20.3
<i>Female Education</i>	<i>4.6</i>	<i>-65.9</i>
Women's Status (Female to Male Life Expectancy)	9.3	-58.9
<i>Per Capita Food Availability</i>	<i>4.5</i>	<i>-46.5</i>
<b>East Asia</b>		
Safe Water Access	13.2	-33.5
<i>Female Education</i>	<i>4.6</i>	<i>-40.2</i>
<i>Women's Status</i> (Female to Male Life Expectancy)	<i>9.3</i>	<i>-37.4</i>
Per Capita Food Availability	9.0	-23.8

Source: Smith and Haddad (2000).

Note: Italics indicate priorities for each region.

popularized by a number of papers including Folbre (1986) and Haddad and Kanbur (1990). These papers made it clear that not all members received food in equal proportion to need. Households might be food secure in terms of overall access to calories, but the household average hid systematic disparities against women and infants (Haddad et al. 1996). In addition, this body of work confirms the central role played by women in achieving food security for all household members. If women have access to a greater share of household resources at a given level of overall household resources, household members will be more food secure (Alderman et al. 1995).

The late-1980s literature on famine and vulnerability also incorporated stability of access into the concept of food security at the household level as well as concern over loss of access, and the destructive nature of coping strategies that preserve a veneer of security while stocks of assets are steadily being undermined (Maxwell and Frankenberger 1992; von Braun, Teklu, and Webb 1999). This concern with stability and vulnerability had previously only been expressed at the global and national level.

The literature of the mid-1980s still focused heavily on calorie adequacy, even if the emphasis had shifted to the individual. Alderman (1986), Behrman (1988), and Bouis (1988) emphasized the intrahousehold

distribution of not just calories, but micronutrients too. The recent emphasis on the micronutrient aspects of food security is summarized in Bouis and Hunt (1999).

The 1990s has seen an increasing focus on the overconsumption of certain foods that are dense in oils, fats, sugar, and salt that is inconsistent with the definition of food security in relation to an "active and healthy life." Popkin's work, in particular, has proved important for raising consciousness in this area (see Popkin 1999, for example).

Despite the current focus on the individual and on diet components other than calories, such as micronutrients, there is too little emphasis from the food security community on the ability of the body to utilize nutrients that are consumed. Does physiological access necessarily match the economic and physical access and if not, to what extent does it negate them?

Under very different circumstances and for different countries, Lutter et al. (1992) and Haddad et al. (1998) show how various levels of food security defined as economic access to food can be undone by diarrhea that restricts the physiological access of the body to nutrients.

Can we, therefore, add a third dimension of access—physiological—to physical and economic? In fact, the USAID definition of food security does just

this, by focusing on food production, food access, and food utilization (USAID 1990). This definition is somewhat controversial. There are suspicions that the definition was formulated, in part, for political reasons related to resource availability. Moreover, nutritionists feel that the definition opens the door for the expropriation of their field. Is, for example, a program to improve care giving a nutrition program or a food security program? Even if the program retains its identity as a nutrition intervention, it has a very important impact on food security because it increases the ability of the body to ingest and absorb food. In other words it increases the physiological entitlement to food. Such an expanded definition helps to build bridges between the agriculture and nutrition communities—an essential development if declines in undernutrition are to be accelerated.

This expanded concept of food security is also consistent with the emergence of the human rights paradigm within the nutrition community (ACC/SCN 1999). The human rights approach stresses the need to “reach the unreached” rather than simply improve the well-being of the average household member. The human rights focus on capability and capacity is also consistent with the need for a person’s body to access nutrients that have been ingested. Human rights in food and nutrition are important for all dimensions of food security, but they have been most explicitly worked through in the area of food utilization. These trends in the conceptualization of food security are summarized in Table 4.2.

### Food Quantity

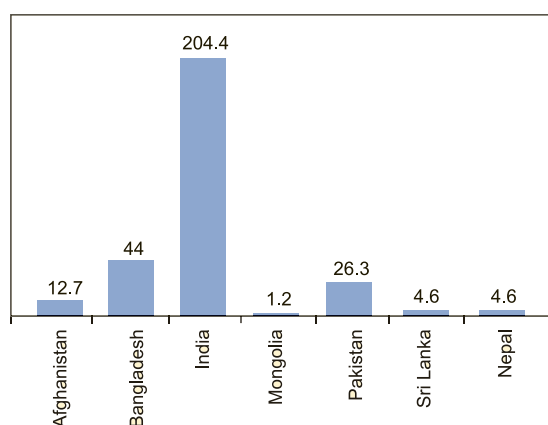
Unfortunately, there is no database that contains household-based estimates of food insecurity, even for the more conventional economic-access definition. This is a very important gap in the ability to diagnose the primary causes of malnutrition. Instead we have to rely on food-supply data that FAO converts into “numbers of undernourished.” This supply-based method has been severely criticized by many who subscribe to the demand-based assessment of household food insecurity.

Using this method, FAO has been tracking the number of “undernourished” by region over time. For Asia and the Pacific, the proportion of the population that is undernourished has fallen from 32 percent in 1979–1981 to 21 percent in 1990–1992 to 17 percent in 1995–1997. The vast majority of the “undernourished” in South Asia is from India, Bangladesh, and Pakistan (Figure 4.3). Similarly, the PRC accounts for the vast majority of “undernourished” people in East Asia (Figure 4.4).

FAO also releases data on the share of the main food group in total per capita food supply. Countries with higher shares in the main food group tend to have a diet of lower diversity. Countries with a high percentage of “undernourished” individuals and a high percentage of food supply from the main food group will tend to be particularly vulnerable to shortfalls in food production. Figure 4.5 plots these two characteristics against each other for the two regions. Bangladesh, Cambodia, and Lao PDR stand out as countries where nutrition status is most at risk due to deficits in food supply.

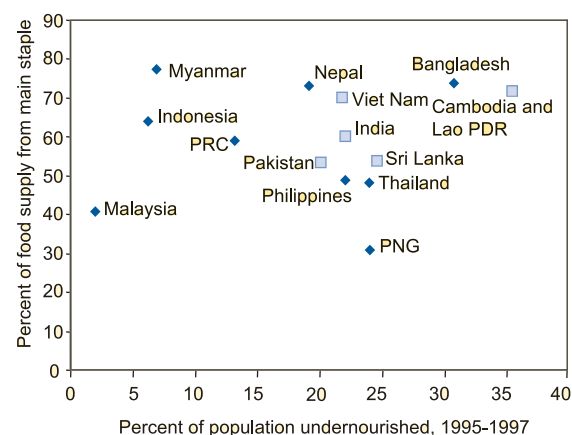
**Table 4.2 The Evolution of Thinking About the Nature of Food Security**

Dimension of Access Comprising Food Security	Component of Diet	Level of Aggregation				Focus on Human Rights
		Global	National	Household	Individual	
Physical Access (food production)	Calories and protein					
Economic Access (preintake entitlement)	Calories					
Physiological Access (postintake entitlement)	Calories and micronutrients					
	Calories, micronutrients, and fats					



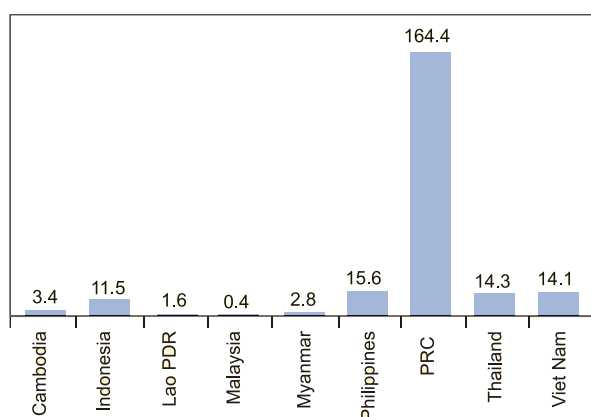
Source: FAO SOFI (1999).

**Figure 4.3 Millions of People with Low Food Availability or "Undernourished" in South Asia, 1995-1997**



Source: FAO SOFI (1999).

**Figure 4.5 National Food Insecurity and Vulnerability in Asia, 1995-1997**



Source: FAO SOFI (1999).

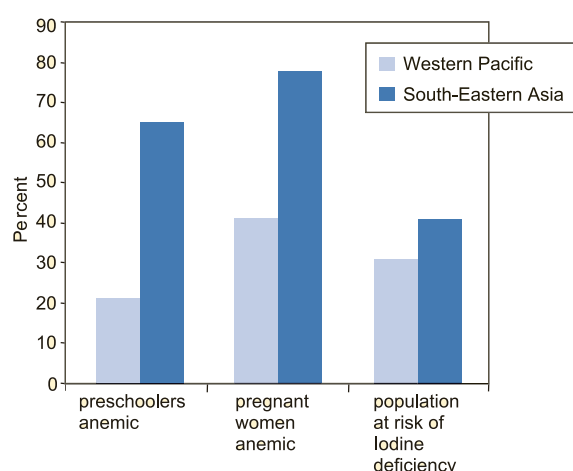
**Figure 4.4 Millions of People with Low Food Availability or "Undernourished" in East Asia, 1995-1997**

## Food Quality

Food security at the national level concerns more than simply total per capita calorie availability. The *source* of calories has a profound impact on the prevalence of undernutrition and diet-related chronic diseases. Insufficient calories from vegetables and animal sources indicate problems resulting from micronutrient deficiencies and of low calorie intake in general. High levels of animal fat and added sugar consumption are risk factors for obesity, diabetes, hypertension, and coronary heart disease.

The micronutrient status of the Asian and Pacific populations is poor. As Figure 4.6 shows, more than 60 percent of preschoolers and more than 70 percent of pregnant women are anemic in South-Eastern Asia (WHO classification, including Bangladesh, India, Nepal, Sri Lanka, and Thailand). Similarly, more than 40 percent of the population of this region are at risk of IDD. For vitamin A, 50 percent of Pakistan preschoolers have subclinical deficiency, 18 percent in the PRC, and 10 percent in the Philippines (ACC/SCN-IFPRI 2000). These micronutrient deficiencies result in a failure of cognitive development, high morbidity, and increased mortality.

In terms of overnutrition, the Asian region is currently experiencing a marked transition in consumption patterns. To describe this transition, we group countries in the region into (1) high income (Hong Kong, China; Republic of Korea; Singapore); (2) middle income (Kazakhstan, Malaysia, Philippines, Thailand); (3) upper low income (PRC, Indonesia, Sri Lanka, Uzbekistan); (4) lower low income (Afghanistan, Bangladesh, Bhutan, Cambodia, India, Kyrgyz Republic, Lao PDR, Myanmar, Mongolia, Nepal, Pakistan, Tajikistan, Viet Nam); and (5) the generally middle-income small island developing states (Cook Islands, Fiji Islands, Kiribati, Maldives, Marshall Islands, Federated States of Micronesia, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu).



Source: ACC/SCN-IFPRI (2000); WHO country groupings.  
Note Fiji Islands and PNG are included in the Western Pacific grouping.

**Figure 4.6 Iron and Iodine Status in Asia and the Pacific**

The largest shifts in the composition of food available for consumption are for the highest-income countries, but there has been considerable change in all countries, particularly during the last decade (Figures 4.7a–4.7f). These changes have brought many benefits in terms of increased food security at the national level, fewer famines, and fewer major large-scale food insecurity problems. They have also increased dietary diversification and improved nutritional status.

The increased variety of the Asian diet, combined with an increased intake of many higher protein foods, has come with a major shift in undernutrition related both to macro- and micronutrient deficiencies. Concomitant shifts in the energy density and saturated fat content of the diet, noted by the large increases in egg, dairy, and meat products along with edible oil, are noteworthy. Also the increase in added sugar intake is quite notable in many countries.

There has been a marked decline in availability for consumption of cereals and starchy roots, the items that provided much of the energy in the Asian diet in past centuries, except for increases among low-income and a slight increase among upper low-income countries. For the latter, there is limited evidence of a small shift downwards in availability of cereal products. These aggregate trends mask a marked shift away from inferior cereal crops toward superior ones, which usually means a shift from millet, sorghum, and other “coarse grains”

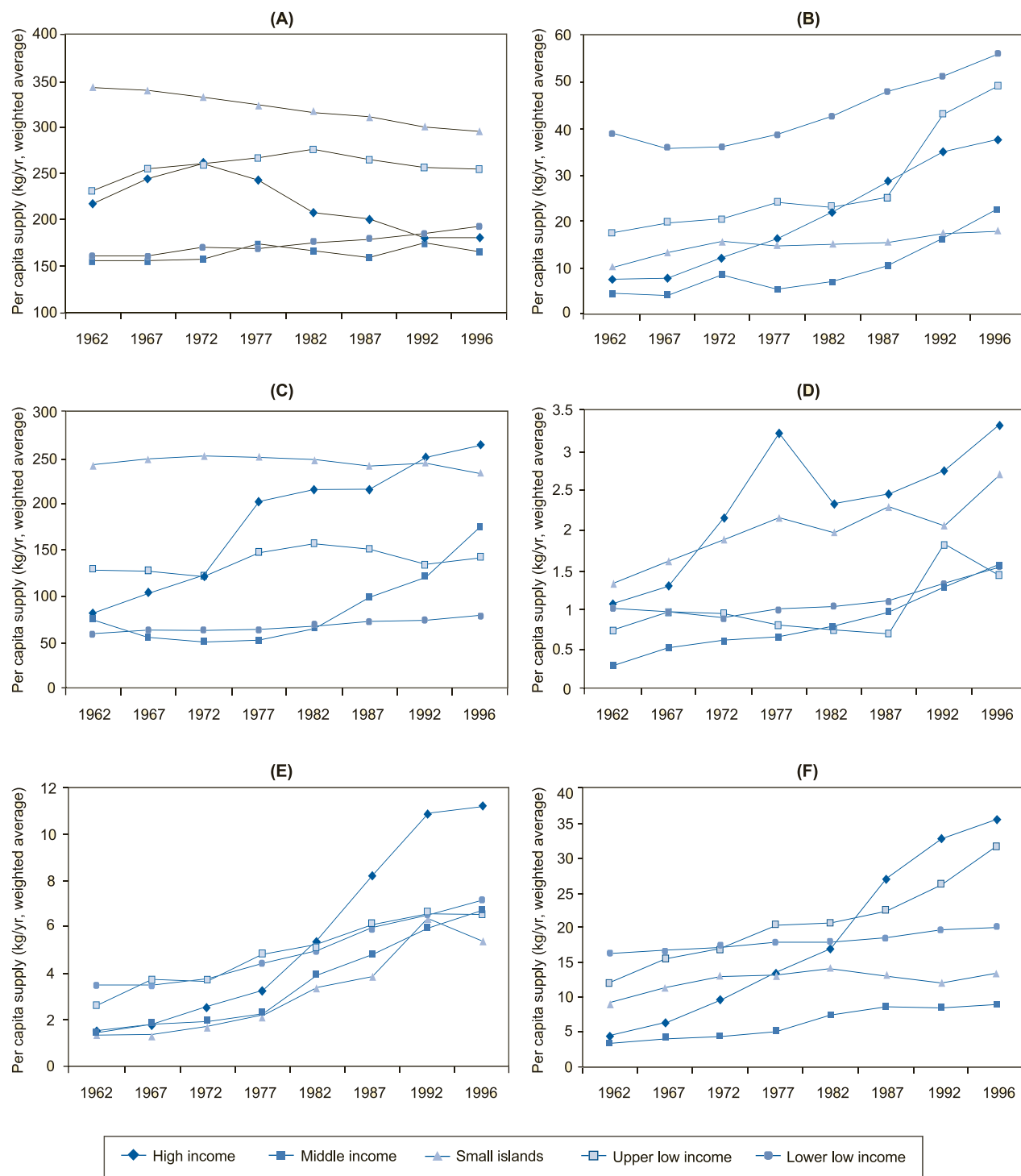
toward rice and wheat and also away from cassava (e.g. Guo, Popkin, and Zhai 1999).

In contrast, there has been a marked increase in availability of eggs and dairy products among all countries. Surprisingly, the highest level of intake is found among the lower low-income countries. Partially, this relates to the importance among the high-income countries of the Republic of Korea, where traditionally there was low dairy product consumption. Hong Kong, China has a high supply of dairy food products, but this is only a small part of the total weighted average in the high-income group. India is the predominant factor in the lower low-income groups, and is a high consumer of dairy products, such that availability in the lower low-income group is high relative to the other groups. This is important because eggs and dairy products are such an important source of saturated fats in the diet. Indian consumption of ghee, a particularly highly saturated fat product, is important.

New time-series survey data for India on household food availability (as distinct from the food supply data in Figures 4.7a–4.7f) confirm these trends (Figure 4.8). In particular, note the increased availability in households of calories from milk products and edible oils, which also increase as a proportion of overall calories over the 30 years surveyed, although they still remained at 7 percent and 5 percent, respectively, of overall calorie consumption in 1994.

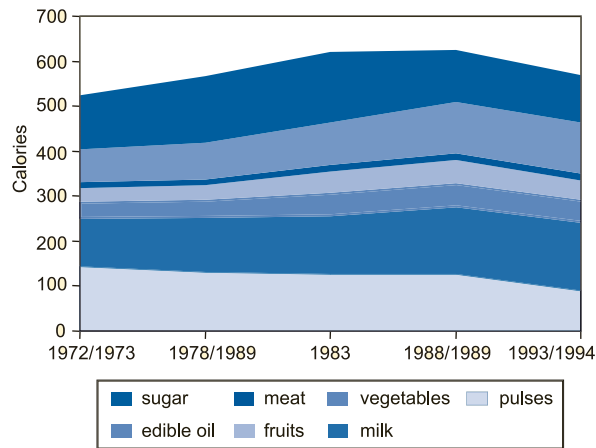
Trends in saturated fat are important. Projections by the International Food Policy Research Institute (IFPRI) show annual growth in consumption of meat and dairy products and also total consumption in 2020. They focus on 1993–2020. For the PRC, they show 3 percent and 2.8 percent increases, respectively. The annual rates of increase for other East Asian countries are about 2 percent and for Southeast Asia, about 2.8 percent (Delgado et al. 1999). Earlier research on consumption trends shows that the IFPRI projections for the PRC are conservative (Figure 4.9).

Fruit and vegetable consumption has increased markedly in the high-income and the upper low-income countries. It remains very high for the small island states, and it is improving slightly for the middle-income and lower low-income countries. It is very hard to translate the aggregate per capita availability of fruits and vegetables into a meaningful measure that can provide some guidance on the distribution of consumption for adults in any country. In the PRC, one study has done this using 3-day diet record data on 7,450 adults from the 1991 PRC Health and Nutrition Survey (CHNS).



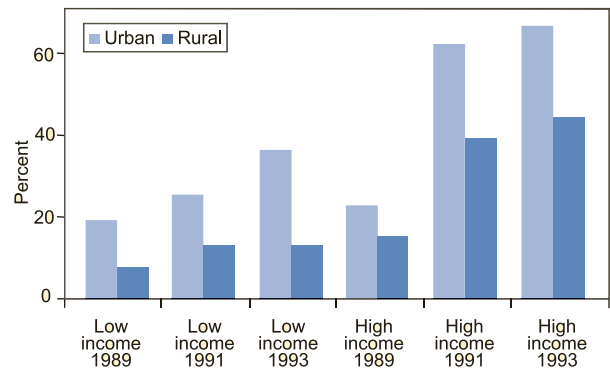
Source: Popkin, Horton, and Kim (2001).

**Figure 4.7 Trends in Per Capita Supply of Various Foods in Asian Countries, by Income Group. (A) Cereals and Coarse Grains; (B) Dairy and Egg Products; (C) Fruits and Vegetables; (D) Animals Fats; (E) Vegetables Oils; (F) Supply of Added Sugar.**



Source: Hanchate and Dyson (2000).

**Figure 4.8 Per Capita Household Calorie Availability from Various Food Groups, India 1972-1994**



Source: Popkin (1999).

**Figure 4.9 Trends in Proportion of Population 20-45 years old, Consuming More Than 30% of Energy from Fat, by Income Group in the PRC (percent)**

In this analysis, only 20 percent of the sample appeared to consume the recommended amount of 500–700 grams of fruit and vegetables. These are the intake levels that PRC nutritionists have established to be protective for noncommunicable diseases. Since the Chinese per capita intake level is similar to that in other low-income countries (both upper and lower), this suggests that 70–90 percent of the middle-income and lower and upper low-income populations were consuming inadequate amounts of fruits and vegetables in 1996.

The levels of availability of edible vegetable oils have increased dramatically for all countries. These oils vary in origin from red palm oils to coconut oils to corn, soybean, and cottonseed oil. They vary greatly in terms of their polyunsaturated to saturated fat ratio—a higher ratio being more healthful. Systematic research on the composition of these oils is lacking and is needed. Research indicates that high levels of oil availability are a key reason for the marked increases in energy density of the Asian diet (Drewnowski and Popkin 1997; Guo, Popkin, and Zhai 1999).

Some scholars allege that added sweeteners—an incomplete measure of dietary sugar intake—is a major detrimental component of the nutrition transition. Availability of added sugar is increasing among the middle and high-income countries and is supplied at high levels by all countries except the upper low-income ones. In particular, there is a high level for lower low-income countries and a contrasting very low level for upper low-income countries. This finding must relate

mainly to the very low levels of added sugar consumed in the PRC. It is important to note that food consumption research on sugar in Asia is incomplete because few food composition tables measure sugar that occurs naturally in foods. Thus, the major analyses undertaken focus on added sugar, which only measures sugar that is added during food processing or consumption.

These trends in food availability should be viewed as a marked shift in the structure of the diet. The change in the structure of the diet is well captured by trends in the availability of total energy and its distribution by macronutrient sources. The high-income countries in Asia have shifted their energy distribution away from a diet dominated by complex carbohydrates to one with increasing fats, added sugar, and protein. These countries have more than 3,000 kilocalories of energy per capita per day available for consumption. The bulk of the Asian population has less than 3,000 kilocalories of energy available for consumption. Added sugar is a small component but, in the high-income and middle-income countries, it is becoming relatively much more important.

In summary, the shifts in diet in Asia are important. The structure of diets is changing in both positive and negative ways. On the one hand, diet diversity is increasing, which has positive effects on undernutrition, particularly on micronutrient status. Similarly, increased dairy product and animal consumption affects overall nutrient quality positively (see Chapter 3). On the other hand, the high increase in edible oil, added sugar, and animal products are also linked with rapid increases in

saturated fats and may displace essential nutrients, leading to increased positive energy imbalance and obesity.

The coexistence of undernutrition and overweight in the same household, particularly in urban areas, is an important issue that will become more apparent as more of Asia shifts toward a more energy-dense and lower-fiber diet and lower activity levels. The proportion of households where one person aged 2 and older is undernourished and another is currently overweight will increase. Analyses of survey data from the PRC, Indonesia, Kyrgyz Republic, and Viet Nam show that an underweight child coexisting with an overweight nonelderly adult was the predominant pair combination. Early analysis of this problem seems to suggest that the speed of the nutrition transition is increasing the likelihood that both problems will coexist in the same household (e.g., Doak et al. 1999).

This finding challenges the assumption that underweight and overweight are opposing public health concerns. The coexistence of underweight and overweight illustrates the need to consider the development of public health programs that are able to simultaneously address both problems (see Chapter 5 for more discussion of this issue).

### Food Policy Instruments

The diversity of definitions of food security is reflected in the broad range of policies that one could classify as “food policy.” Typically, these policies encompass physical access (related to food production and marketing) and economic access (related to food prices, income, tastes, and decision-making power). One could extend the definition of food policy to policies that affect the physiological access to food such as good quality hygiene and care behavior, and good-quality health, water, and sanitation facilities. The previous section argued for an expanded definition of food security. However, the temptation to expand the definition of food policy instruments to include, say, improved water access must be resisted. Water access relates to water policy. The emphasis here is to examine the possible impact of conventional food policy policies on nonconventional dimensions of food security.<sup>1</sup>

This section subjects different food policy instruments—trade policies, agricultural policy, policies designed to increase the income-generation ability of the poor, and policies that aim to transfer income to the poor—to the expanded food security definition. Questions are then raised as to the extent to which each policy can be redesigned to have a larger impact on human nutrition. The policy instruments and the questions raised are summarized in Table 4.3.

### *Trade rules and the World Trade Organization*

The World Trade Organization (WTO) is a forum for negotiations as to the exact rules underpinning a rules-based open-trade regime between member countries (Diaz-Bonilla 2000). The outcomes of the negotiations may have very important nutrition implications, including (a) the degree of openness of industrialized countries to high-value food crops and (b) the extent to which food safety is truly compromised by freer trade.

The poorer countries tend to have a comparative advantage in labor-intensive crops such as fruits and vegetables. Such crops tend to reap a high return in developed-country markets because of the high labor input and perishability. These crops also happen to be high in micronutrients. If—and it is a big if—the countries of the north open their markets to the countries of the south, there is likely to be a large supply response that is likely to be a relatively good way to generate income in the small-scale farm sector and, via linkages, to the nonfarm rural sector. This will improve the physical and economic accessibility components of food security for rural areas. There may also be spillover effects in that the efficiency of producing for the domestic urban and rural market may also decline, reducing the real cost of these micronutrient-rich foods for domestic consumers. Trade policy in the developed countries might, therefore, have a rather direct impact on diet quality.

However, if more open food trade leads to the export and import of unsafe food, it could lead to a decline in health and food security. It is clear that global standards of conduct and enforcement, reached by consensus, are required for food safety. The WTO agreement on the Application of Sanitary and Phytosanitary Measures (SPS

<sup>1</sup> However, one could make the argument that all policies to raise income levels of the poor are, by definition, food policies. To some extent this is precisely what has happened in the literature. For example, why are cash-based public works programs considered food policy instruments as opposed to union wage-setting?

**Table 4.3 Possible Impact of Food Security Interventions on an Expanded Concept of Food Security**

Instrument	Dimension of Food Security				
	Physical Access		Economic Access		Physiological Access
	Calories	Quality	Calories	Quality	Calories/Quality
WTO Rules		Will increased penetration of developing-country goods into industrialized markets of high-value goods spur production of micronutrient-rich foods?		Will increased production of high-value crops for export lead to improved economic access for domestic consumers to micronutrient-rich foods?	Will increased openness increase the risks of poor food safety and a decline in the ability to absorb nutrients due to illness?
Food Fortification Policy		Need for regulatory environment to stimulate and monitor private-sector supply of fortified foods			
Agricultural Technology	Staple Yield Increases	Has the physical access to nonstaples decreased?	Promotion of nonfarm rural economy for income generation	Are the relative prices of nonstaples increasing?	To what extent does the time allocation in food and cash crops affect women's ability to allocate resources and time to care for mother and infants?
	Drought Tolerance and Pest Resistance	Conventional and transgenic breeding for improved micronutrient content		Are the price of oils and sugars too low relative to other foods?  What is the potential of urban agriculture?	How could improved water management for agriculture also improve water access and quality for domestic consumption?  What are the health consequences of agricultural practices?
Food Price/Subsidy Policy	Consumer price subsidies on cereals	Does it make sense to subsidize the production of foods that are rich in micronutrients but that are consumed mostly by the poor?	Food price subsidies are typically on low-income-elasticity foods for self-targeting, but what are the nutritional implications?		What are the implications of self-targeted food price subsidies that rely on an estimate of a low opportunity cost of the poor that does not factor in the high opportunity cost of time spent in child care?

Continued next page

**Table 4.3 (Cont.)**

Instrument	Dimension of Food Security			
	Physical Access		Economic Access	Physiological Access
	Calories	Quality	Calories/Quality	Calories/Quality
Microfinance	Helps farmers to get access to credit, savings, and insurance to allow the purchase of improved inputs, avoid the sale of assets, and permit long-term planning  Does it help the development of home gardens and livestock production?	Helps consumers to smooth consumption within year (lean and harvest) and across years, avoiding costly storage of large amounts of staple foods  Does smoothing enable households to purchase foods that are less easily stored, such as fruits and vegetables?	Nutrition education and behavior change, e.g., "credit with education"	
Targeted Human Development Investments Tied to Behavior Change			What are the implications for household income generation from fewer children working in the labor market?  Can these interventions be targeted to women to improve resource flows to mothers, infants, and girls?	What is the potential for this type of intervention to work outside Latin America? Is this one way of relieving the credit market imperfection that leads to child labor?
Work Interventions (e.g., Public Works Projects)	Projects to improve agricultural land and to conserve water		Net increases in income help to diversify diet Empowerment of women if they are included in work  Does the work run down women's nutrient stores?	Construction of schools, health clinics, crèches, improved water services  Sufficient provision of crèches to permit women to work?

Agreement) is one such standard. The Agreement emphasizes the use of risk assessment in determining the appropriate level of protection with respect to human, animal, or plant life and health in a territory, and the use of scientific principles and evidence in establishing and evaluating SPS measures. It also calls for WTO members to regulate food safety based on the standards, guidelines, and recommendations set forth by the Codex

Alimentarius Commission regarding food additives, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling, and hygienic practice.

Perhaps a more important consequence of differing food safety standards for food security is the potential for them to be used as a de facto barrier to trade. The SPS Agreement is intended to set rules that prevent food safety measures from being used as nontariff barriers to

trade. But the ability of members to apply stricter SPS measures than contained within the Codex when there is scientific justification for doing so, has diluted this intent somewhat because “scientific justification” often reflects normative values. For example, some of the demands in Europe and North America for higher safety standards may be misplaced if exporting developing countries are held to standards that the importing developed countries themselves could not meet until recently. There is also concern in the other direction. For example, consumers in the PRC, Republic of Korea, and Japan are being denied US foods due to strict phytosanitary requirements such as cold treatment and fumigation of apples (Japan), zero-tolerance decay levels in imported US fruit (Republic of Korea), and fruit fly concerns for US fruit (PRC) (see the WTO World Wide Web site at [www.wto.org](http://www.wto.org)).

Agriculture

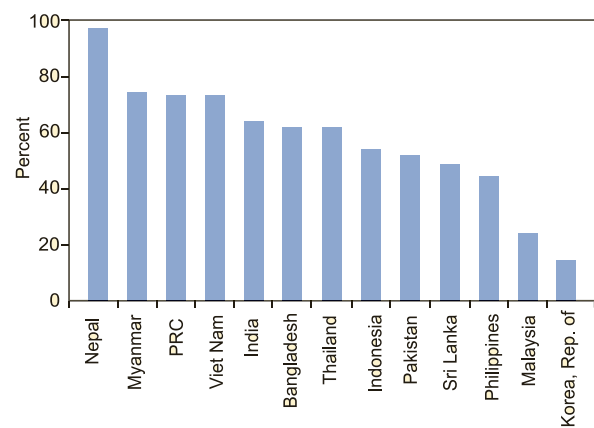
Agriculture is obviously a key sector for the generation of household food security. It is key because (1) its main output is food and (2) a very high percentage of the rural poor depend on it for income and employment (Figure 4.10). However, there are at least three trends that are driving an ever-closer convergence of interests in the areas of agriculture and nutrition.

First, the pressure on the agriculture sector to become more explicitly poverty focused has created the demand for indicators of well-being that are easy to measure over time and space. Nutritional indicators based

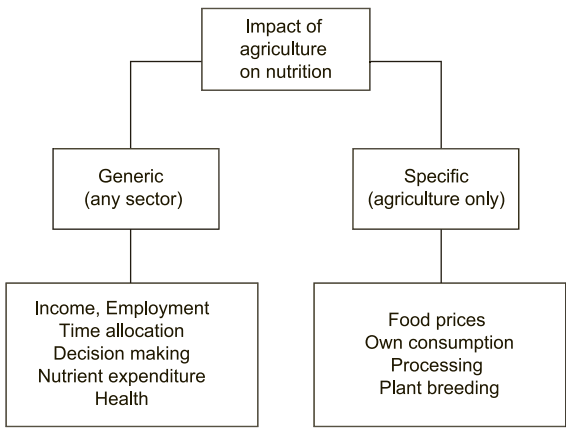
on body measurements are more credible than income or the value of goods consumed, because they do not rely on a wide range of underlying information or on assumptions as to the cost of living, and they can be assessed at the individual level (ACC/SCN-IFPRI 2000; Lipton 2000). The increased use of these nutrition measures creates an increased awareness of determinants of good nutrition status. Second, the expansion of the private sector into the production of foods—particularly genetically modified foods—that are consumed by middle- and upper-income groups has refocused the role of the public sector on foods consumed mainly by the poor and on agricultural development in less favored areas (Hazell and Haddad 2000). Third, there is an increasing realization within the nutrition community that the potential of conventional food-based approaches has not been adequately exploited (Ruel and Levin 2000).

There are two basic routes through which agriculture can affect nutrition: generic and specific (Figure 4.11). Generic impacts such as employment and income generation, and altered time-allocation patterns would result from any small-scale, labor-intensive productive rural activity. Specific effects are achieved because it is food that is being produced.

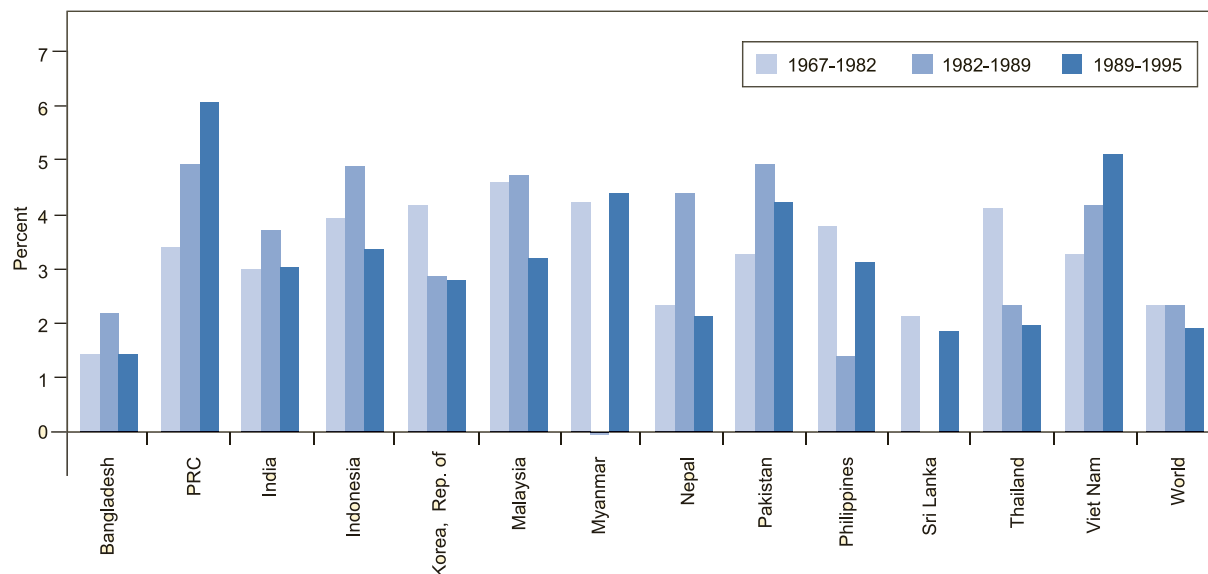
With regard to generic aspects, a vibrant agriculture generates substantial amounts of food and the income to access it. Agricultural output has grown more rapidly in Asia than in the rest of the world. This growth rate has increased over time (Figure 4.12), but has been uneven. During 1989–1995, the PRC,



Source: FAOSTAT <http://faostat.fao.org>  
**Figure 4.10 Share of Agricultural Labor in Total Labor Force, 1995 (percent)**



**Figure 4.11 Agriculture's Potential Influence on Human Nutrition**



Source: Rosegrant and Hazell (2000).

**Figure 4.12 Growth in Net Agricultural Production (International 1989-1991 Dollars)**

Myanmar, Pakistan, and Viet Nam have been the best performers with annual growth rates of more than 4 percent. Bangladesh, Nepal, Sri Lanka, and Thailand have been the worst performers with growth rates around 2 percent.

High growth rates in agriculture are important because in common with any other major rural livelihood activity, agriculture generates income and employment—both for smallholders and for others in rural areas who sell to and buy from farmers. Recent research (Delgado, Hopkins, and Kelly 1998) has shown that increases in agricultural output lead to large second-round increases in the rural economy. These effects arise in the sectors that supply the agriculture sector with goods and services and via the demand from those rural nonfarm sectors that need further goods from agriculture. In some cases, these second-round effects are larger than the initial growth in agricultural output. Discussed below, poverty reduction typically leads to reduction in malnutrition.

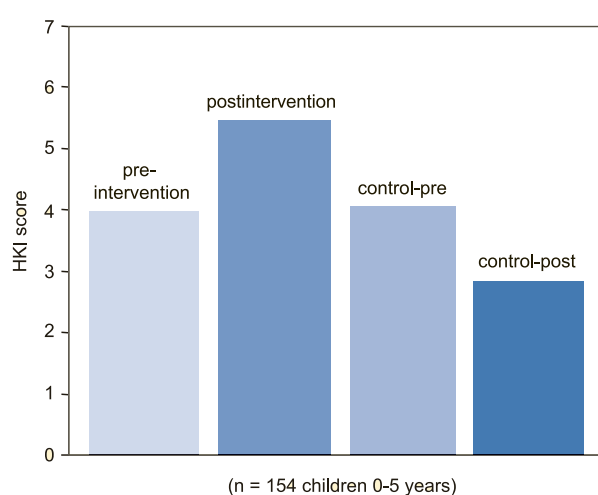
Agriculture can also affect nutrition via the time allocation of household members (for example, is it compatible with childcare activities?), the nature of household decision-making activities (does it empower women more than men?), the health environment (does fertilizer run-off pollute drinking water?), and energy balance (is it such hard work that the energy expenditure

of key household members such as mothers and adolescent girls increases too much?).

Agriculture has a number of other specific features relevant for nutrition because it is food that is being produced. First, increased productivity decreases food prices. This effect will be less in an increasingly liberalized world, but where transport and other transaction costs are high, food prices will fall. The question is: which food prices? If productivity gains focus on staples, the price of micronutrient-rich nonstaples in areas in which foods are less tradable may well increase. For the rural poor, the increased income generation that accompanies increased agricultural productivity may well enable a more micronutrient-rich diet to be achieved, but for the urban poor the negative result might be stronger. More research is needed on the long-term price trends faced by consumers for staple and nonstaple foods.

Second, does what is grown affect what is eaten? In less developed food and labor markets, it is more likely that this is the case, implying that the value of home gardening may be highest where markets are thinnest. The fact that food is produced also opens the door to a wide range of food-processing techniques that may or may not enhance the density and bioavailability of micronutrients in the diet.

A large literature has developed on food-based interventions for (particularly micronutrient) malnutrition reduction. In general, there is a relatively small set of documented interventions, few of which have been assessed in a rigorous way (Ruel and Levin 1999). Some of the interventions are promising, particularly for vitamin A (Hagenimana and Oyunga 1999; Low et al. 1999; Smitasiri and Dhanamitta 1999). In the Hagenimana and Oyunga (1999) study, which had a strong evaluation design, the introduction of retinol-A-rich sweet potatoes in a Kenyan community together with a communication program on vitamin A, demonstrated a significant increase in the frequency with which vitamin-A rich foods were consumed (Figure 4.13).



Source: Hagenimana and Oyunga (1999).  
HKI score = Helen Keller International method of estimating Vitamin A consumption.

**Figure 4.13 The Impact of Yellow Sweet Potatoes on the Frequency of Consuming Vitamin A-rich Foods in a Kenyan Village (HKI score)**

These interventions share a number of characteristics: (1) nutrition and health expertise was used in problem assessment and in related disease control (e.g., to control *Ascaris* and hookworm infestations that affect absorption of nutrients); (2) new agricultural or horticultural technologies were used; (3) there was a social marketing/nutrition education component; and (4) attention was given to the institutional factors necessary for such partnerships to form and flourish.

The outlook for fruit and vegetables as a way of combating iron deficiency is less positive (Ruel and Levin

1999). For populations that cannot afford animal products and do not have the institutional structures to undertake daily iron supplementation, the options are rather limited (Gillespie 1998).

In Bangladesh, Bouis et al. (1999) found that innovations in vegetable technology did not result in a significant increase in vegetable consumption in adopting households. The study also found that the direct impact of new fishpond technologies on diet quality was negligible and may even have been negative as the large fish were consumed instead of the smaller fish that were more micronutrient dense (note that the fishpond technology will have had a positive impact on diet quality through modest increases in income). These examples highlight the need for well-integrated nutrition education expertise if agricultural initiatives that are nutrition-motivated are to succeed.

Third, there are promising new techniques for nontransgenic breeding that may well be used to increase the impact on micronutrient status of those consuming staple crops. These may (1) increase the micronutrient concentration in the crop (Box 4.1), (2) decrease the concentration of absorption inhibitors such as phytic acid, and (3) increase the concentration of promoter compounds (for iron and zinc in particular) such as sulphur-containing amino acids (Ruel and Bouis 1998).

#### **Box 4.1 Breeding for Micronutrient-dense Staple Food Crops**

Does breeding micronutrients into staple food crops like rice and wheat offer policymakers an additional, low-cost sustainable way of improving the nutrition of the world's poorest and most malnourished people?

It is too early to tell. Work underway at the International Rice Research Institute (IRRI) and the International Food Policy Research Institute (IFPRI) has identified a rice variety that has iron densities twice as high as currently grown varieties. There seem to be few if any trade-offs with yield, so farmers have no disincentives to grow it. There are no consumer acceptability issues either. The main issue is the impact on human nutrition. Will the doubled iron content be bioavailable to the human body and even if so, is this sufficient to have an impact on the iron status of vulnerable groups? A human bioavailability test in the Philippines is being planned by IFPRI, IRRI, and the Asian Development Bank (ADB) under a new ADB regional technical assistance (RETA) grant to test the impact of high-iron rice on iron deficiency in women.

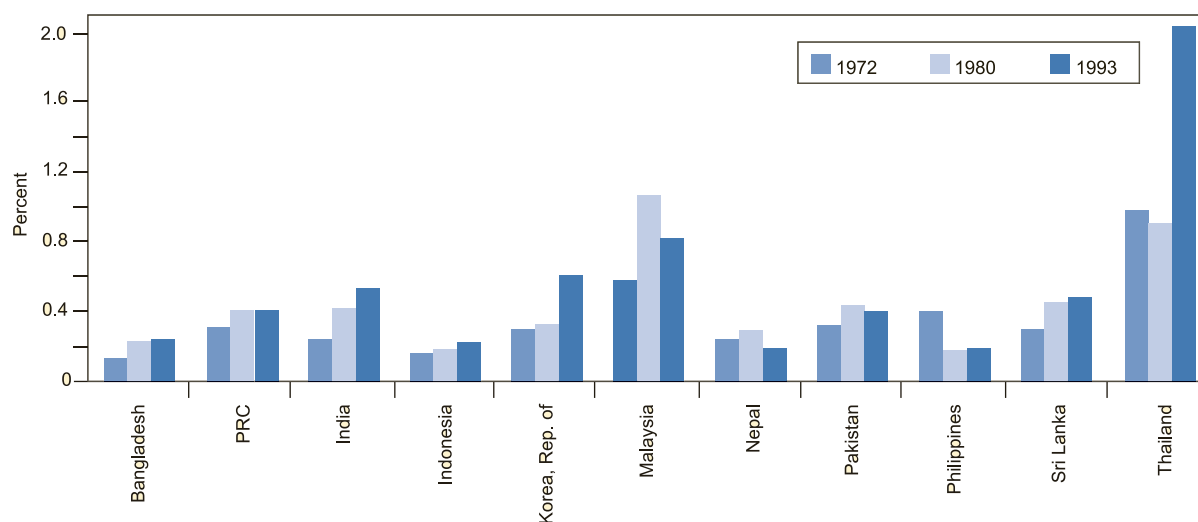
Source: Adapted from Bouis and Hunt (1999).

Finally, there are several transgenic approaches to increasing the micronutrient content of crops. Compared to traditional breeding work, biotechnology is at a much earlier stage, but it is yielding results that are promising. Work by the Swiss Federal Institute of Technology's Institute for Plant Sciences has demonstrated some success in introducing genes into a rice variety such that iron and vitamin A concentrations are increased. The Swiss team plans to collaborate with the International Rice Research Institute in future work to test the health and environmental consequences of the technology, and to evaluate the acceptability of the rice to farmers in terms of yield impact. This is a publicly-funded initiative. Much of the biotechnology work, however, is being undertaken by the private sector. The claiming of intellectual property rights by the private sector over new combinations of genes will obviously place a premium on access to new transgenic varieties. Here the challenges are for policymakers, international financial institutions, and publicly-funded agricultural research systems such as the Consultative Group on International Agricultural Research to search for innovative ways to ensure that the benefits from this work flow to malnourished individuals (Pinstrup-Andersen 1999).

In Asia, further improvements in agricultural output will have to come from increases in agricultural productivity. Input levels are high and the marginal

returns to increased applications are diminishing (Rosegrant and Hazell 2000). For India, work by Fan and Hazell (1999) suggests that investing in less favored areas may well be the best way to generate increased agricultural productivity and poverty reduction. They use a long time series of Indian data, disaggregated to the district level to explore the implications of government investment in less favored (primarily rainfed) and more favored (primarily irrigated) lands. Their results are striking. They find that public investments in less favored lands may well have larger poverty-reducing impact than investments in more favored lands. They speculate that this is due in part to overinvestment and diminishing returns in the latter regions.

Moreover, the ways in which increases in productivity are achieved will have to consider the environmental and nutritional consequences. Improved public and private investment in agricultural research will be the best way to raise productivity in ways that are compatible with environmental and nutritional concerns. Investments in agricultural research are stable throughout Asia as a proportion of overall government expenditure (Figure 4.14), although Thailand is exceptional in that it has increased investment over this period. For some countries such as Sri Lanka, Nepal, and Bangladesh where agriculture is growing slowly, investments have declined despite the continued high percentage of the total labor force in agriculture.



Source: Fan and Pardey (1998).

**Figure 4.14** Agricultural Research Investment as a Share of Agricultural GDP in Asia (percent)

It is not just the quantity of resources committed to agricultural research that matters, but how they are allocated within the sector that counts. Agricultural research funds have to be allocated to address productivity, environmental sustainability, and malnutrition reduction.

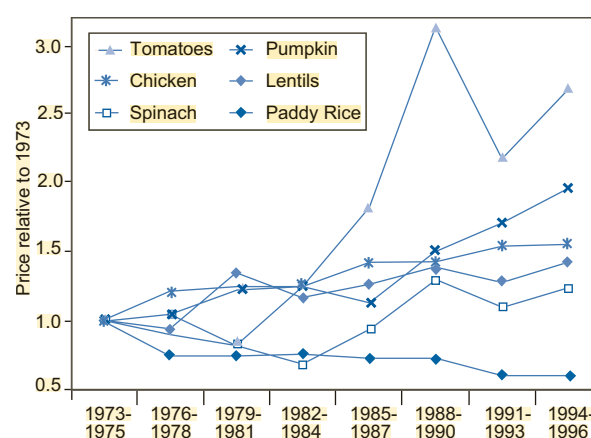
For example, are national and international agricultural research scientists doing enough work to (1) generate healthy foods such as lean meat (in response to overnutrition concerns), or (2) bring down the real price of healthy nonstaple crops that are rich in the micronutrients so essential to child survival and nutrition? On the latter question, evidence from Bangladesh suggests that the real price of items such as vegetables, fruits, livestock, and dairy products is increasing, while the price of the main food staple, rice, is decreasing (Figure 4.15).<sup>2</sup>

The extent to which agricultural research resources are orientated toward women will also have an impact on nutrition outcomes. Women that are empowered via access to technology, information, and access to decision-making fora will be more likely to direct household resources toward child well-being (Haddad 1999). Moreover, there is considerable evidence (stronger in sub-Saharan Africa than in Asia) that agricultural productivity could be improved by a redistribution of a given set of resources from men to women. In other words, precious female entrepreneurial talent is being underutilized in agriculture due to rules restricting their access to inputs (Quisumbing 1996).

The CGIAR has recently initiated a 14 case-study research program involving 9 of the international research centers to systematically examine the relationships between various components of agricultural research (both the substance and the process) and poverty and nutrition via the pathways identified above (IFPRI/DFID 2000).

#### *Food fortification*

The fortification of foods with micronutrients has a relatively long history in improving the diet of populations. Fortification has proved successful in



Source: Bouis (2000).

**Figure 4.15 Food Price Trends in Bangladesh, 1973-1996**

decreasing micronutrient deficiencies in Europe, North America, and more recently in Latin America. For example, in 10 countries in Latin America, more than 90 percent of all households consume salt with added iodine (Manila Forum 2000). In Asia, progress has been slower. Iodized salt coverage rates in the region vary from 90 percent in the PRC to 20 percent in the Philippines. Reaching Asian consumers with food fortified with the other key micronutrients—vitamin A and iron—has proved even more difficult. This is due to differences in dietary patterns. Latin America has a much higher consumption than Asia and the Pacific of wheat flour and sugar.

The main Asian staple is rice. The development of technology to successfully fortify rice has not progressed rapidly. The development of technology to fortify complementary foods that infants begin consuming after age 6 months has also been hampered by the uncertainty created by the UNICEF/WHO Code of Marketing Breast Milk Substitutes, which is geared toward those up to 6 months of age (Manila Forum 2000). Once technology has been developed it needs to be adopted by industry. For this to happen there has to be a demand for the product at prices that are commercially viable for the

<sup>2</sup> The prices of rice, wheat, sorghum, lentils, chickpeas, cowpeas, spinach, tomatoes, pumpkin, and onions are taken from FAOSTAT web site (FAOSTAT 1999). These are all producer prices (in local currency) per metric ton. The prices were converted to real prices by the GDP deflator (1987 = 100) from World Bank (1999a). The prices of chicken, eggs, cow milk, ruhi fish and hilsa fish were taken from 'A Database for Agricultural Marketing' published by the Research and Planning Department of Agricultural Marketing, Dhaka, August 1997. These are all nominal, annual, national, average wholesale prices. They were converted to real prices using the above deflator.

producer. In addition, the public sector must ensure the harmonization, enforcement, and monitoring of fortificant standards.

A successful and sustained expansion of fortified foods involves many actors: the food technology community, the commercial food distribution industry, social marketers (public and private), and the public-sector regulatory infrastructure. Experience from Latin America and from Asia has shown that it is essential to get all stakeholders collaborating as soon as possible. Solutions where all parties gain must be found. Producers must not lose profits, consumers must get better access to micronutrients, and governments get healthier and more productive populations.

This is easier said than done. What are the institutional arrangements that permit such a broad coalition of agro-industrial-health concerns to come together and work productively? Experience from the region suggests that an important first step is to forcefully communicate the extent of the problem and its human and economic consequences. Also important is recognition by the food and nutrition community that there are companies that have objectives and methods that do not conflict with the social goal of improved nutrition for all. Experiences such as those in the Philippines, Viet Nam, and India (Box 4.2) should be assembled and widely promulgated.

#### *Income-generation programs*

There are other interventions that governments may enact to increase the incomes of the poor. These include microfinance interventions, workfare programs, human investment programs, and food price stabilization/food

subsidy programs. These are included here because they are relevant for household food security and for other underlying determinants of malnutrition. Higher levels of income allow households to purchase more of the inputs necessary for good child growth: food, care, and health. However, as illustrated in the next chapter, poverty and undernutrition do not necessarily go hand-in-hand (Figure 4.16); the relationship between poverty and undernutrition is certainly discernable, but not perhaps as tight as is commonly thought (see Heaver and Hunt 1995 for a good intracountry example of this less-than-strong relationship). This divergence is largely because income does not guarantee access to all the inputs required for good nutrition. For example, increased income may well come at the expense of child care if the mother is unable to get adequate child care facilities and or substitutes. In addition, if the markets for clean water and sanitation are missing, increased income will not meaningfully increase the entitlement for nutrition inputs. Moreover, poverty does not rule out the emergence of overnutrition, as demonstrated in Chapter 2.

#### *Microfinance programs*

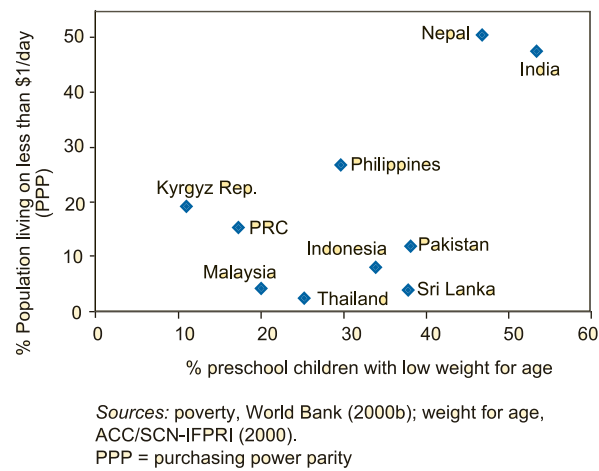
The intent of microfinance programs is to provide the poor with financial services. These services—credit, savings, and insurance—allow clients to borrow money to invest in capital for future income generation and to tide them over during seasonal shortages of food and other goods. These services also allow poor people to save resources to take advantage of future opportunities and cope with future shocks, and they provide insurance against future risks such as livestock disease (Figure 4.17).

### **Box 4.2 Engaging the Private Sector in Food Fortification: Some Examples**

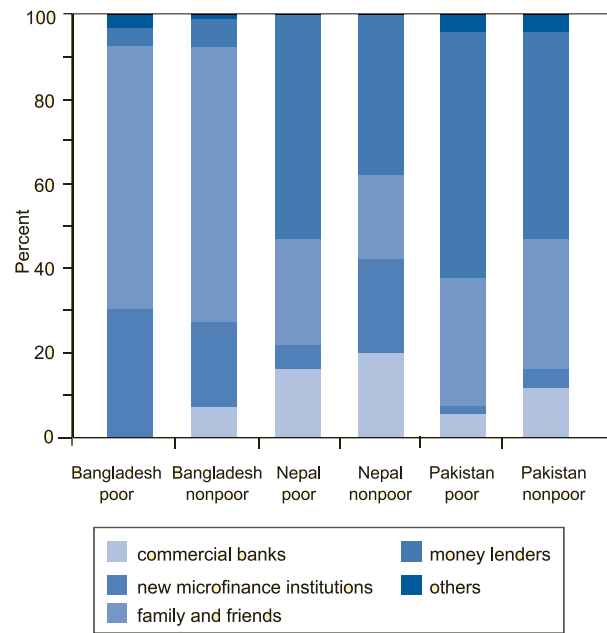
Raising awareness among private-sector managers is the first step. Sometimes this happens fortuitously as private companies actively scan for new opportunities. This was the case in 1992 when executives from Procter and Gamble attended a presentation on vitamin A, iron, and iodine deficiencies at Cornell University. The result was a concerted effort to develop *Nutri-delite*, a triple fortified drink. In other cases, private-sector managers have become aware of micronutrient malnutrition as a result of focused communications from the public sector. In Viet Nam, a multisectoral committee, including the National

Institute of Nutrition, the United Nations Children's Fund, and Hoffman La Roche, worked to raise awareness among private companies. Subsequently, the Ben Hoa Sugar Company took the lead in developing a vitamin A fortified sugar, *SugarA*, which was successfully test marketed in early 2000. A mission from the Micronutrient Initiative of Canada first advocated the potential of sugar fortification to reduce the burden of vitamin A deficiencies to India's National Federation of Cooperative Sugar Factories. Research and development work there in this area is ongoing.

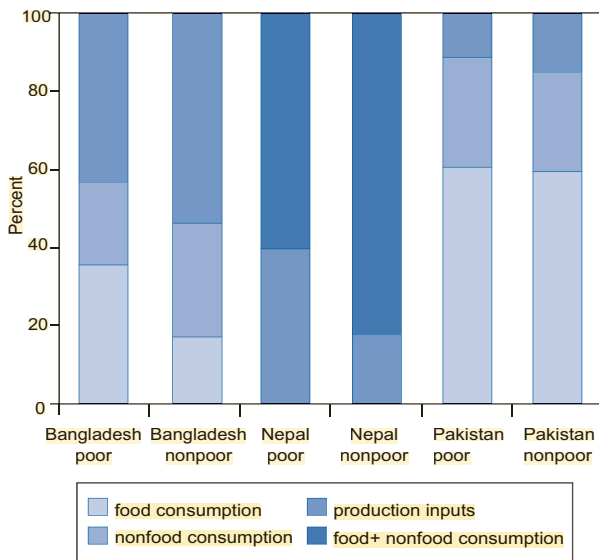
Source: Manila Forum (2000).



**Figure 4.16 Proportion of Population Living on Less than \$1 a day and the Percent of Underweight Preschool Children**



Source: Zeller and Sharma (1998).  
**Figure 4.18 Source of Rural Finance by Poor and Nonpoor in Selected Asian Countries (percent)**



Source: Zeller and Sharma (1998).  
**Figure 4.17 Stated Use of Rural Finance by Poor and Nonpoor in Selected Asian Countries (percent)**

Typically, small loans are made by a community-based organization or NGO and collateral is provided in the form of group liability. If one person defaults on repayment, the group is liable for payment. Repayment rates have been shown to be high. The key limitations to microfinance are sustainability and ability to cope with widespread shocks. The transaction costs of serving the

poor tend to be high in relation to the flow of financial resources. The poor are often in remote areas and tend to borrow and save in small amounts. Moreover, the institutions that have emerged to serve the poor tend to have local perspectives (Figure 4.18). This is a real advantage in tailoring financial services to the needs of the poor, but is a drawback when attempting to pool risk across different regions and sectors.

Asia has been at the forefront of the revolution in microfinance institutions. Table 4.4 describes some of the major institutions and their scope.

The poverty impact of microfinance institutions is more mixed, at least in terms of quantitative evidence. In general, the studies summarized by Zeller and Sharma (1998) in Table 4.5 find a positive impact of credit on incomes, controlling for other explanatory factors including those that affect participation in credit programs. However, they also note variations in impact across countries as well as outcomes. Generally, improved access to credit raises incomes, usually increases caloric availability, but has no impact on child health as measured by anthropometric outcomes.

The lack of measured impact on child nutrition might reflect a true lack of effect or an inability to measure that impact. Recent quantitative and qualitative work

**Table 4.4 Selected Microfinance Institutions in Asia**

Name	Institution Type	Subsidies from Government	Loan Recovery (%)	Number of Members
Association for Social Advancement, Bangladesh	Nonbank rural financial institution	Yes, in new branches	99.9 (1997)	800,000 in 1997
Bangladesh Rural Advancement Committee	Nonbank rural financial institution	Yes, but moderate	95-100 (average last 10 years)	More than 1 million in 1998
Bankya Rakyat Indonesia	Banking institution serving poor	No; bank makes a profit	>95	16.2 million depositors and 2.5 million borrowers in 3,512 units
Grameen Bank, Bangladesh	Banking institution serving poor	Yes, moderate through grants and low-interest loans from donors	98 (in 1995)	2.07 million in 1,055 branches (1995)
Mutual Assistance Credit Groups, PRC	Nonbank rural financial institution	Yes, state and relief funds		170,000 groups nationwide in 1995

Source: Zeller and Sharma (1998).

**Table 4.5 Estimated Impact of Informal Credit Programs on Selected Welfare Measures**

Welfare Outcome	Bangladesh	Cameroon	PRC	Madagascar	Malawi	Pakistan
Household Income	+	+	+	+	0	
Agricultural Technology Adoption				+	0	+
Food Expenditure	+		+		0	+
Calorie Availability	+	0	+	+	0	
Nutrition Status of Children	0	0		0	0	

Source: Zeller and Sharma (1998).

in Bangladesh suggests that microfinance targeted to women could have a large positive impact on nutrition status (Box 4.3).

To have a greater nutrition impact, microfinance programs need to be more accessible to poor women in rural and urban areas, and combined with nutrition education so as to ease any work-care trade-off.

#### *Workfare programs*

Workfare programs are defined by their work requirement in return for payment. The most common

forms are labor-intensive public works schemes. Typically a wage is offered below market wage for a similar task, thus targeting people who cannot get a job at the prevailing market wage. These programs are effective as a means for transferring resources to the poor when they (1) target poor areas and communities; (2) set a wage lower than the market wage for comparable activities (in this way, only the poorest self-select into the program and jobs are less likely to be rationed to the better-connected); (3) employ labor-intensive methods of production; (4) generate infrastructure that is more likely to benefit the poor;

### Box 4.3 Microfinance—Does Targeting to Women Make a Difference? Evidence from Bangladesh

A number of NGOs in Bangladesh have attempted to improve women's status and the status of children in their households by directing credit to women. How well have these programs worked? The Pitt and Khandker (1998) study on the differential impacts of NGO microcredit directed to men and women is particularly illuminating because it was well designed and the data were carefully analyzed. Specifically, they tested for the differential impact of male and female borrowing from three NGOs on eight outcomes—boys' and girls' schooling, women's and men's labor supply, total household expenditure, contraception use, fertility, and value of women's nonland assets. They found that "the set of female credit variables is statistically significant in 7 of 8 cases at the 0.05 percent level. By contrast, the set of male credit variables is significant in 3 out of 8 cases" (p. 41). One of the implications of their results is that household consumption increases by T18 for every T100 lent to a woman but only by T11 for a man (Morduch 1997).

Kabeer (1998) reviewed the conclusions of the econometric studies of credit to women in Bangladesh and compared the results with her own participatory evaluation. She was more interested in the perspective of the women themselves as to whether they felt empowered by the receipt of credit. Despite increased workloads, the loanees clearly felt more self-fulfilled and valued by the other household members and the community. The following quote from a loanee illustrates the point:

*Ideas of the mind is everything. If you have money in your hand, you feel joy. If you have no money, you feel pain. My labour has increased, but I don't feel it because the money is also coming in. It doesn't feel like hard work. (Kabeer 1998: p.31).*

(5) generate skills that will enhance the ability of the poor to secure employment after the project has ended; and (6) are implemented with significant community involvement so as to generate capacity within the community to engage in wider political processes.

By far the largest workfare or public works programs are found in Asia (Table 4.6). In general, the Indian and Bangladesh programs are thought to function quite well in an absolute sense, particularly in times of seasonal distress. How well do these programs operate relative to other poverty-reducing mechanisms? Taking into account the costs of participation—both out of pocket and opportunity costs—one study (Ravallion and Datt 1995) found that the cost of participation by the poor in the Maharashtra Employment Guarantee Scheme was one quarter of the gross wage earnings of the scheme. Moreover, the costs of participation in terms of foregone income made the cost of poverty impact of the scheme not much greater than that of a hypothetical untargeted income transfer.

The scope for improving the operation of these workfare programs is thought to be quite large. Data exist to better target projects to poor areas and increased liberalization will likely make it easier to set project wages below market wages to better self-select the poorest. In addition, attempts to build up capacity and skills at the individual and community levels via workfare programs have not been properly evaluated

and factored into the benefit-cost calculations. Moreover, untargeted programs can exclude the poor due to high transaction costs (for example, travel time to a health clinic or a cash collection point).

Recently, several Southeast Asian economies—Indonesia, Republic of Korea, and Thailand—have turned to public works schemes as a vital component of strengthened safety nets in the wake of the regional financial and economic crisis (see Globalization, Chapter 5). The experience of setting up these large public works programs under crisis provided some important lessons: (1) making public works projects community-led takes time; (2) the involvement of women is not automatic. In Indonesia, the projects did not attract women well, but in the Republic of Korea the projects were explicitly targeted to women. Wages that are close to market or minimum wages not only fail to target the projects adequately toward the poor, but they also exclude women who typically will work at lower wages. Moreover, the work has to be culturally appropriate for women and attention has to be paid to provision of adequate child care facilities. The experience in Bangladesh and India with gender-sensitive public works should be informative for East Asian countries; and (3) the lack of up-to-date poverty or undernutrition maps hindered the targeting of projects to those most affected or those most vulnerable (Horton and Mazumdar 1999).

**Table 4.6 Workfare Programs: Operations in Selected Countries**

Country	Program	Public Works Wage Below Market Wage?	Scale of Operation (million person-days of employment/year)	Ratio of Wage Cost to Total Cost (%)	Total Cost / Day of Employment (US\$)
Bangladesh	CFW, 1991–1992	Yes	15	0.5	1.6
India	CFW, 1991–1992	No, but equals minimum	850	0.6	1.3
India	Maharashtra Employment Guarantee, 1991–1992	No, but equals minimum	100–180	0.51	1.2
Pakistan	CFW, 1992	Yes	5.15	0.6	2.8
Philippines	CFW, 1990	No	0.3	0.5	3.2
Botswana	CFW, 1992–1993	No	7	0.63	1.7
Ghana	CFW, 1988–1991	-	0.5	0.2	3.4
Kenya	CFW, 1992–1993	No	0.6	0.3–0.4	3.0
Bolivia	CFW, 1982–1990	-	8–9	0.4	8.0
Chile	CFW, 1987	Yes	40–45	-	0.5
Honduras	CFW, 1990–1991	-	2.5	0.4	1.0
Costa Rica	CFW, 1991–1994	-	8.9	-	4.0

Source: Subbarao (1997).

Note: CFW = cash for work.

### *Income transfer programs*

#### *Food price subsidy/stabilization*

Food price stabilization via consumer food price subsidies, the domestic procurement of foods, and government control of imports—usually all three—has also been tried by many Asian governments as a way to reduce the fluctuations in food prices faced by the poor. In the 1970s, with agriculture playing a dominant role in most economies and against a backdrop of an unliberalized world grain markets, large swings in the domestic price of staples such as rice were commonplace, with resulting risks to overall inflation and civil unrest (Skees, Hazell, and Miranda 1999). These price stabilization programs probably had overall benefits to the poor—both rural and urban. However, as agriculture has become less important and the world market has liberalized, it has become more difficult and less necessary for government bureaucracies to try to substitute the role of the market. This has been

recognized by many countries in the region. Consequently, these programs are highly controversial.

Some countries in the region have made the difficult transition from general to targeted subsidies. The transition is difficult due mainly to political economy and administrative factors. The programs have large constituencies behind them. But the effort is well worth it. Not only can the poor be reached at a lower cost, but fewer restrictions are placed on agricultural input and output markets, thus allowing for a more vibrant agriculture.

In Bangladesh for example, there has been a general movement away from general price subsidies toward more targeted food programs for the poor (Ahmed and Haggblade 2000). However, in India, the costly Public Distribution System for food has persisted and has been estimated to cost R5.4 for every R1.0 transferred to the poor (Measham and Chatterjee 1999) as opposed to the Integrated Child Development Services Program, which costs R1.8 to transfer R1.0 to the poor.

### *Targeted human development programs*

Targeted human development programs are relatively unknown in Asia, but are widespread in Latin America. These programs are similar to workfare programs in that they have a requirement for receipt of resources. The requirement is not work, however, but investment in the human capital of children. Cash transfers are typically made to households in poor communities (often to women) on the condition that their children attend school and that their family members attend health clinics. These facilities are also upgraded so that they are likely to have an effect on the current and new users. Programs such as *Progres*a in Mexico, FISE in Nicaragua, and PRAF in Honduras are currently in operation at a large scale.

Evaluations of these large-scale programs are under way. Results from the *Progres*a evaluation are promising: consumption, nutrition, and school enrollment are up as is women's status, with poverty and child labor down (Skoufias and McClafferty 2000). Such rigorous evaluations are sorely lacking. What needs to be done now is to develop a library of such evaluations and to experiment with program delivery mechanisms. In the IFPRI evaluation of PRAF, communities are randomly assigned to four groups: those receiving nothing; those receiving a supply-side boost to the quality of health and education services; those receiving a boost to their ability to demand such services (a cash transfer to mothers tied to behavior change); and a fourth group receiving both supply- and demand-side interventions (Flores and Morris 2000).

The Food For Education Program (FFE) in Bangladesh began in July 1993 on a large-scale pilot basis, covering about 5,000 primary schools spread all over the country. Most children from the poorest families in Bangladesh do not attend school because they cannot be spared from contributing to their family livelihood. The FFE food ration (wheat) becomes the income entitlement that would enable a poor family to release children from household obligations so they can go to school. An assessment of the FFE program in April 1994, based on a survey of primary schools and households, found the cost of delivering T1.0 of income to a household through FFE at T1.6, much lower than for other transfer mechanisms.

With regard to education impact, Ahmed (2000) found that the FFE did not simply draw students from neighboring nonFFE schools, but also children from the

catchment area that were not currently in school. The new children were from households that were slightly poorer than currently enrolled FFE recipients. Children who were not enticed into school were from families that were 30 percent poorer than the currently enrolled FFE students. Attendance increased for both boys and girls, but increases in attendance were about 10–15 percent higher for girls. The benefits from such a program could be far-reaching in terms of the status of women and desired family size. It would be important to conduct a follow-up study to determine the sustainability of the initial impacts on girls' education and whether this led to delayed marriage and permanent improvements in women's status.

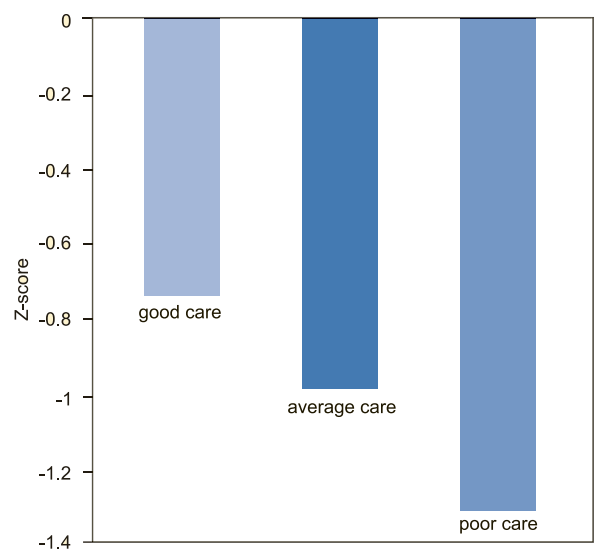
A recent development has been the fortification of the wheat flour that is distributed via the FFE program. This is another way in which human investment programs that rely on a food-based income transfer can increase their nutrition impact. A follow-up evaluation is underway to examine the impact of the FFE on school enrollment and the quality of education received and on the sustainability of using fortified wheat flour (Ahmed and Del Ninno 2000).

### **STRENGTHENING THE STATUS OF WOMEN**

The ability of women to influence decisions that have large impact on their lives and the lives of those they care for is fundamental to the adequate provision of care to themselves and to their children. In particular, in societies where they have a much lower status than men, women tend to suffer disproportionately from poverty, ill health, and mortality. Moreover, their children get less to eat and girl children, in particular, are discriminated against in feeding, the receipt of health care, and education. These are all components of care provision, which is now beginning to be quantified together with its contribution to reducing child undernutrition. Figure 4.19 highlights a recent study from Ghana (there are none from Asia) that demonstrates the large and positive impact of child care on child height-for-age for poor women in Accra, controlling for a host of other individual, household, and community effects.

On a global scale, increases in female status and female education have been estimated to account for 50 percent of the reduction in child malnutrition rates over the past 25 years (see Figure 4.1).

Data for a number of Asian countries show that those in South Asia have the lowest status of women on

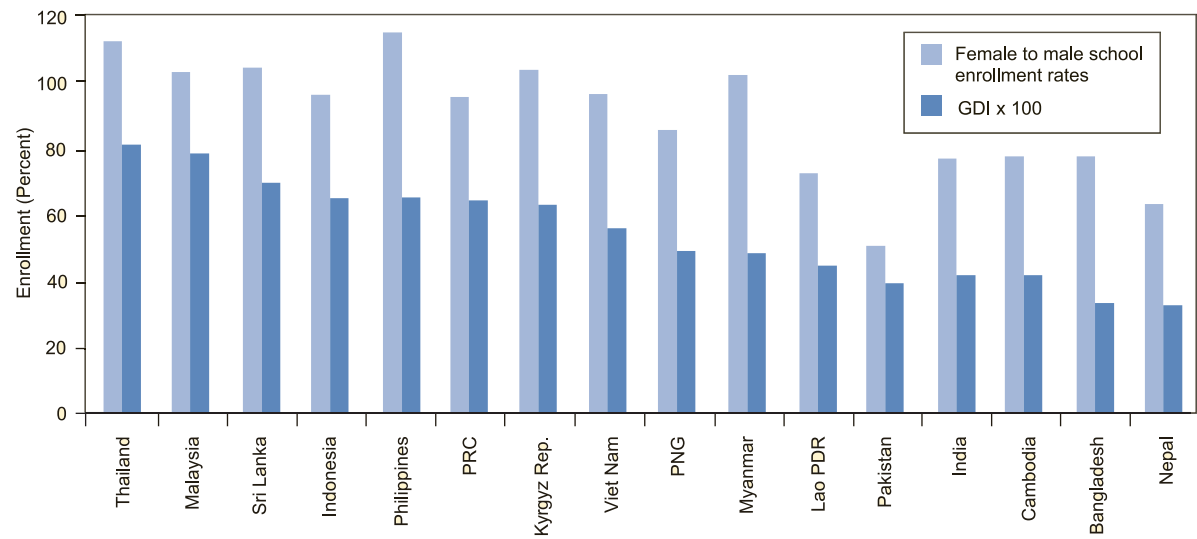


Source: Ruel et al. (1999).  
**Figure 4.19 Impact of Care Received by Infants Predicted Z-score Height for Age, Multivariate Results for Poor Households in Ghana**

UNDP’s Gender-related Development Index (Figure 4.20). Thailand has the highest score and Nepal the lowest. A second indicator, the ratio of female to male school enrollment rates, shows a similar pattern, with countries such as Myanmar, Philippines, and Thailand showing higher school enrollment rates for females. Pakistan has the lowest ratio with just 5 females enrolled in school for every 10 males.

Another indicator is the ratio of life expectancy of women to men. In more developed countries, this ratio is approximately 107 percent: women live 7 percent longer than men. It is striking that in the countries of South Asia this number is close to 100 percent and in Nepal (1995), the number was less than 100 percent.

Household survey data from 40 countries in four developing regions (Table 4.7) show that in the countries of South Asia, the difference in years of education between men and women is greatest, girls are married at the youngest ages, male births are most preferred, and the difference in numbers of boys and girls vaccinated is greatest.



Source: UNDP <http://www.undp.org/hdro/98 gdi.htm>  
Note: The Gender-related Development Index (GDI) is a gender-disaggregated version of the Human Development Index and is based on the relative differences between men’s and women’s life expectancy, educational attainment, labor force share, and relative wages (see Technical Note 2 in UNDP 1998).

**Figure 4.20 Gender-related Development Index and Ratio of Female to Male School Enrollment Rates (percent), 1995**

**Table 4.7 Women's Status, from Household Data Sets in 40 Countries**

Region	Difference in Years of Education of Woman and Her Male Partner	Difference in Woman's Preferred Numbers of Girl and Boy Children	Woman's Age at First Marriage	Difference in Vaccination Score (0-100) of Woman's Girl and Boy Children
South Asia	-2.71	-0.55	16.68	-4.29
Sub-Saharan Africa	-1.34	-0.10	17.28	0.39
Latin America/Caribbean	-0.01	0.05	19.60	-2.28
Near East/North Africa	-1.96	-0.29	18.51	-1.56
All 40 countries	-2.02	-0.39	17.35	-2.95

Source: Demographic and Health Surveys (Smith 2000).

The factors behind discrimination against women are deeply rooted. Differential returns to adult men and women in the economic sphere, mainly due to differential access to resources, induce parents to invest more heavily in boys, although there is evidence that mothers are less likely to do this (Hallman 2000). Sociocultural factors include the inability of females to carry on the lineage; the perceived inability of females to protect their families physically in areas of endemic violence and in local power struggles; prohibitions on women working outside the home; for urban women, nonenforcement of laws concerning alimony and child support; restrictions on female ownership/control of land and/or assets; poor access for women to communal resources (such as the village commons and other so-called common property resources); and poor access to external social support systems (such as natal family).

This discrimination, in addition to violating human rights, has real economic costs. Recent careful microeconomic studies in Bangladesh and Ethiopia that examined the impact on shares of household-level budget shares for child education of differential asset holding between males and females, showed that increasing female asset holding (at constant household wealth) had a positive impact on the household budget share allocated to child education, while increasing male asset holding decreased the share (Quisumbing and Maluccio 1999). However, a similar study in Ghana found that the budget shares to education increased no matter

who gained extra assets, but they increased faster when women held the extra assets (Doss 1997).

### Policies to Improve Women's Status

The previous section suggests that economic growth in the absence of policies to reduce gender asymmetries will not improve women's status relative to men in the short-to-medium run. Policies to redress this failure are important for the long-term battle for greater equality of rights. It is difficult, however, to argue that these policies are either necessary or sufficient for gender-sensitive projects to work. This section demonstrates that the existence of these policies, while certainly helping projects to improve women's status, does not guarantee that they will do so. Similarly, the absence of these policies does not preclude effective project initiatives for improving women's status (Haddad 1999).

#### *Monitoring the enabling environment*

The effective monitoring of the levels and changes in the enabling environment is likely to be a powerful force for reforming it. This kind of monitoring and consciousness-raising is important because there is often a tacit assumption that policymakers are able to abstract themselves from societal biases.

The increasing influence of the human rights movement in nutrition programming might serve as a

way of better monitoring violations in the economic, social, cultural, political, and civil rights of women and men. Inherent in the promotion of human rights is the promotion of gender equity in access to information, in the ability to participate in governance processes, in the access to government benefits, and in the right to hold access to property.

Another way of monitoring the enabling environment is to track the different implications of public budgetary allocations for men and women. Examples include education (if much of the education budget goes to tertiary education, does this short-change women because they are under-represented at this level?), service provision (if services are available only at certain outlets, what are the implications for women who tend to have less access to transport than men?), public-sector employment (will affirmative action be extended to women?), child care provision (will government services target women, who have the greater need for such provision?), and employment benefits (what happens to informal-sector employers, mostly women, when they become unemployed or ill?).

Public policy in most countries, but especially in the developing world, tends to reinforce intrahousehold and intrafamily inequality. A systematic review of relevant policies in Asia has not been undertaken (Box 4.4. contains some insights from country reports). However, reviews of the US, northwestern Europe, Latin America and the Caribbean, and sub-Saharan Africa reveal distinct patterns of gender bias in public policy, particularly in the area of child support and social entitlements, such as pensions. Moreover, some employers are, therefore, discouraged from hiring women and some require a certificate that they are not pregnant.

Women are also less likely to be employed in jobs with benefits (full time, formal sector). When they are, they pay the same taxes as men, but the receipt of survivor benefits for widows of employed men is much easier to obtain than benefits to widowers of employed women. Retirement benefits are lower for women. Family allowances give benefits to employed men with dependent wives, but not benefits to employed women with dependent children. Maternity leave benefits are often absent, and when funded by the employer they can serve as a disincentive to hire women (see Horton and Mazumdar 1999 who report this phenomenon in the Republic of Korea). Moreover, sex discrimination laws, if they exist, may be enforced in the public sector, but typically not in the private sector.

#### Box 4.4 Women, Work, and Child Care

The trade-offs women face in working and caring for children are serious. Solutions from the region include maternal leave for pregnant mothers; crèche facilities at workplaces; the increased treatment of pregnant women in hospitals; information and education campaigns to support the rights of women, which must be protected in the area of pregnancy choice; and the formation of day care centers in rural areas during harvest time, with the provision of a supplementary meal to the mother and the production of local and, hence, affordable weaning foods.

Source: ADB Country case studies from Bangladesh, PRC, Sri Lanka, and Viet Nam.

Some of the legislation discussed above may seem far removed from nutrition programs. If these laws were to change, what would be the effect on women and their children? Unfortunately, there are few chances to assess such changes in a rigorous way. One example is the change in design of a welfare program in the United Kingdom, called the Child Benefit. A legislative change in the late 1970s resulted in income transfers being directed specifically to women in the form of cash as opposed to a deduction from the household's income tax. This had a strong negative impact on household budget shares to tobacco, housing, and men's clothing, and a strong positive impact on children's clothing, fuel, and food purchased for home consumption.

#### Changes to Food and Nutrition Policies and Programs

The policies described in the previous sections are not explicitly geared towards food security and child nutrition. Are there examples of such policies that are designed to improve women's status relative to men?

One example is the Food For Education program in Bangladesh that gives larger amounts of food to households if a girl rather than a boy is enrolled in school. An alternative route is to target cash resources to women directly as is done in *Progresá*, the large Mexican antipoverty program. It has an annual budget of approximately US\$500 million. The program aims to provide a series of interventions, including monetary assistance, nutritional supplements, educational grants, and a basic health package, to its beneficiaries for at least three consecutive years. One of the innovative aspects

of the program is its attempt to transfer the monetary assistance to women. It is hoped that the receipt of income by the female will improve her ability to make decisions that directly affect child nutrition and household food security. However, there are concerns that the receipt of this new source of income may lead to increases in domestic violence.

#### *Changes in project design*

Designing projects that are sensitive to gender relations is another way of improving women's status. It is important to make the distinction between projects that are sensitive to gender relations and those that exclude men. The latter projects may well be inefficient because they have not considered the needs of men. Gender sensitivity needs to be woven into the project at all stages: design, implementation, monitoring, and evaluation. A strong and recurring theme in the broader literature and the ADB country case studies is the need to provide child care facilities for working women.

Microfinance programs can be tailored better to women if they acknowledge women's child care needs and help to build up women's decision-making power in a number of areas. Public works programs can do the same. Both types of programs need to ensure that women have access to the opportunities they provide and that trade-offs with child care time are minimized.

Does attention to gender relations in project design lead to more effective programs? Data from all 271 World Bank projects in the agricultural and human-resource sectors that were approved during or after 1987 and were completed and evaluated by 1997 indicate that it does. Projects with gender achievements were 16 percent more sustainable than those without. More work needs to be done to collect and analyze data such as these, from the development banks, governments, and NGOs to isolate the impact on project success of attention to gender relations in project design (Haddad 1999).

Attention to gender relations in project design is not guaranteed by greater participation at the community level, which may well reinforce existing gender asymmetries that are loaded against women. For example, in the selection of individuals for employment in public works projects in South Africa, community-based project steering communities and street committees were heavily involved. Yet, the values and attitudes of the individuals on those committees proved

crucial to the selection of women. When a woman's name was drawn out of a hat by a committee member, often her name was discarded and another name drawn, because the committee members determined that the work was not suitable for a woman, perhaps because it was construction related.

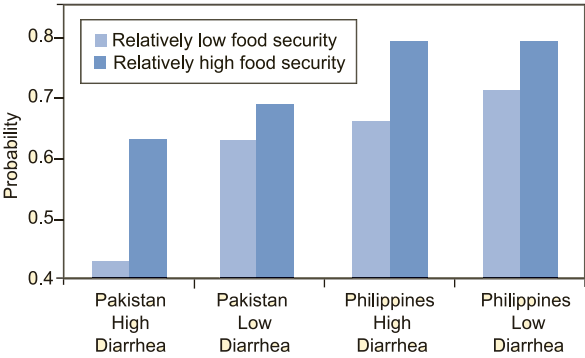
Finally, nutrition interventions that directly address maternal morbidity, intrauterine growth retardation, and low birth weight need to be found. Two recent review papers focus on the effectiveness of specific interventions in reducing intrauterine growth retardation (de Onis, Blossner, and Villar 1998) and maternal morbidity (Kuiler et al. 1998). The latter study found positive evidence with regard to nutrition interventions for the prevention of maternal morbidity and concluded that, for populations with a high incidence of nutritional anemia, iron and folate supplementation should be routine during antenatal care. Pregnant women in low-calcium areas should be encouraged to increase consumption of this element via their diet. The effectiveness of other micronutrient interventions such as zinc and magnesium is less conclusive.

The review by de Onis, Blossner, and Villar (1998) of 136 randomized controlled trials evaluating 36 prenatal interventions aimed at reducing intrauterine growth retardation, is less encouraging in that it identifies only balanced protein/energy supplementation as increasing birth weight and then only marginally. Data and evidence on other interventions such as nutrition advice and a range of micronutrient supplementations are too weak to recommend for routine supplementation programs. The review raised questions about whether one-shot nutrition interventions can overcome the effects of long-standing social and nutritional deprivation, and called for more and better-designed studies on interventions that target women during pregnancy.

### **WATER, SANITATION, AND HEALTH SERVICES**

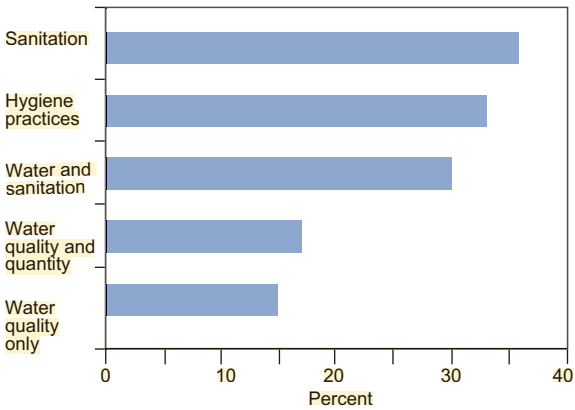
Water, sanitation, and health services have played critical roles in reducing child undernutrition over the past 25 years. These factors were responsible for approximately 19 percent of the reductions in low weight-for-age during 1970–1995 (Figure 4.1). Moreover, like all the underlying determinants, there are strong interactions with caring behavior and with household food security.

Household survey data from the Philippines and Pakistan illustrate this point (Figure 4.21). There was a



Source: Haddad et al. (1998).

**Figure 4.21 Probability of Avoiding Low Child Weight for Age, by Interactions of Levels of Household Food Security and Levels of Child Diarrhea, Pakistan and Philippines**



Source: Esrey et al. (1991).

**Figure 4.22 Reduction in Diarrheal Morbidity from Improvements in One or More Components of Water and Sanitation (percent)**

larger relative impact on the likelihood of preschool children avoiding underweight from improving household food security in diarrhea-prevalent situations as opposed to improving it in low-diarrhea situations. Of course, the largest positive impact was observed when the incidence of diarrhea was low and household food security was high.

**Access to Safe Water and Adequate Sanitation**

Infection and food intake are the two immediate factors in malnutrition. Both are affected by limited access to water, exposure to poor quality water, and inadequate facilities for the disposal of excreta and garbage. Good-quality water and sanitation services play a crucial role in minimizing the ingestion of pathogens (via drinking water and food that has been poorly prepared, handled, or stored) that cause the gastrointestinal infections that lead to diarrhea. Diarrhea leads to a lower absorption of nutrients, dehydration from fluid loss, and a lack of appetite. These are serious problems for infants in the absence of sanitary hydration and food ingestion. In addition, poor-quality water can transmit diseases from parasitic pathogens, e.g., ascariasis, dracunculiasis, hookworm, schistosomiasis, and trachoma, which inhibit the body’s ability to absorb nutrients and process toxins (Esrey et al. 1991).

For diarrhea, studies have shown that improved water quality reduces morbidity prevalence and severity, but not as effectively as combinations of improved water quality, improved water quantity, and improved

sanitation (Figure 4.22). The reductions in diarrheal morbidity from these interventions are large—between 15 and 33 percent. The reductions due to sanitation alone account for most of the combined sanitation and water improvements, probably due to increases in water quantity without increases in water quality. For parasite infection, the various elements of improved water and sanitation delivery have large but different impact on the infection rates of different parasites (Table 4.8).

In addition to reducing pathogen ingestion, improved water access leads to reduced time spent looking for and fetching clean water. Typically, women and children are assigned to this activity with its high level of drudgery and physical hardship. In addition, the time they spend in these activities has a high opportunity cost in terms of child care and time spent in school. Thus, improved access to improved water facilities can have large indirect benefits on energy and nutrient expenditure and on care inputs into good nutrition.

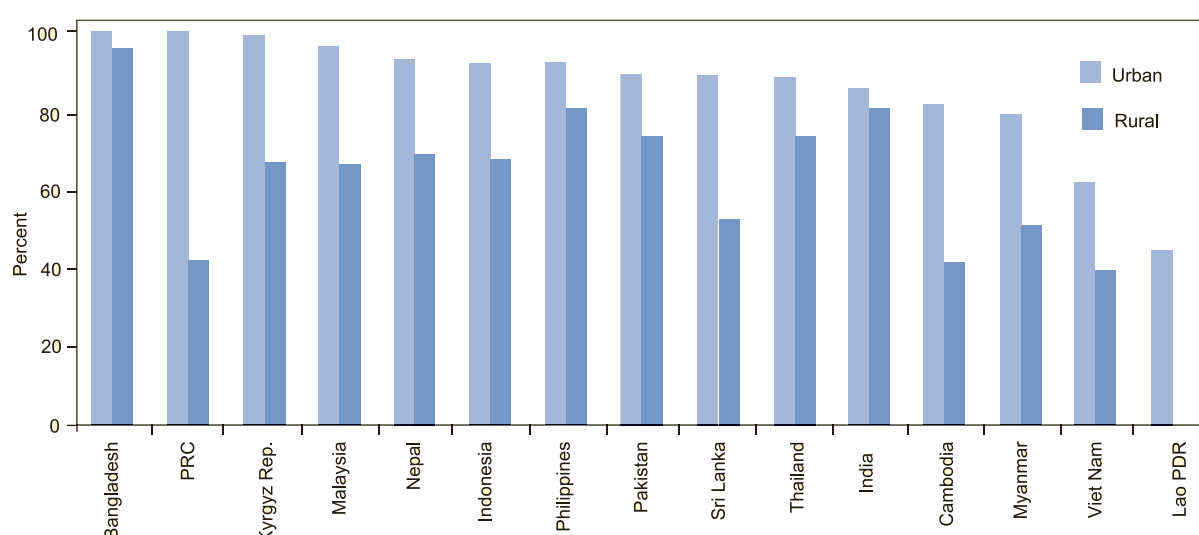
Access to safe water varies widely within the region, but in all countries with the exception of Viet Nam, access has been increasing (Smith and Haddad 2000). Overall, access is high in PRC, Malaysia, Philippines, and Thailand and lower in Lao PDR, Myanmar, and Viet Nam. In South Asia, Bangladesh, India, Nepal, Pakistan, and Sri Lanka show similar levels.

In general, access to safe water is high in urban areas, with only Viet Nam showing access rates below 80 percent (see Figure 4.23). In rural areas, access is much lower and not obviously related to access rates in urban areas. For example, access to safe water in urban PRC is

**Table 4.8 Relationships between Water and Sanitation Interventions and Morbidity from Selected Parasitic Infections**

Disease	Improved Drinking Water	Improved Water for Domestic Hygiene (e.g., cooking)	Improved Water for Personal Hygiene (e.g., washing)	Improved Human Excreta Disposal	Expected Reduction in Morbidity (%) (median from a range of studies)
Ascariasis	+	++	0	++	29
Dracunculiasis	++	0	0	0	78
Hookworm	0	0	0	++	4
Schistosomiasis	0	++	++	++	77
Trachoma	0	+	++	0	27

Source: Adapted from Esrey et al. (1991).



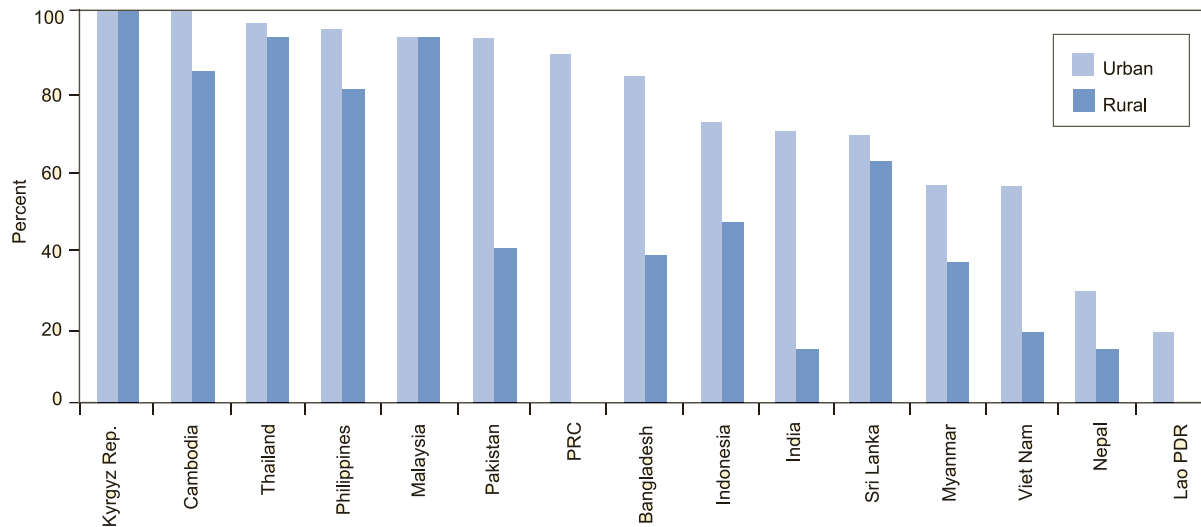
Source: UNICEF (1998).

Note: For Lao PDR, the number is the overall access rate.

**Figure 4.23 Proportion of Population with Access to Safe Water in Urban and Rural Asia, 1990-1998 (percent)**

higher than in urban India, but India has much higher access rates in rural areas. This differential is not likely to be maintained under the rapid urbanization that the Asian region is undergoing (see Chapter 5). Every effort must be made to ensure that the disparity will be reduced by an increase in access in rural areas, rather than a decrease in urban areas.

Access to adequate sanitation shows similar rural-urban differentials (Figure 4.24). However, there are some striking differences. For example, urban populations in India and Sri Lanka have similar access to adequate sanitation, but in rural areas, Sri Lankans are four times as likely to have access to adequate sanitation. Interestingly, the opposite pattern is



Source: UNICEF (1998).

Note: For Lao PDR, the number is the overall access rate.

**Figure 4.24 Proportion of Population with Access to Adequate Sanitation in Urban and Rural Asia, 1990-1998 (percent)**

observed for access to safe water. Some countries rank better in water access than in sanitation access, but Lao PDR, Myanmar, and Viet Nam are near the bottom of the rankings for both sets of services. Improvements in the availability of water and sanitation services are likely to have a high return in terms of malnutrition reduction, particularly in rural areas. But note that the availability of adequate sanitation disposal services does not guarantee their use. For example in the PRC and Viet Nam, the use of excrement as a fertilizer in agriculture increases the risk of food and water contamination.

Does a high level of access to safe water in an urban setting mean that access is not location specific? A recent study using representative household survey data from Dhaka and Kathmandu found a low degree of clustering of access to clean drinking water in Kathmandu but a high degree in Dhaka (Table 4.9). This suggests that targeting interventions will be much easier in Dhaka than in Kathmandu.

### Health Service Access

Access to health services varies widely by country (Figure 4.25). Access to doctors is highest in the PRC, Cambodia, India, and Pakistan. It is lowest in Bangladesh, Indonesia, Nepal, and Philippines. Access to nursing professionals

tends to be high when access to doctors is low. The exceptions are Bangladesh and Nepal. Access to nursing professionals has a stronger negative correlation with child undernutrition rates than does access to doctors (Figure 4.26). This suggests that expanded community-based nutrition programs could exploit synergies with existing nurse-based health service delivery systems.

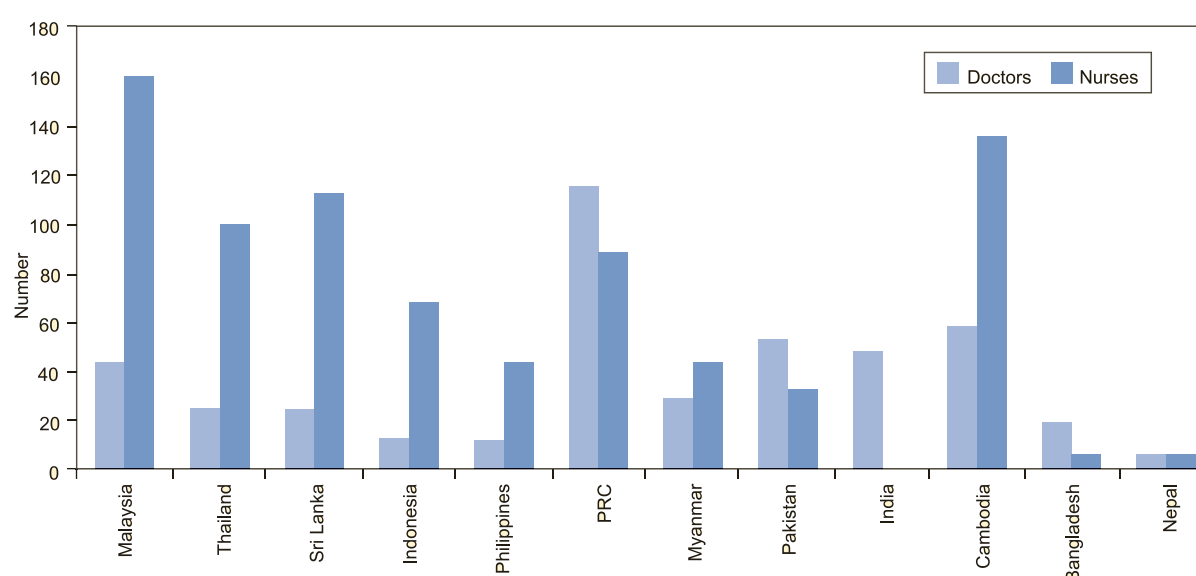
### *Improving service delivery in water, sanitation, and health*

Much can be done to increase access of the poor to water, sanitation, and health services. First, examine the distribution of public expenditures on these services by income group. The figures in this subsection are at the national level. Smaller surveys have shown that these national averages mask the differential access that the poor and nonpoor have. As the data in Chapter 7 show, spending on health services can be highly skewed away from the poor. Access to public water services is also highly dependent on income. Moreover, the costs of getting access to water in the dry season from informal vendors can amount to 18 percent of total expenditures for the poor (World Bank 2000a). Efforts must be made to target new infrastructure development—whether primary health care, or water, or sewers—to those who currently have none.

**Table 4.9 Clustering of Access to Clean Drinking Water in Kathmandu and Dhaka**

Dimension of Welfare	Kathmandu (1997)	Dhaka (1996–1997)
Number of clusters in analysis	33	21
Median number of households per cluster	12	16
Proportion of households with drinking water from a closed-system water source in the home or yard (%)	94	71
Proportion of variation in access to drinking water from closed system due to location in a particular cluster (%)	8	60

Source: Morris (2000).

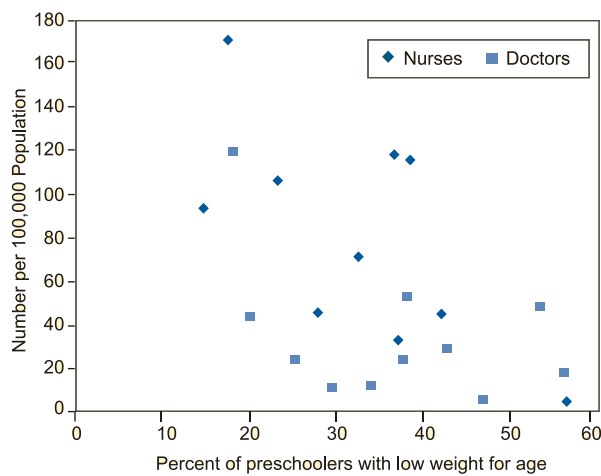


Source: UNDP (1998).

**Figure 4.25 Doctors and Nurses per 100,000 People in Asia, 1993**

Second, involve communities. Worldwide experience has shown that their involvement will (1) increase the usefulness of the services delivered (e.g., nurse-based preventative and promotive advice in addition to doctor-based curative treatment); (2) usually increase access for the poorest (of course, it is important that “the community” represents the concerns of the poor adequately and is not held hostage to local elite); (3) promote the sustainability

of the service or resource via improved management (e.g., water-user groups that develop strong incentives for efficient water use); and (4) increase the availability of cofinancing from users. Is there any evidence that increased community participation improves water project performance? One of the best studies to address this issue is by Isham, Narayan, and Pritchett (1995). Using a range of performance indicators for 121 World



Sources: Data on doctors and nurses from UNDP (1998). Underweight data from ACC/SCN-IFPRI (2000).

**Figure 4.26 Proportion of Preschooler Underweight (percent) Versus Nurses and Doctors per 100,000 People in Asia, 1993**

Bank rural water projects from 49 countries, they found econometric evidence (based on indicators from consultation and shared decision making to exclusive participant decision making) that participation of beneficiaries is strongly correlated with performance. Research has also shown that if these services meet the needs of the poor, they would be prepared to pay for some of the cost (Box 4.5; Pouliquen 1999).

Third, whenever possible involve the private sector to deliver more efficient services that are responsive to customer satisfaction. Food fortification is a good example of how initial public-sector investments can leverage private-sector funds to deliver fortified food (more on this in Chapter 7). The private sector can be involved in fortification (and sometimes they are compelled to by law) because it is contestable—barriers to entry do not preclude several suppliers of fortified food. Garbage collection is also contestable and has the potential for private-sector delivery. Health service delivery is also contestable and a large percentage of health expenditures, even in the poorest countries in the region, is from private sources (see Chapter 7). Domestic water provision is perhaps the least

contestable of all these services, although in many countries, including some in Asia, private companies find the delivery of water via trucks to be commercially viable (Pouliquen 1999). Water pricing for agricultural uses, while still controversial, would increase the incentives for efficient water use in crop and livestock production and make more water available for domestic uses, both for the rural areas and for the cities.

Fourth, recognize that provision of health, water, and sanitation services is critical to the provision of high-quality care. Caring behavior that incorporates unclean water, poor-quality health services, and poor sanitation is “destructive,” serving infants and their families very poorly. If the provision of these services is seen through a care lens, it would ensure that the needs of women are taken into account and it would lend an increased sense of purpose to service provision. The incorporation of child anthropometry measures into the set of performance indicators would reinforce the role that these services play in the better use of food and delivery of “constructive” caring behavior.

Fifth, look for positive synergies in service delivery. A holistic assessment and analysis of the role that water, sanitation, and health services play in the nutrition status and livelihoods of the poor will likely identify opportunities for action that have a higher return. For example, there is quite a lot of evidence that slum upgrading is successful because a range of actions are taken at the same time, such as dwelling upgrades, improved service delivery, and strengthened property rights (World Bank 2000a). The explicit building of nutrition concerns into integrated management of childhood illnesses and into the provision of hospital services via the Baby-Friendly Initiatives (a WHO/UNICEF initiative, which has influenced the routines and norms of hospitals worldwide through the ‘baby-friendly’ certification process; UNICEF 2000) is also an example of such integrated thinking and acting. However, multisectoral action is difficult to coordinate at all levels—e.g., local, government, NGO, and donor—and integrated actions are certainly not the rule. Rather, cross-sectoral assessment and analysis may be more important than cross-sectoral action.

#### **Box 4.5 The Orangi Pilot Project in Pakistan**

The provision of free basic services is often thought to be the responsibility of government. In the late 1970s in Orangi, a large unplanned settlement in Karachi, public sanitation provision was minimal. Bucket latrines were the main means of disposal of human excreta and open sewers were used for the disposal of wastewater. The Orangi Pilot Project (OPP), an NGO project, was introduced in 1980 as a low-cost sanitation program, which gradually became a large community-based integrated urban development program. Between 1981 and 1993, Orangi residents installed sewers serving 72,070 of 94,122 houses at an average cost of \$31 per house or \$6 per person for the average household size of 5. Much of funding required was raised within the communities. The rest came from NGOs and multilateral donors.

Various components have been successfully added to the program since its initiation, including a basic health and

family planning program, a credit program for small family enterprises, a low-cost housing upgrade program, a school infrastructure and quality-improvement program, and a women's work center program. The OPP is thought to thrive on participation, the development of low-cost technology, organization of action by small groups of residents, research into effectiveness of OPP, partnerships with government, and the support and development of community activists. Replication of the experience, however, has generated mixed results, and it is clear that OPP's success has been due in large part to strong leadership at the top.

The importance of such leadership, its generation, and the capacity required to generate it should be the focus of new operational research.

The Orangi Pilot Project is described in *Environment and Urbanization* 7(2):22, 1995.

## 5. Contextual Factors and Processes

This chapter focuses on the social, economic, political, and cultural factors that determine the type of environment for nutrition-relevant action. Several phenomena are changing the context within which even the basic determinants of malnutrition function. Many of these contextual changes are enabling, some are disabling. They provide new opportunities and new challenges to policymakers and program designers as to when and where the public sector should intervene in the nutrition sector and how it should best do so. Their implications are discussed in this chapter. First, the relationship between economic growth, poverty reduction, and nutrition improvement is discussed. This is followed by an analysis of the links between nutrition and democratization, and the importance of legislation and other major contextual changes such as globalization, urbanization, and decentralization. The final two sections focus on major changes in the demographic landscape—aging and the present and future implications of the HIV/AIDS pandemic.

### ECONOMIC GROWTH AND POVERTY REDUCTION

As indicated in Chapter 4, countries of the region vary widely in their per capita gross national product. Table

5.1 lists the countries by the five groups introduced in the previous chapter: low income (lower), low income (upper), middle income, high income, and small island developing states. Although malnutrition rates are associated with gross national product, they vary widely by income levels. For example, Figure 5.1 shows the wide variation in child underweight rates for a given GDP per capita for 63 developing countries. The Figure shows that economic growth is important for malnutrition reduction, but that some countries at approximately \$1,000 GDP per capita have underweight rates of over 50 percent while others with a similar GDP per capita have a rate between 20 and 30 percent.

Data from the Asian region (Figure 5.2) show a similar pattern. For example, Viet Nam (1998) has a much lower GDP per capita than Indonesia (1995), but it also has a lower under-five stunting rate. Similarly, the PRC (1992) and the Philippines (1993) have similar stunting rates, but the GDP per capita of the latter is twice that of the former. Note the clustering of the South Asian countries in the high stunting-low GDP corner of the graph, a feature noted in Chapter 2 in the situation analysis. Finally, the most recent stunting data available, used in Fig. 5.2, are on average 8-years old. This points to a relative dearth of monitoring of nutrition outcomes within the region, discussed below in the section on Globalization.

**Table 5.1 Country Groupings for Nutrition Transition Analysis**

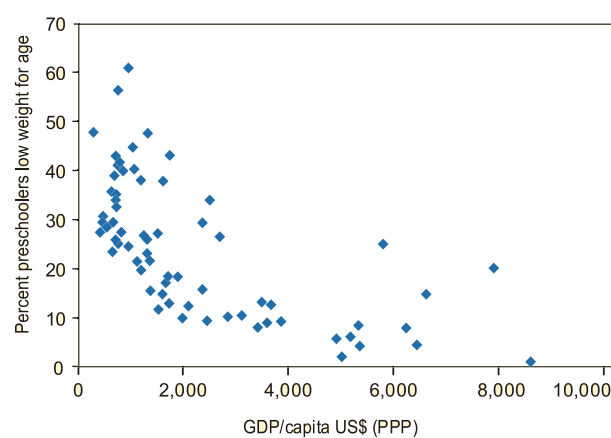
Group	Country	GNP/capita (PPP), 1998 (US\$)
Low Income (Lower)	Nepal	1,157
	Cambodia	1,257
	Bangladesh	1,361
	Bhutan	1,536
	Mongolia	1,541
	Viet Nam	1,689
	Pakistan	1,715
	Lao PDR	1,734
	India	2,077
	Papua New Guinea	2,359
	Kyrgyz Republic	2,247
Low Income (Upper)	Indonesia	2,651
	Sri Lanka	2,979
	People's Republic of China	3,105
Middle Income	Philippines	3,555
	Thailand	5,456
	Malaysia	8,137
High Income	Korea, Rep. of	13,478
	Hong Kong, China	20,763
	Singapore	24,210
Small Island Developing States	Kiribati	1,891
	Solomon Islands	1,940
	Vanuatu	3,120
	Samoa	3,832
	Maldives	4,083
	Tonga	4,101
	Fiji Islands	4,231
	Brunei Darussalam	16,765

Source: World Bank (2000b).

PPP = purchasing power parity

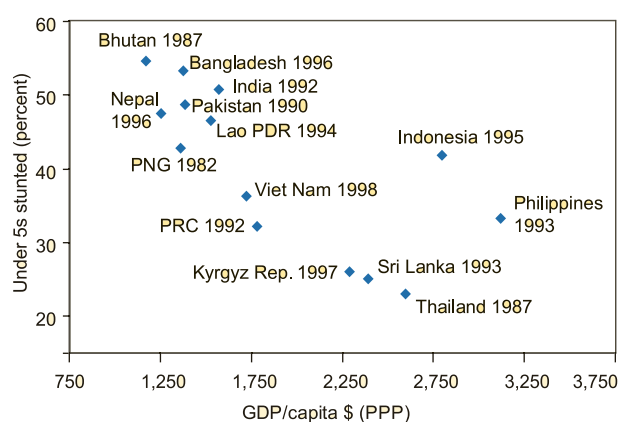
The consensus view is that poverty-reducing economic growth, combined with a legal framework that protects the rights of the poor and vulnerable and is favorable to efforts to reduce malnutrition, and a government structure that is accountable, representative, participatory, and responsive are vitally important for accelerating reduction in malnutrition. Economic growth can serve as an important spur towards accelerating reduction in child malnutrition, particularly if the growth is poverty reducing.

But is income growth poverty reducing? This is an old question and one that remains controversial. A spate of recent studies has suggested that growth is very good



Source: Alderman et al. (2000).

PPP = purchasing power parity

**Figure 5.1 Low Weight for Age by GDP Per Capita (PPP), 1990s**

Sources: ACC/SCN-IFRI (2000) and World Bank (2000b).

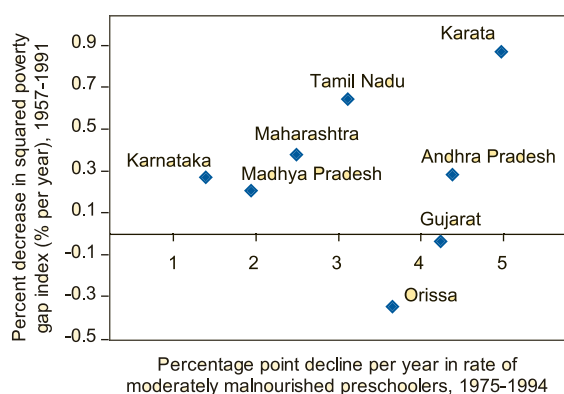
Note: Stunting data are missing for Malaysia and GDP per capita (PPP) data are missing for Myanmar.

PPP = purchasing power parity

**Figure 5.2 Proportion of Children Under 5 Who Are Low Height for Age (Stunted), by GDP Per Capita in Same Year (PPP, Current International) for Latest Year Stunting Data Available**

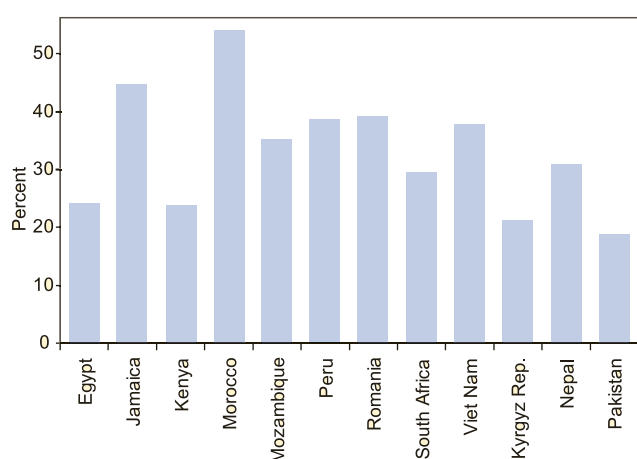
for poverty reduction, although maximizing growth is not necessarily the same as maximizing poverty reduction (Osmani et al. 2000). The next question is: how good is poverty reduction for malnutrition reduction?

State-level data from India from the past 30 years show that progress in reducing malnutrition is only weakly associated with progress in reducing poverty (Figure 5.3). More generally, recent analysis of cross-section household survey data from 12 countries shows that even rapid and sustained income growth at the household level will only



Sources: Datt and Ravallion (1997) and Measham and Chatterjee (1999).

**Figure 5.3 Reductions in Poverty and Reductions in Moderate Malnutrition in Eight Indian States**



Source: Alderman et al. (2000).

**Figure 5.4 Reductions in Prevalence of Underweight (Low Standardized Weight for Age) Due to 5% Per Capita Income Growth Rates to 2020 (percent)**

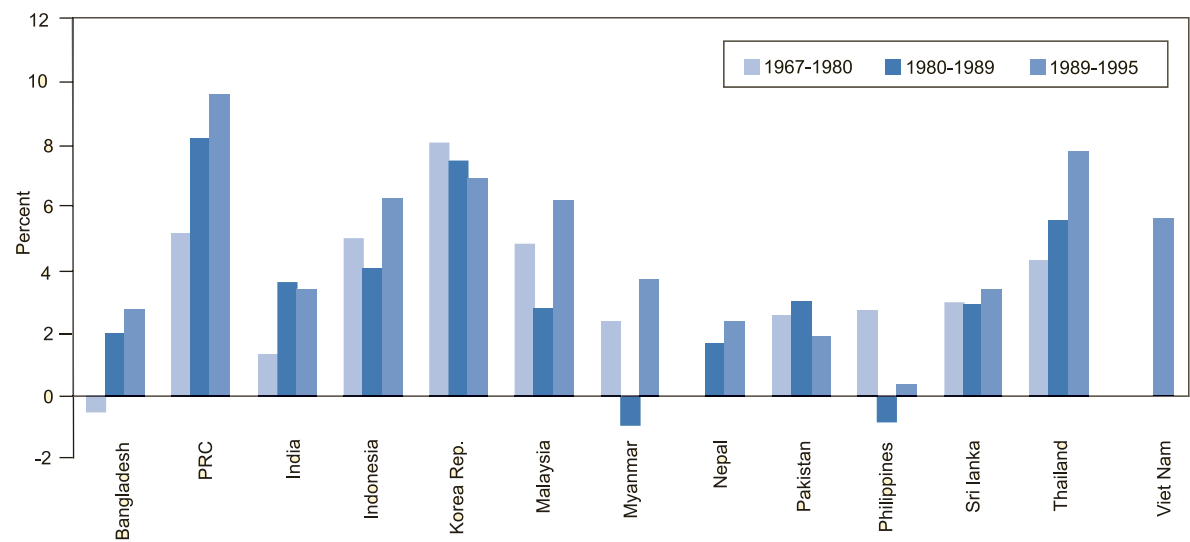
serve to bring us half-way to the general goal of halving the rate of malnutrition by 2020. Figure 5.4 shows that for Pakistan, Nepal, and the Kyrgyz Republic—countries that have recent multipurpose surveys—per capita income growth rates of 5 percent per year over the next 20 years alone will only reduce underweight by one third of the current rate. Some Asian countries, including the PRC, Indonesia, Republic of Korea, Malaysia, and Thailand, have exceeded this growth rate for sustained periods between 1967 and 1995 (Figure 5.5). Others, such as Bangladesh, Myanmar, Nepal, and Philippines, have

demonstrated very slow growth in per capita incomes. However, income growth does not have to be poverty reducing. Much depends on the distribution of income. Figure 5.6 shows that the level of income distribution in Asian countries varies widely. In Bangladesh, PRC, India, Lao PDR, Pakistan, and Viet Nam, inequality is low as indicated by a low Gini coefficient (at the extremes, a Gini coefficient of zero would mean that everyone has the same income level; if one individual possesses all the income in a country, the coefficient would be one). In terms of trends, inequality is increasing in PRC, Malaysia, Sri Lanka, and Thailand and decreasing in Bangladesh, Indonesia, Pakistan, and Philippines.

Countries experiencing both income growth and declines in inequality have a good macroeconomic environment to support reductions in malnutrition rates. Until the recent financial and economic crisis, Indonesia would have fitted into this profile. The PRC, India, Pakistan, and Viet Nam also appear to have a favorable climate from a purely economic perspective—that is reasonable economic growth and low inequality—for reduction in child malnutrition. However, it should be stressed that even broad-based economic growth will be unsuccessful in reducing malnutrition if unaccompanied by political choice to allocate sufficient public expenditure to this end. The extent to which this occurs in the region is discussed in Chapter 7 on financing.

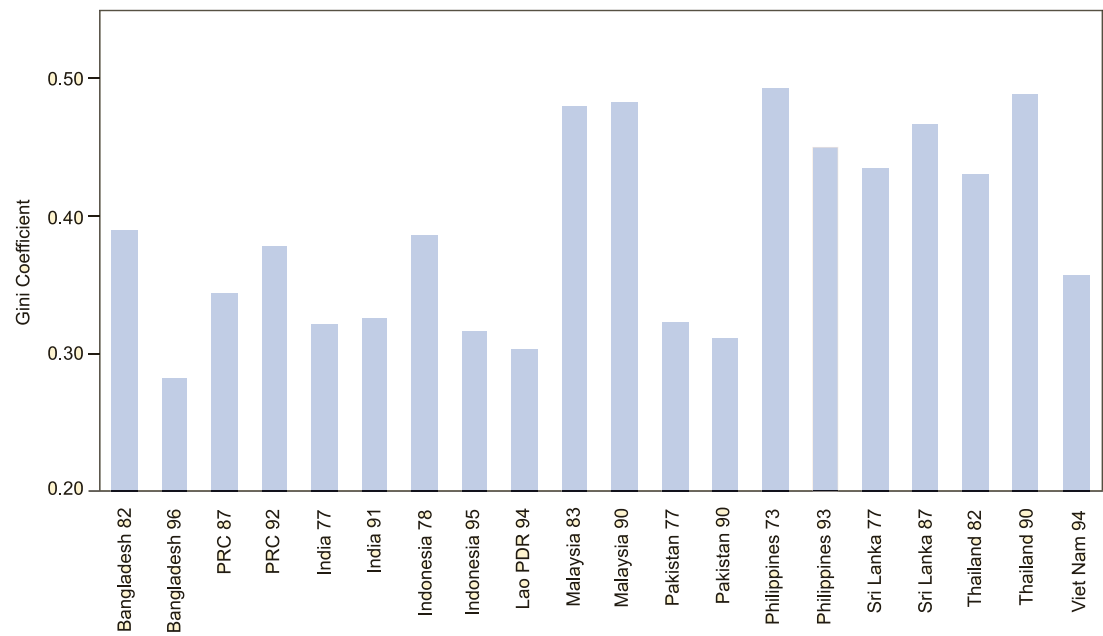
If countries that have exceeded a sustained growth rate of 5 percent per year in GDP per capita still need heavy investment in direct nutrition interventions to halve malnutrition rates by 2020, then countries such as Bangladesh, India, Nepal, and Philippines need these programs even more. This reinforces the case for the direct nutrition interventions outlined in Chapter 3.

Does increased investment in nutrition come at the cost of income growth? As Chapter 2 has shown, the economic costs of malnutrition are substantial. Some of the most revealing evidence that investment in health and nutrition affects subsequent economic growth is provided by state-level research on India over the period 1960–1990 (Figure 5.7). For example, during this period, the annual decline in poverty in Uttar Pradesh was slower than in Kerala due to the former's worse infant mortality rate in 1960 (even after controlling for a wide range of other factors and for reverse causality) (Datt and Ravallion 1997).



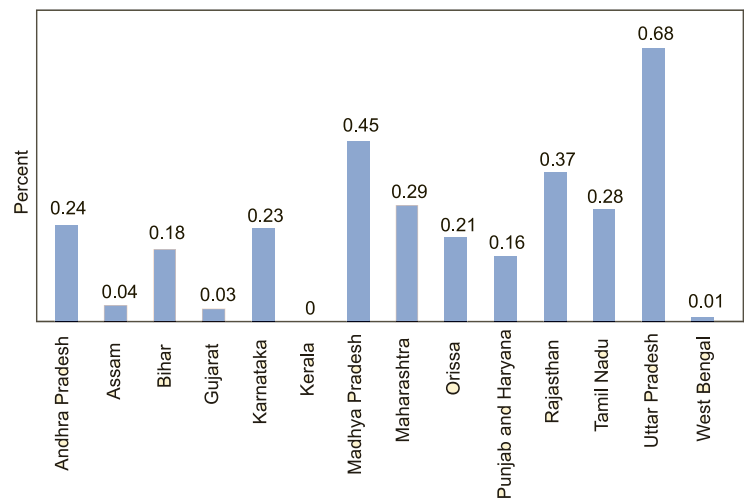
Source: Rosegrant and Hazell (2000).

Figure 5.5 GDP Per Capita Growth Rates for Asia



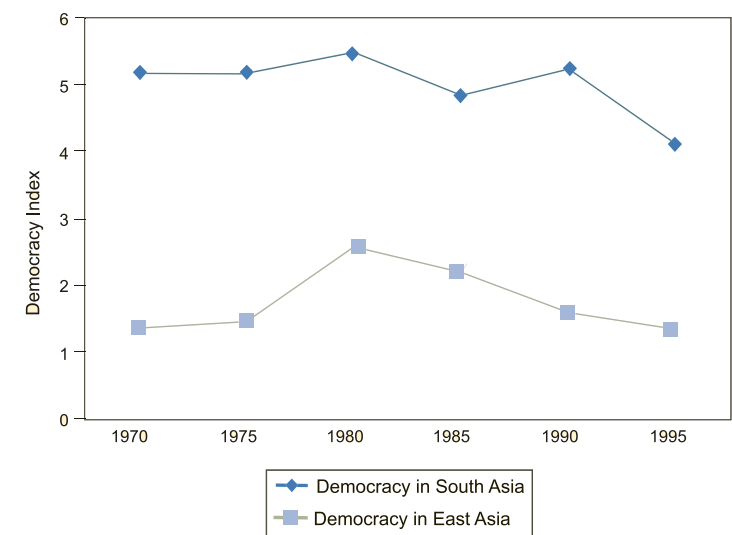
Source: Deininger-Squire dataset on inequality.

Figure 5.6 Gini Coefficient, Asian Countries, 1970s-1990s



Source: Datt and Ravallion (1997).

**Figure 5.7 Difference in Annual Poverty Reduction Rate (percent), Relative to Kerala, 1960-1990, Due to Infant Mortality Rates in 1960 in Selected Indian States**



Key: 1 = least democratic, 7 = most  
Source: Smith and Haddad (2000).

**Figure 5.8 Trends in Democracy in Asia (population weighted averages)**

DEMOCRACY

The ability of individuals to choose their political representatives and to hold them to account for their performance underpins efforts to effectively decentralize government and respect human rights. Levels of democracy vary widely between regions and countries. In general, South Asian countries are more democratic than the examples from East Asia in Figure 5.8 (the countries are named in Figures 5.9, 5.10). Democracy has declined in both groups in recent years.

Figures 5.9 and 5.10 show trends in democracy by country in the two groups. In the 1990s, only Malaysia, Philippines, and Thailand in the East Asian group have levels that exceed the South Asian countries. The other five countries in this group have lower levels than the worst-performing countries in South Asia: Sri Lanka and Pakistan.

Is democracy important for reducing malnutrition? The evidence shows that, on average, the two are strongly associated.<sup>1</sup> Strong civil and political rights are associated with decreases in malnutrition, holding GDP per capita and a host of other country-specific factors constant (Smith and Haddad 2000). Figure 5.11, based on a regression analysis, shows the changes in low-weight-for-age rates associated with changes in civil and political rights and changes in GDP per capita by five-year periods for 63 developing countries. For example, in 1990–1995, worsening levels of civil and political rights in these countries were associated with a 0.7 percent increase in underweight rates.

Enhanced democracy is hypothesized to work in a number of ways, including the following.

- *Enhanced property rights.* The perception and the reality of secure property rights are important for private-sector

<sup>1</sup> The PRC is an obvious outlier to this observed relationship in that democracy as measured by the Freedom House indicator is relatively low while malnutrition rates are also relatively low. It is an open question as to whether PRC malnutrition rates would be lower or higher with a higher degree of democracy as measured by the Freedom House index.

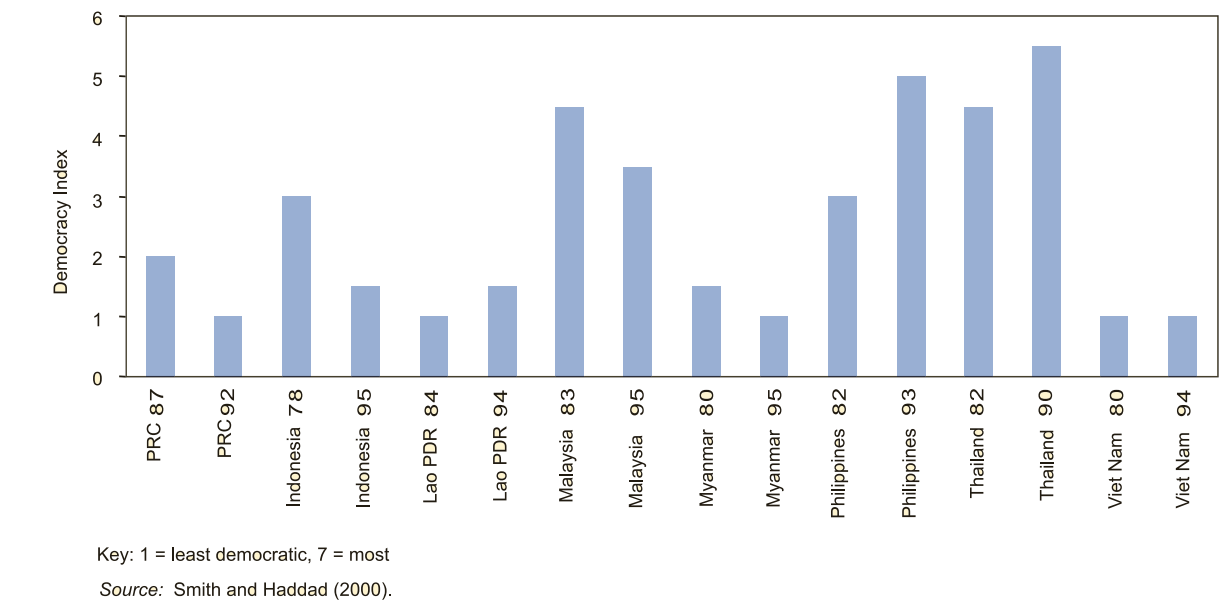


Figure 5.9 Democracy Trends in East Asia, 1970s-1990s

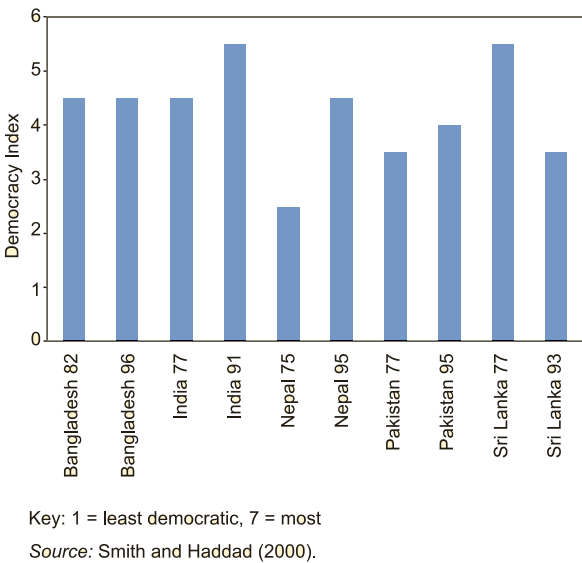


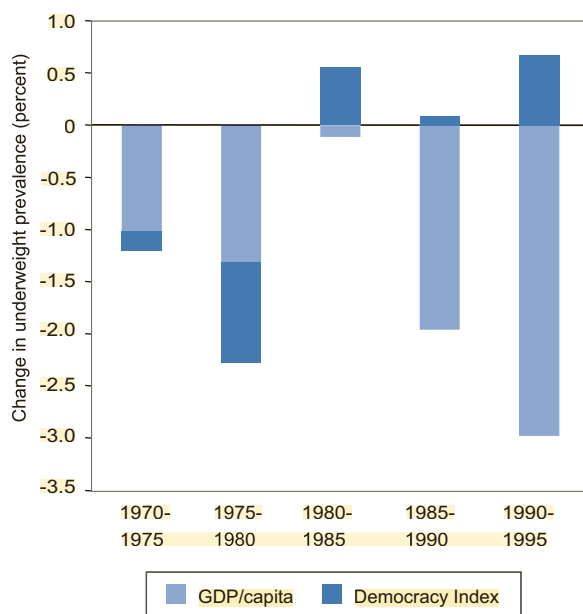
Figure 5.10 Democracy Trends in South Asia, 1970s-1990s

investment at all levels. In particular, gender differences in rights can lead to negative impact on child nutrition as outlined in Chapter 4.

- *Better and more accessible information.* Sen (1995) argues that substantial famine has never occurred in any country with democratic

institutions and an independent and relatively free press. Democratically elected governments have political as well as moral obligations to prevent catastrophes such as famines. The recent famine in the Democratic People’s Republic of Korea reminds us of the close relationship between civil and political rights on the one hand, and economic, social, and cultural rights on the other. A free press that could openly report on the food, nutrition, and health situation in the country may well have ameliorated the present crisis.

- *More accountable governments.* Has democracy been effective in moving nutrition higher up the development agenda? Sri Lanka, Thailand, and the State of Kerala in India all have undernutrition rates that are lower than would be predicted by their income levels, reflecting the high priority that their governments have given to the eradication of malnutrition. As far as we are aware, there has been no qualitative or quantitative investigation as to why some developing-country governments allocate more to nutrition than others or of the role played by democratic institutions. These are important areas for future research.



Source: Smith and Haddad (2000).

**Figure 5.11 Percent of Explained Reduction in Child Underweight Rates, for 63 Developing Countries, 1970-1995**

## LEGISLATION

Legislation provides the framework for holding duty-bearers responsible for their obligations to undertake actions that promote the reduction of malnutrition. Under democracy, legislation is more likely to reflect the needs of the poor and malnourished. A thorough review of the legislative framework in the areas of food, care, and health is a worthwhile activity. An active civil society would be more likely to undertake such an unofficial watchdog role. Earlier, the importance of reviewing legislation on property ownership, inheritance, and workplace benefits for evidence of gender discrimination was stressed. Below, the impact of the Asian financial and economic crisis on labor market outcomes is discussed, highlighting the role of labor legislation in mitigating such impact. Other areas that are crucial for nutrition include (1) micronutrient fortification and (2) laws surrounding the regulation of breast-milk substitutes.

As indicated in Chapter 4, successful micronutrient fortification requires partnerships between the public and private sector. National legislation is important to the underpinning of that relationship. Unreasonable legislation cannot be enforced, but some legislation is

necessary for the protection of the consumer. Table 5.2 lists the current legal status of attempts to fortify various foods with various micronutrients within the Asian region. The probability of success of a fortification effort is likely to be greater when it is mandatory, but for coalition-building reasons the legal process might need to evolve from permitted to mandatory status. For the countries in Table 5.2, only flour in Indonesia has mandatory fortification. The objectives of the regulations and guidelines should be (1) to protect those who buy and consume the product, and (2) establish standards and guidelines to which all producers of the fortified products should conform. Box 5.1 outlines the generic content of such a set of guidelines.

Laws on the marketing of breast-milk substitutes are also crucial to underpin efforts to promote exclusive breastfeeding for the first 6 months of life. The record of various Asian countries in the implementation of the international code of breast-milk marketing is presented in Figure 5.12. Strengthened legislation in Cambodia, Republic of Korea, Malaysia, Myanmar, Pakistan, and Thailand would enhance efforts to promote the provision of care to infants.

## GLOBALIZATION

Globalization is a controversial term for which there is no agreed-upon definition. Liberalization of trade and advances in technology have led to rapid increases in trade, financial resources, and information. Trade, finance, and information flows, fuelled by technology and liberalization are at the core of most definitions of globalization. Wider definitions include trends in climate, civil conflict, infectious disease, and labor migration. For brevity, the discussion here is restricted to the narrower definition.

### Globalization of Financial Markets

Between 1970 and 1998, foreign direct investment grew 15-fold, from US\$44 billion to US\$644 billion, and the number of multinational corporations worldwide grew from 7,000 to an estimated 53,600 with 449,000 foreign subsidiaries (French 2000). The increasing importance of multinationals and foreign direct investment is illustrated by Figure 5.13. In 1980, the amount of foreign asset holding as a proportion of world trade was at the levels of the early 20th century. The last 20 years have seen an explosive growth in this type of investment, particularly in Asia.

**Table 5.2 Legislation on Food Fortification in Asian Countries**

Country	Food Fortification Opportunity	Status/Planned Action
PRC	Soy Sauce: Fe Wheat: Fe, folic acid, vitamin A Rice: Fe, plans for vitamin A	Feasibility/effectiveness trials
India	Wheat flour: Fe, folic acid, B vitamins	Permitted
	Sugar: vitamin A Oils and Fats: vitamin A	Feasibility/effectiveness trials Permitted for fats Stability trials for oils
	Tea, Milk: vitamin A	Permitted
Indonesia	Flour: Fe, Zn, B1, B2, folic acid Sugar: vitamin A	Mandatory Permitted
	Wheat flour: Fe, Zn, folic acid, B1, B2, niacin Sugar: vitamin A Oils: vitamin A	Voluntary fortification under consideration
Philippines	Wheat Flour: Fe, folic acid, vitamin A	Bill under review for mandatory fortification
Thailand	Noodles: Fe, I, vitamin A Rice: Fe, B1, B2, B6, niacin	Permitted
	Fish Sauce: Fe Sugar: vitamin A	Effectiveness trials No regulations in place yet
Kyrgyz Republic	Wheat Flour: Fe	Permitted but not yet mandatory

Source: Mannar (2000).

### Box 5.1 Fortification Policy Guidelines, Standards, and Inspection Systems

The regulations and guidelines relating to food fortification should include the following:

- *A rationale for fortification:* The decision to fortify a product with a particular nutrient has to be based on scientific data obtained through dietary surveys and biochemical and/or clinical studies.
- *Recommended minimum and maximum level(s) of added nutrient per serving:* The level of the fortificant added should be sufficient for positive impact on the nutrition status of the population, but not be in such quantity as to cause toxicity.
- *Establishing recommended dietary allowance (RDA):* This is essential as a reference for fortification and in communicating the amount of the nutrients per serving to the population that consumes the fortified product.
- *Establishing labeling standards:* The goal is to put only relevant information.
- *Establishing guidelines for making nutrition and health claims:* Claims made on the nutrition and health benefits of the product should be supported with scientific data.

Source: Mannar (2000).

However, the globalization of financial markets in the absence of appropriate oversight measures and governance structures can lead to financial crises such as in Asia, which began in 1997 (Figure 5.14).

The extent to which a financial crisis becomes a human resource crisis depends largely on the scale and targeting ability of safety net programs either in place before or shortly after the crisis hits. Timely and accurate information is important for the design and timely implementation of effective safety nets that protect the poor and vulnerable.

Most of the attention regarding the Asian financial and economic crisis has been on changes in poverty rates based on income or total consumption. Estimates

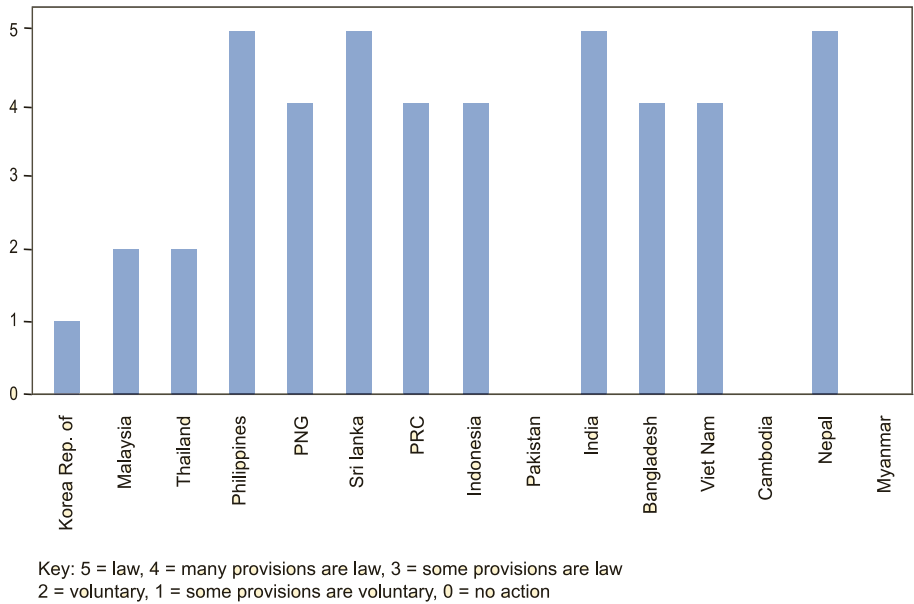
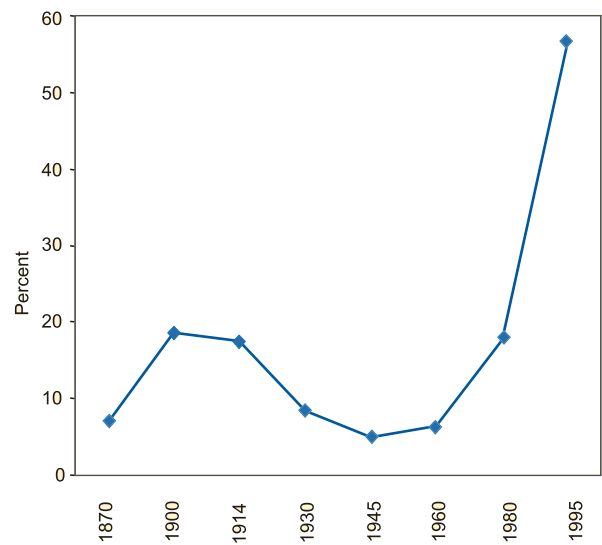


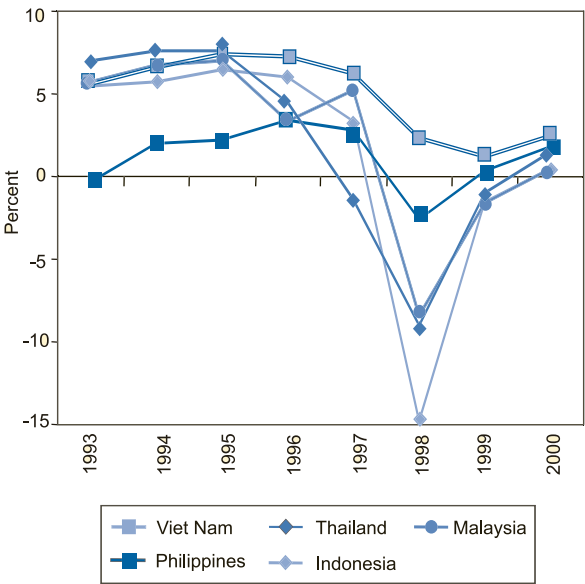
Figure 5.12 National Implementation of the International Code of Marketing of Breastmilk Substitutes

of the changes in poverty have been highly contentious and vary significantly depending on assumptions made. Nevertheless, as Figure 5.15 implies, all the indications are that poverty rates increased anywhere from 15



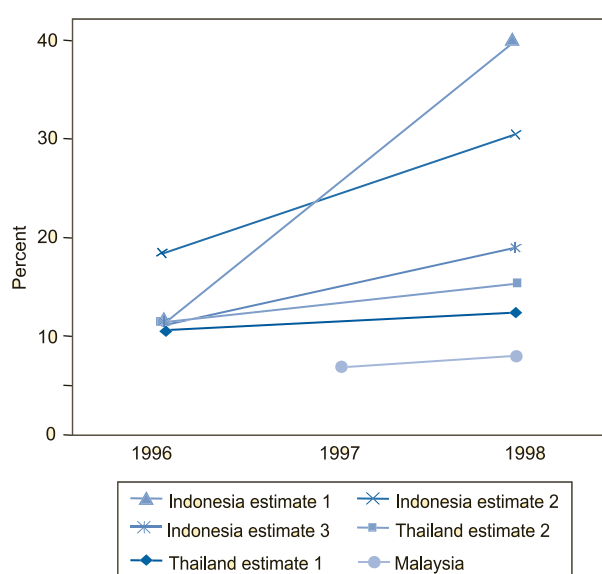
Source : Crafts (2000).

Figure 5.13 Foreign Asset Holding as a Proportion of World GDP (percent)



Source : ADB (1999).

Figure 5.14 Growth Rate of GDP Per Capita of Southeast Asian Countries (percent )



Sources: Thailand estimate 1 from AusAID (1999), Thailand estimate 2, Indonesia estimate 1 and Malaysia estimate from UNFPA/ANU (1999), Indonesia estimate 2 from LPEM/University of Indonesia, and Indonesia estimate 3 from RAND. Detailed references found in Babu (2000).

**Figure 5.15 Changes in Poverty During the Asian Financial and Economic Crisis of 1997 (Percent of Individuals Below the Poverty Line)**

percent (Thailand estimate 1) to 400 percent (Indonesia estimate 1).

Much of the poverty impact occurred through labor markets. The Republic of Korea typified the response of an industrialized country, namely increases in open unemployment with job losses being concentrated on casual rather than permanent workers. In Indonesia and Thailand, unemployment increased with large declines in real wages in the former, and massive migration from the urban to rural areas in the latter. Migrant workers in the Republic of Korea (low-skilled foreign workers) and internal migrants in Thailand and Indonesia are also thought to have been hard hit. These workers tend to be lower skilled, with less demand for their services in agriculture in a region already hit by El Niño. They also have the least claim on employers (e.g., for housing) and the government (e.g., for employment or other benefits). A number of labor market interventions were initiated in response to the crisis. Chapter 4 has already discussed the workfare programs that were instituted in the Republic of Korea, Indonesia, and Thailand. Malaysia's interventions focused on making employment less accessible to migrant workers, while the Philippines, one

of the least badly hit economies, made fewest labor market changes (Table 5.3).

Less attention has focused on malnutrition rates. The exception is Indonesia, the hardest-hit country in terms of GDP per capita. Results of the studies there are presented in Box 5.2. Although more mixed than might be expected, the evidence shows a decline in diet diversity, a loss of weight for adults, less resources to education, but contradictory findings on child undernutrition and micronutrient status.

Studies of the poverty and nutrition impact of the crisis suggest the following:

- Public institutions were not in place to provide social support in a crisis. This is probably a consequence of rapid growth in the past five years (Horton and Mazumdar 1999). Where they do not exist, democratic entities help them get established more quickly (Rodrik 1999).
- The returns to improved precrisis nutrition surveillance and vulnerability mapping would have been large, for example in targeting public works projects.
- Targeting the chronically poor is not the same as targeting crisis relief (i.e., the areas with largest drops in welfare may not be the poorest). Although the impact of a crisis is widespread, it may not be universal—there is scope for geographic targeting of assistance.
- Attention needs to be paid to the trade-offs between coverage and the value of the transfer. For example, the Indonesia Family Life Survey study reports that in the months prior to the 1998 survey, 9.6 percent of households received assistance from the government or NGOs in the form of cash, food, or nonfood and 22.9 percent of households were able to purchase food in subsidized markets. These coverage rates are reasonably high, but the average value of the transfer was only 1 percent of average monthly household expenditures.
- The impact of the crisis was first felt in the formal sector but was quickly transmitted to the informal sector and there is evidence that income inequality widened.
- Pro-poor public expenditures in social sectors need to be protected during crises because

**Table 5.3 Changes in Labor Market Institutions Following the Asian Financial and Economic Crisis**

Institution	Indonesia	Korea, Rep. of	Malaysia	Philippines	Thailand
Public Works	New large public works schemes	New large public works schemes; some targeted to women	No change	No change	New large public works schemes
Unemployment Insurance	No unemployment insurance to begin with and no change	Began in 1995 for firms >30 workers, extended to firms >5 workers Mar. 1998, and to all firms in Oct. 1998, but only to those contributing >6months: only covers 20-25% of job losers	No unemployment insurance to begin with and no change	No unemployment insurance to begin with and no change	No unemployment insurance to begin with and no change
Severance Pay	No information	Before: dismissal for cause only prior to 1997  After: allow employees to receive severance if voluntarily quit	Those employed >12 months receive 10-20 days pay/year of experience:  No change	1 month per year of service; no change	Increased max. benefits to 10 months salary; set up public fund for workers whose firms go bankrupt
Labor Market Information	System not well developed: offices not computerized and not linked; no change	Before: network of centers were not heavily utilized. After: Gov't. set up "Employment Security Centres"; large rise in usage; "Work-net" begins	Before: network of centers After: no change	No information	83 branches in country, computerized and linked but access limited due to hardware problems; no change
Others	Subsidized loans to cooperatives	Before: low minimum wages  After: W6.4 trillion in wage subsidies, some targeted to youth and women; loans for venture business	New immigrant recruitment blocked in some sectors; efforts to redeploy existing migrants; levies on migrants raised	Minimum wages higher than rest of Asia; no change	Self-employment loans

Source: Horton and Mazumdar (1999).

households rely increasingly on public (as opposed to private) services during hard times (see Chapter 7). There is no region-wide data as yet on how governments in the

region chose to alter their overall and intrasectoral patterns of public expenditure on health and education.

### Box 5.2 Nutrition and Education Impact of the Financial and Economic Crisis in Indonesia

*Diet quality declines.* The evidence shows that diet quality and diet diversity have declined in the wake of the crisis. Analyses from Helen Keller International (HKI) indicate fewer dairy and meat products being consumed postcrisis. The Indonesia Family Life Survey (IFLS) studies show the proportion of the budget to food staples increasing and that to nonstaples decreasing.

*Adults get thinner.* In terms of adult anthropometry, the HKI studies show increases in the rate of low maternal BMI and the IFLS study shows increases in the rate of low BMI for all adults.

*Micronutrient status: mixed results.* In terms of micronutrient status, the HKI studies show increased child and maternal anemia and nightblindness in rural Central Java. The IFLS analysis shows an opposite pattern: declines in low hemoglobin rates, although this is the average change for all individuals over the age of 1 year. No age-sex breakdowns were provided. Both the HKI and IFLS studies show declines

Source: Adapted from ACC/SCN-IFPRI (2000).

in the proportion of children receiving vitamin A supplements prior to the survey rounds.

*Child undernutrition: mixed results.* For children, the differences between the two sets of studies are much larger. The HKI data from Central Java for 1995–1999 show increases in wasting and underweight rates for under-5 children. The IFLS data show declines in wasting and stunting rates for under-9 children. However, there are no separate data for under-5 children. Therefore, the findings of the two studies are not strictly comparable.

*Less emphasis on education.* For school enrollment for children aged 7–12 years old, the IFLS data show decreases in enrollment, for both boys and girls. For the same age group, a 100-village UNICEF survey shows the reverse pattern. For household investments in health and education, the IFLS data show a decrease in budget shares (of an already shrinking budget) allocated to education and health care.

#### Managing future shocks

Whether or not the frequency and severity of such financial shocks has actually increased, the media coverage of them probably has. Perhaps as one consequence of this increased scrutiny, the 1990s have seen a reallocation of public-sector development resources toward relief. Whatever the trends in these aggregate shocks, they undoubtedly affect people's lives. Children may be pulled out of school, adults may not get health care, diet quantity and quality may worsen, infants may not be breastfed, assets might be sold, people may migrate, and land may be degraded. Typically, the coping mechanisms are "destructive" in the sense that they erode the asset base upon which current livelihoods are founded.

Relief resources must be used so that (1) they maximize the impact on those affected by allowing them to protect their assets (even if they are not the poorest individuals), and (2) leakage to the unaffected is minimized even if they are poor. Attainment of these two goals would minimize unnecessary diversion of resources away from development in the medium run while allowing humanitarian objectives to be fulfilled.

#### The dynamic monitoring of food insecurity

Monitoring systems that are relatively simple and yet have the ability to track a rapidly changing situation (crisis or not) with sufficient accuracy and reliability to guide timely action remain elusive. There are examples of successes (see Box 3.7), but they remain few. This is due to weak demand for such information and a weak ability to supply it.

How to generate such a demand is a difficult question to answer. A culture of access to information is a prerequisite. Unfortunately, this is frequently not the case for many countries. Democracy might help to stimulate the demand for information but opposite tendencies might also prevail. The incentive to highlight failure is not large. This is why a vibrant and independent research culture is so crucial to the effective formulation of evidence-based policy. The emergence of NGOs and private voluntary organizations (PVOs) armed with good data on research performance and the performance of the government is one way to stimulate demand within official circles to generate their own performance data. Other sources include universities that routinely engage in surveys and assessments and media that routinely undertake public opinion surveys.

If demand at the government level is to be stimulated by the nongovernment supply of data, how will the capacity for the latter be generated? There has been much debate on this because the concept of capacity is deceptively complex. Capacity is about much more than simply technical skills, it is also about organizational culture. Is experimentation encouraged? Are occasional failures viewed as learning experiences? Much more research is needed into the kinds of capacity constraints that are binding in terms of the effective implementation of food and nutrition monitoring and nutrition interventions in general (Gillespie 2001).

The capacity requirements will surely be diminished by indicators that meet the above criteria for accuracy and reliability, but also that are low cost, simple, and timely. The development of such indicators has also been rather elusive, although a number of recent developments seem promising, particularly involving the use of nontraditional nutrition indicators (Bergeron 1999; Christiaensen, Hoddinott, and Bergeron 2000; Morris et al. 1999; Derrickson, Fisher, and Anderson 2000; Studdert, Frongillo, and Valois 2000). This body of work has been spurred on by (1) an increasing number of surveys against which simpler indicators can be validated (although these surveys need to be standardized into a global food consumption database as argued below), (2) developments in information technology that have improved data-sharing abilities, (3) more program funding tied to results-based performance, and (4) a recognition by the nutrition research community that it needs to become more operations-oriented.

The Cornell group has been at the forefront of food insecurity indicator development. The Radimer index, originally developed for the US (Radimer et al. 1992), has been used and validated in a number of developing countries, most recently in Indonesia (Studdert, Frongillo, and Valois 2000). The index consists of about 20 questions relating to hunger, a concern about future hunger, and dietary diversity. Dietary diversity was demonstrated to be a useful leading indicator as to the effects of the financial and economic crisis in Indonesia (ACC/SCN-IFPRI 2000). More work needs to be done to validate this index in developing countries. However, the context specificity of the index does weaken its ability to compare food insecurity across time and large areas. Perhaps the most important lesson to draw here is not the specifics as to which questions work in which context, but (1) the importance of a process of indicator development that is somewhat participatory, and (2) the

ability of relatively simple indicators to achieve the required level of sophistication to prove the impact of scarce resources that have alternative uses.

### *Flexible safety nets*

Broadly, safety nets are synonymous with social security. The term “social security” encompasses a wide variety of social insurance and social assistance policies, programs, and strategies in both the public and private sectors. Social insurance initiatives typically include pensions, health and education services, various insurance markets, and unemployment benefits. In the more developed countries these are available in both the private and public sectors. In less developed countries these insurance schemes tend to be restricted to those employed in the formal sector—whether private or public—typically excluding households and individuals at the bottom end of the income distribution. Individuals unable to access formal-sector insurance rely on a range of coping strategies to pool and manage risk.

Social assistance programs in the public sector range from the relatively untargeted and long term (general food price subsidies) to the highly targeted and short term (feeding in emergency relief situations). Private strategies include inter- and intrafamily transfers and the formation of new community organizations.

Social safety nets comprise subsets of these interventions, depending on the source of the definition. Most often, safety nets comprise social assistance policies, programs, and strategies, although some define safety nets as comprising all insurance and assistance initiatives.

Ideally, safety nets should meet an individual’s basic needs for a defined period with clear exit criteria while not undercutting their ability to assist themselves in the future. At a minimum they should strengthen development objectives by protecting an asset base. At best, they should improve the asset base via training, community empowerment, and the creation of direct assets such as schools, drainage systems, roads, and community centers. In addition, they should be able to be turned on and off as the situation demands. If a crisis is on the horizon and has been caught by a nimble food insecurity monitoring system, then the safety net should go taut or expand where needed. Table 5.4 summarizes the position of some stylized safety net programs along the dimensions of flexibility and asset development.

In terms of development and flexibility, smaller-scale public works and targeted human development

**Table 5.4 Dimensions of Flexibility and Development in Safety Net Design**

Safety Net	Flexible	Inflexible
Asset Building	Smaller-scale public works targeted using food insecurity data, with an emphasis on capacity building at the individual and community levels  Cash transfers that are targeted to school and health behaviors, and are triggered by leading edge indicators of crisis	Construction of large-scale infrastructure  Microfinance initiatives
Not Asset Building	Targeted food price subsidies, informed by up-to-date reliable information and underpinned by capacity to generate and use the information	Universal food price subsidies targeted to staple foods

programs, described further below, seem to meet these goals best. Indeed, several Asian countries—Indonesia, Republic of Korea, and Thailand—have turned to public works schemes as a vital component of strengthened safety nets in the wake of the financial crisis that began in 1997. The experience of setting up large public works programs under crisis led to some important lessons, including: (1) making public works projects community-led takes time; (2) the involvement of women is not automatic (in Indonesia, the projects did not attract women well, but in the Republic of Korea, the projects were explicitly targeted to women); and (3) the lack of up-to-date poverty or undernutrition maps hindered the targeting of projects to those most affected or those most vulnerable (Horton and Mazumdar 1999).

Wages that are close to market or minimum wages not only target the projects poorly toward the poor, but they also exclude women, who typically will work at lower wages. Moreover, the work has to be culturally appropriate for women and attention has to be paid to the adequate provision of child care facilities. The experience in Bangladesh and India with gender-sensitive public works should be informative for other Asian countries.

### Globalization of Trade

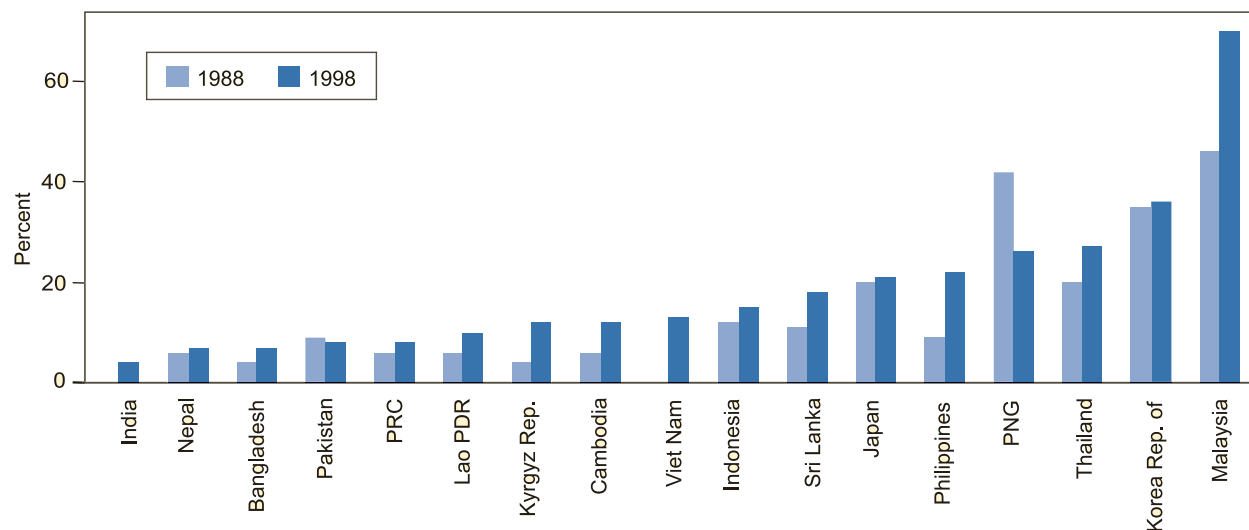
Increasing trade liberalization is thought, in general, to spur overall economic growth. The differing levels of trade within the region (Figure 5.16) reflect different sizes of economies, landmass, and access to sea routes. Trade flows, as a proportion of GDP for countries such as the PRC and India, will inevitably be low, simply due to the size of their

internal markets. The level of trade flows also reflects income levels and policy choices (see Malaysia and Thailand, for example). Perhaps more importantly than the overall level of trade is its increase over the past 10 years in most of the countries within the region.

But the increasing openness of developing-country markets to imports, when combined with the failure of developed countries to reciprocate, may well produce a situation that denies developing countries access to high-income markets. In the area of food—still an important export, particularly for the poorest countries—demands in Europe and North America for higher safety standards constitute a potential trade barrier for less developed countries. Some of these concerns are valid, and exporters will need to improve sanitary conditions. Some of the concerns, however, may be misplaced if the exporting developing countries are held to standards that the importing developed countries themselves could not meet until recently.

There is also concern in the other direction. For example, consumers in some Asian countries are being denied US foods due to strict phytosanitary requirements such as cold treatment and fumigation of apples (Japan), zero-tolerance decay levels on imported US fruit (Republic of Korea), and fruit fly concerns for US fruit (People's Republic of China) (see the WTO World Wide Web site, [www.wto.org](http://www.wto.org)).

It is clear that global standards of conduct and enforcement, reached by consensus, are required as regards food safety. The WTO agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) is one such standard. The SPS Agreement



Source: World Bank (2000b).  
PPP = purchasing power parity

**Figure 5.16 Trade Flows as a Percent of GDP (PPP)**

is intended to set rules that prevent food safety measures from being used as nontariff barriers to trade. The Agreement emphasizes the use of risk assessment in determining the appropriate level of protection with respect to human, animal, or plant life, and health in a territory and the use of scientific principles and evidence in establishing and evaluating SPS measures. It also calls for WTO members to regulate food safety based on the standards, guidelines, and recommendations set forth by the Codex Alimentarius Commission regarding food additives, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling, and hygienic practice. Members can apply stricter SPS measures than contained within Codex Alimentarius if there is scientific justification for doing so.

The current standards under the WTO, the SPS, and the World Trade Agreement (WTA) offer potential benefits and pitfalls when it comes to food policy. Generally, the WTA requires that imported goods receive no less favorable treatment than domestic products, that domestic measures not restrict trade unnecessarily, and that only the least trade-restrictive measures be adopted. The resulting reduction in unnecessary differences in standards, bureaucratic red tape, and associated costs offers benefits that should promote the export of foods.

Even neutral requirements that have the effect of restricting trade may be found to violate the WTA.

Although governments are given specific authorization to deviate from its principles when necessary to protect the health and safety of their populations, many technical issues (such as questioning the stability of packaging materials) have the potential to restrict trade. As a result, governments may find themselves relieved of some of their discretion to set their own food policies and standards. In turn, this may make administration of their fortification programs more burdensome.

In the area of fortified foods, the General Agreement on Tariffs and Trade (GATT) and the WTA have some very specific implications. Examination of the text of the revised GATT and the Agreement on Technical Barriers to Trade, as well as some dispute-body and appellate decisions, suggests that:

- national legislation/regulations mandating fortification will need strong evidence demonstrating the necessity of fortification to protect the population's health;
- where international standards exist, national standards will have to be based on them;
- standards for raw product composition, fortificant levels, packaging, and labeling that are different for imported products based on climate, transport, and other considerations, will be subject to intense

scrutiny and require sound justification, probably of a scientific nature; and

- in setting standards, governments may have to examine critically each standard proposed and consider whether the objective of the standard could be met through equivalent or less restrictive measures. This last issue potentially will vex national governments trying to establish effective standards designed, in part, for ease of administration within the context of already overburdened and poorly functioning food inspection systems.

On the international level, it would be helpful for the Codex Alimentarius Commission and other international standards to address standards for all fortified foods likely to be relevant for addressing micronutrient deficiencies and to make a policy statement supporting governments' decisions to require mandatory fortification as a primary, sustainable, and cost-efficient strategy toward eliminating micronutrient deficiencies.

In general, the countries of the region need to prepare themselves for future trade negotiations. Two ways to do this are a review of the strength of domestic institutions responsible for food safety testing protocols, and a review of the strength of their representation at the WTO headquarters in Geneva, both in terms of the numbers of representatives and their technical knowledge.

### Globalization of Information and Communications

*Knowledge about how to treat such a simple ailment as diarrhea has existed for centuries—but millions of children continue to die from it because their parents do not know how to save them. World Bank (1998, p.1)*

The last decade has seen an unprecedented decline in the cost of transferring information. In the mid-1980s it was 100 times as expensive in real terms to transmit information electronically as it was in the late 1990s (World Bank 1998). This is due to a revolution in information and communications technology—personal computers, microchips, optical fibers, satellite communications, and the like—that has connected hundreds of millions of people to each other and to enormous amounts of information via the Internet (Bedi 1999). Some 300,000 users join the Internet each week, and while access to this information is far from global,

some developing countries are catching up, with rates of connection now exceeding those of some developed countries. More traditional forms of information access are also increasing rapidly. For example, the ownership of televisions in Asia, even among the lowest-income countries in the region, is increasing rapidly.

Improved access to information provides several opportunities for accelerating the reduction of malnutrition. First, a vast amount of food and nutrition information and data are already available on the Internet. Such information can be fairly easily accessed to (1) find out about new nutrition initiatives and determine the latest thinking on existing nutrition problems; (2) obtain best practices; (3) map food production and malnutrition by country and region within country (Slack 1998); and (4) guide the livelihood activities of poor people in remote areas (Box 5.3).

Second, the Internet provides a forum for debate on issues that require discussion. The potential for information technology to facilitate regional collaboration in the area of nutrition is large. For example, such technology would be immensely important (but not sufficient) for the formation of a regional nutrition center of excellence for data sharing, standards promulgation, and research.

Third, the wide availability of information makes organization based on control of information much harder to sustain. For example, it is thought by many that improved access to information will foster democracy and the decentralization of decision making (Friedman 1999; World Bank 1999b). The benefits of decentralized decision making at the community level have long been recognized by the nutrition community, as has the importance of democracy for avoiding malnutrition (Sen 1995).

Fourth, easier access to information makes it easier to hold institutions and other duty-bearers accountable for their actions. Finally, the new technology can be used to establish virtual universities and distance learning to strengthen the capacity of nutrition professionals in the region, perhaps within a regional context.

Improved access to information can, however, have negative effects on efforts to eliminate malnutrition. First, because the generators of much of the new information reside primarily in developed countries, there is a real danger that proprietary concerns will restrict public access to that information. Second, information is frequently incorrect—either through error or by design. Misleading information, through advertising or poor training, about breastfeeding or HIV prevention, for example, could prove fatal (UNDP 1998). Third, information generation

### Box 5.3 Bridging the Digital Divide: An Example from Southern India

Information and communication technologies are increasingly considered development tools. But how will the poor get access to them? A number of different answers are emerging as experts balance cost and access. Before the Internet came to Veerampattinam, a coastal village in southern India, the local fishers worked without knowing sea conditions or the location of fish shoals. Lives were sometimes lost because of rough seas. In late 1998, the M.S. Swaminathan Research Foundation, an Indian research center, installed a computer in a “village information shop” with financial assistance from the International Development Research Centre, Canada.

Through a wireless local-area network, the computer accesses daily data on wave height and wind forecasts from a US Navy World Wide Web site. This information is broadcast to the villagers in the early morning via loudspeakers on the roof of the information shop.

Armed with this knowledge, the fishers now ply the seas in greater safety and with more efficiency. Not only has the Internet-enabled computer made the main work of the village easier, but it has also made information about prices, health and transportation facilities, and entitlement schemes accessible. Indeed, before the computer arrived, villagers were unaware of housing loans to which they were entitled. Most fishers in the village have now benefited from these low-cost loans.

Veerampattinam is one of many recent examples of the way the Internet has reached and benefited the poor in developing countries. Although small in scale, these examples have posed a challenge to the view that the Internet belongs to the technologically advanced and that it would be out of place in poor rural areas.

Source: Mohan (2000).

reflects the perspective of the person generating it. If information is generated mostly by people who do not experience poverty and malnutrition themselves, it will lack balance. The new information technology affords an opportunity for the poor and malnourished to have a voice in policymaking and program design.

How can the nutrition community accentuate the potentially positive aspects of the information and communications revolution and minimize the potentially negative ones? A number of mechanisms exist. For example, public institutions can share as much nutrition data and information as possible via the Internet and other mechanisms. They can undertake quality control of that information via peer review and open and transparent debate. They can subject themselves to accountability mechanisms such as external review or processes and impact and they can make the rationale upon which their decisions are made more transparent. Public institutions can also serve as active partners to private organizations, thus increasing the likelihood that private data and information resources will generate positive benefits for the poor and malnourished.

### URBANIZATION

Urbanization is progressing at a rapid pace in Asia. The overall rural population is projected to remain constant, while the urban population is expected to double in size in the next 20 years (UN 1998).

In general, urban areas have lower undernutrition rates than rural areas, with the ratio of rural to urban underweight rates ranging from 1.8 in the PRC to 1.2 in Bangladesh (WHO 1999a). This difference is largely due to the better services available in the cities, but it is also due to combining data from the urban middle and upper classes. The averages mask serious undernutrition situations in the cities. For example, Table 5.5 shows that the prevalence of diarrhea in the early 1990s was lower in urban areas of Bangladesh and Pakistan than in rural areas in these countries. However, when these data were separated into socioeconomic groups within rural and urban areas, the poorest urban group was seen to experience higher rates of diarrhea than the poorest rural group.

Is rural-urban migration likely to result in increased urban undernutrition? The most recent data available that are comparable over time indicate that urban areas are becoming responsible for an increasing share of national undernutrition. This is not only due to the movement of population from rural to urban areas, but also to a narrowing of the undernutrition rates between rural and urban areas. Table 5.6 shows that in the PRC and the Philippines, both the absolute number of underweight children in urban areas and the share from urban areas of all underweight children has been increasing. In Bangladesh these trends were reversed from 1989.

This shift is important because it is unlikely that the constraints to better nutrition will be the same in urban

**Table 5.5 Undernutrition in Rural and Urban Areas of Bangladesh and Pakistan, by Socioeconomic Status**

Percentage of Infants with Diarrhea in the Two Weeks Preceding a Health Survey	Bangladesh, 1993	Pakistan, 1991
Urban areas	7.6	14.2
Rural areas	8.1	15.2
Highest socioeconomic group (top 20%) in urban areas	3.4	12.3
Highest socioeconomic group (top 20%) in rural areas	6.9	14.1
Lowest socioeconomic group (bottom 20%) in urban areas	12.6	20.1
Lowest socioeconomic group (bottom 20%) in rural areas	8.7	19.8

Source: Ruel, Haddad, and Garrett (1999).

**Table 5.6 Changes in the Numbers of Underweight Children in Urban Areas of Bangladesh, PRC, and Philippines, in Different Time Periods**

	Absolute Number of Urban Underweight Children Increasing	Absolute Number of Urban Underweight Children Decreasing
Share of urban underweight children increasing	Bangladesh, 1985–1996 PRC, 1992–1996	
Share of urban underweight children decreasing	Philippines, 1987–1993	Bangladesh, 1989–1996

Source: Haddad, Ruel, and Garrett (1999).

and rural areas. A number of phenomena that are unique to or exacerbated by urban living and the circumstances that bring individuals to urban areas in the first place produce these urban-rural differences. These phenomena, discussed in detail below, include greater dependence on food purchases, weaker informal safety nets, greater labor force participation of women, higher fat diet with less physical activity, greater potential access to public services, and nontraditional property rights.

*Greater Dependence on Cash Income for Food and Nonfood Purchases (Hence, Greater Reliance on Foods Grown by Someone Else).* Consumer food prices are very important for the urban consumer. They are also important for rural net food purchasers and even net food producers who purchase some items, and who see ever-increasing linkage between producer and consumer prices

along with price liberalization. Access to consumers for food traders and vice versa, therefore, remains important. However, urban crowding and associated traffic and safety concerns mean that local municipalities are often tempted to move food traders further from their customers. Food market trader locations have to be carefully considered in an urban setting. The transaction costs of getting access to staples and nonstaples have to be balanced against traffic flow and environmental concerns. A participatory process has the best chance of arriving at such a compromise.

Similar issues arise with urban agriculture that has proved to be quite an effective way of improving the quality of food supply to the cities from within or close to the cities (Smit 1996). Some examples of the context of urban agriculture in Asia include Shanghai, which

offers an example of highly articulated rural-urban relationships leading to a high level of self-sufficiency in essential foods; Lae, Papua New Guinea, noted for a comprehensive city-wide food and fuel self-reliance program; George Town on Penang Island, Malaysia, where conflicting demands are posed by rightful landowners and entrenched farmers on land that has for decades been used to produce food; Singapore and Hong Kong, China, cities that have vigorously pursued urban food production in an intensive and scientific manner; while in the village of Matalahib in metropolitan Manila, a successful but short-lived community garden program was implemented (Yeung 1996).

However, there have been no evaluations of the net impact of urban agriculture initiatives on the nutrition status of infants. Those that have been conducted have come from sub-Saharan Africa (Maxwell, Csete, and Levin 1999).

The urban environment, with on-average higher standard of living than rural areas, also suggests need for closer targeting of food price subsidies. Self-targeting mechanisms make sense in an urban setting because often location is only a useful guide to poverty at very disaggregated levels. However, self-targeting has costs in terms of the opportunity cost of women's time. This may not be significant in terms of wages earned in the labor market, but it may be significant in terms of child care time. Idle time is not something that many mothers of young children have in abundance.

*Weaker Informal Safety Nets.* The notion that informal safety nets are weaker in urban areas needs to be tested rigorously. The speed at which new migrants to urban areas establish effective networks is unclear. Rarely do migrants move to a city in which they do not already know someone. Simultaneously, the notion of "community" may be less spatially defined in an urban area. These two phenomena, where present, make it ever more important that food and nutrition interventions maintain the discipline of community orientation. Indeed, community-based interventions may be one method for building social capital in urban areas.

Should formal safety nets consciously strive to meet this safety net gap? Safety nets tend to be stronger in urban areas in any case due to proximity to government and a greater political voice of urban populations. Nevertheless, governments need to be very careful about encouraging universal safety nets that crowd out the formation of new social capital in urban areas. If there is to be more attention to targeting safety nets, it should

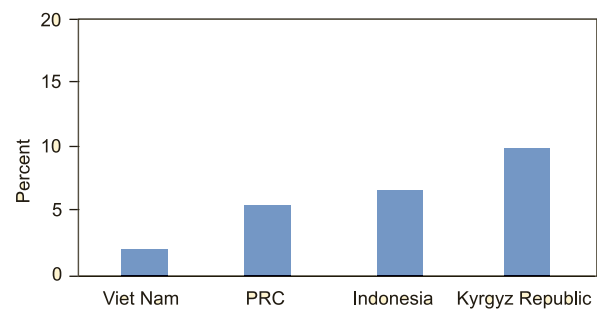
be across "community," not within. Intracommunity disputes over eligibility for programs have the potential to rip what social fabric exists.

*Greater Labor Force Participation of Women and its Consequences for Child Care.* The physical dislocation of women's workplace from their children in urban areas introduces more severe trade-offs between time in wage activities versus child activities than would be felt in rural areas. In Latin America, women have innovated, with the help of NGOs and the government, to develop child care groups. These are typically assisted by food aid. Evaluations from Guatemala City and elsewhere show that they can be very successful in mitigating the impact on child nutrition of maternal employment, and may even improve the nutrition status of the infants of working mothers compared to those of nonworking mothers (Ruel et al. 2000).

*Lifestyle Changes, Particularly Those Related to Higher-fat Diets and Lower Levels of Exercise.* Urbanization exacerbates the transition towards more sedentary lifestyles and higher-fat diets—risk factors for the diet-related chronic diseases that are rapidly increasing throughout the developing world (Popkin 1999; Ruel, Haddad, and Garrett 1999). Given the evidence implicating fetal undernutrition as an additional risk factor for diet-related chronic disease in adults (Barker 1998), policymakers will feel added pressure to find solutions to simultaneously occurring urban under- and overnutrition.

The coexistence of under- and overnutrition within the same households presents even more of a challenge (Figure 5.17), and is also associated with urbanization (see Food Security section), but as the data indicate, for comparable levels of urbanization, the countries of Asia are less prone to this phenomenon compared to other regions (Figure 5.18). The most must be made of this lull to formulate interventions and policies that are effective in addressing the under- and overnutrition found within the same household.

*Greater Availability of Public Services but Questionable Access for Poor Slum Dwellers.* On average, access to public services such as water, electricity, sewage, and health, is higher in urban than in rural areas. Where the poor and nonpoor are neighbors, it is more likely that the urban poor do have improved service access. However, a recent study suggests that it is difficult to generalize about the clustering of urban malnutrition (Morris 2000), making the targeting of infrastructure delivery difficult. The same is true of access to public services. The same study, using



Source: Popkin, Horton, and Kim (2001).  
**Figure 5.17 Proportion of All Households with Both Underweight and Overweight Members in the Same Household in Selected Countries (percent)**

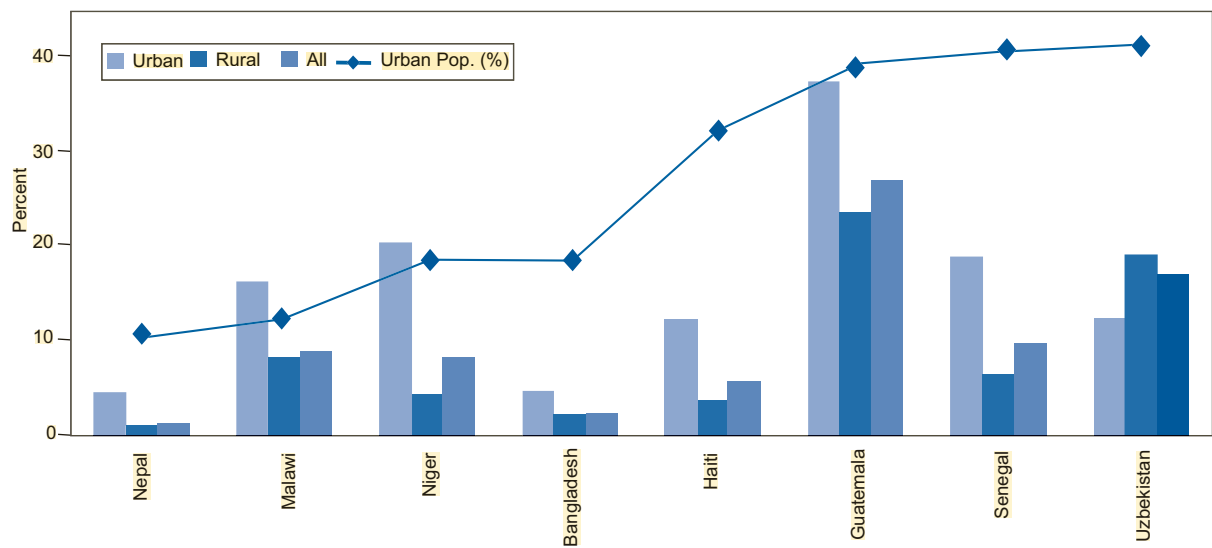
representative household survey data from Dhaka and Kathmandu, shows that access to clean drinking water is very location specific in the former but not in the latter (see Table 4.9).

*Nontraditional, or Lack of, Property Rights.* An example of the direct and indirect consequences of weak property rights in urban slum areas is given in Box 5.4, showing how lack of property rights can deter government and NGOs from working in communities that lack property rights. The example suggests that, particularly for the poor, interventions that are effective in rural areas

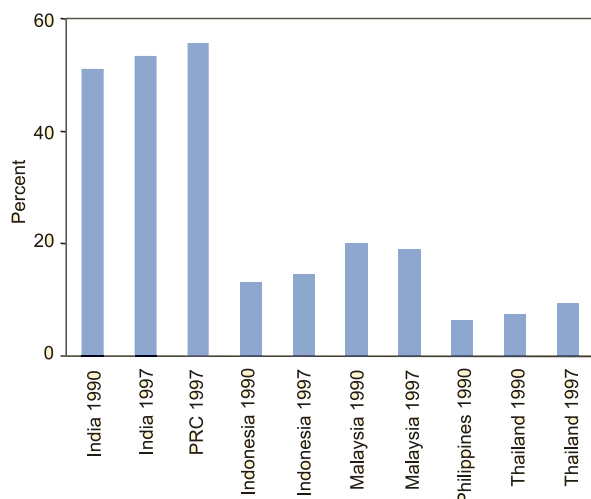
cannot be counted on to be effective in urban areas. More experimentation and evaluation with pilot interventions in urban areas is needed.

DECENTRALIZATION

The allocation of public resources—whether health and nutrition or otherwise—is decentralizing rapidly in many institutions throughout the world. At the government level, as Figure 5.19 shows, the share of subnational government expenditure as a percentage of the total is increasing in all countries for which there are data over time, with the exception of Malaysia. Levels of subnational expenditures vary substantially. In large countries such as the PRC and India, centralized government is impractical. In India, there is a federal constitution that gives its states considerable fiscal and regulatory powers. This can be seen in the very different rates of progress the various states have made in poverty and malnutrition reduction over the past 30 years, not all of which is due to endowments of natural resources (see Household Food Security, Chapter 4). In the 1990s, the powers of the state governments have increased with increased emphasis on liberalized markets and the rise of regional political parties. The power of local governments within states has also increased since the 1992 constitutional reform recognizing local governments. By



Source : Garrett, Ruel, and Hussein (2000).  
**Figure 5.18 Households with Preschool Children and that Contain a Stunted Child and an Overweight Mother, by Level of Urbanization, 1990s (percent)**



Source: World Bank (1999c).

**Figure 5.19 Subnational Government Expenditures as a Percentage of Total Government Expenditures and Tax Revenue in Asia, 1990 and 1997**

contrast, the PRC is formally a unitary state, not a federation, but political and economic power has dispersed rapidly since the reforms of 1978. Health and education are controlled by the provinces, which then negotiate with prefectures, counties, and towns (World Bank 1999a).

In principle, the movement of accountability and authority closer to the intended beneficiaries of an initiative—poor communities, for example—is likely to strengthen the incentives to use public funds more effectively and to generate complementary private funds. This is also discussed below (Chapter 6, Mobilizing Extra Resources for Nutrition). In practice, however, mechanisms to ensure sufficient local capacity and accountability have to be present as well. Communities also have embedded power structures and, in the absence of transparency and accountability mechanisms, local groups can misallocate funds, encourage a climate of corruption, and increase inequality between those who have access to power and those who do not. Moreover, if local communities are to compete for central funds, the better equipped, more cohesive, and less excluded communities will capture them. Communities that are

unable to organize proposals or are less likely to be noticed by central authorities—likely to be the poorer communities—will lose out.

The scaling down or decentralization of government will be more effective if it is met by a scaling up of local capacities to sustain improvements in nutrition status (Marchione 1999). Community-based nutrition programming has long been considered a vital component of the fight against malnutrition (Tontisirin and Gillespie 1999). To what extent do community-based efforts, often bolstered by the work of NGOs, serve as a way of empowering communities to participate in other development activities? The body of quantitative empirical research on the impact of community participation on general project performance is small but growing. The two studies that use data from a large number of projects and have paid most attention to the econometric issues find that community participation leads to improved project performance (Isham, Narayan, and Pritchett 1995, on the performance of World Bank water projects and Adato et al. 1999, on the performance of labor-intensive public works projects).<sup>2</sup> For example, the latter study shows that when community-based organizations have the sole responsibility for public works implementation, the projects transfer resources more efficiently to the poor, are more likely to generate second-round effects for the poor and create more employment per dollar than would otherwise be the case (Table 5.7).

Data on a large number of nutrition projects are needed in order to address such questions as: Can nutrition programs empower communities beyond their immediate concerns? And can community-based nutrition initiatives foster an increasing adherence to human rights by a wide range of actors? Human rights have already been explicitly incorporated into the Triple-A cycle by UNICEF. In addition to the assessment, analysis, and action steps, new components on role analysis and capacity analysis have been implemented. Role analysis explicitly uses the human rights framework of duty-bearer and claimant to highlight the interlinked responsibilities of various actors at various levels in developing and executing an effective nutrition strategy. However, responsibilities can only be met if there is sufficient capacity to do so, hence the assessment of

<sup>2</sup> Other recent studies show that community-group-based lending schemes have higher repayment rates if their membership has higher indicators of social cohesion (Zeller 1998). In addition, there is a rapidly growing body of work linking membership in social and economic groups to accelerated upward income mobility (Maluccio, Thomas, and Haddad 1999).

**Table 5.7 The Impact of Community Participation in Antipoverty Programs: Public Works (PW) Projects in South Africa**

Dimension of PW Performance	Impact on PW performance when...	
	CBO has sole responsibility for PW implementation	CBO assists but is not key decision maker
% of PW costs to wages	Increase	No effect
% of employment to women	No effect	Increase
Likelihood of second-round effects	No effect	No effect
Rands to create one day of employment	Decrease	No effect
Rands to transfer 1 Rand to poor	Decrease	No effect

Source: Hoddinott et al. (2000).

capacity (Jonsson 2000), a subject taken up in more depth in Chapter 6.

These questions remain to be answered, but the signs are promising. Several community nutrition projects have served to stimulate other decentralized development activities. In Sri Lanka, for example, the nutrition component of a poverty alleviation project supported by the World Bank used participatory approaches to enhance nutrition awareness and improve feeding practices. The project aimed to use nutrition as an entry point to poverty alleviation, by combining it with community infrastructure development, savings, credit, and microenterprise development in a phased manner. In a setting characterized by top-down development planning, the project demonstrated that when communities understood the change process and took ownership, positive change could occur (World Bank 1999c).

### AGING

There are rapid shifts occurring in the demographic landscape. The population of Asians 65-years old and more will increase from approximately 250 million out of 3.5 billion (7 percent) to 850 million out of 4.9 billion (17 percent) by 2050 (Figure 5.20). For the countries included in Figure 5.20, the current proportion of adults over 65 ranges from about 3 percent (Bangladesh, Nepal, and Pakistan) to 6 percent (PRC) (Figure 5.20).

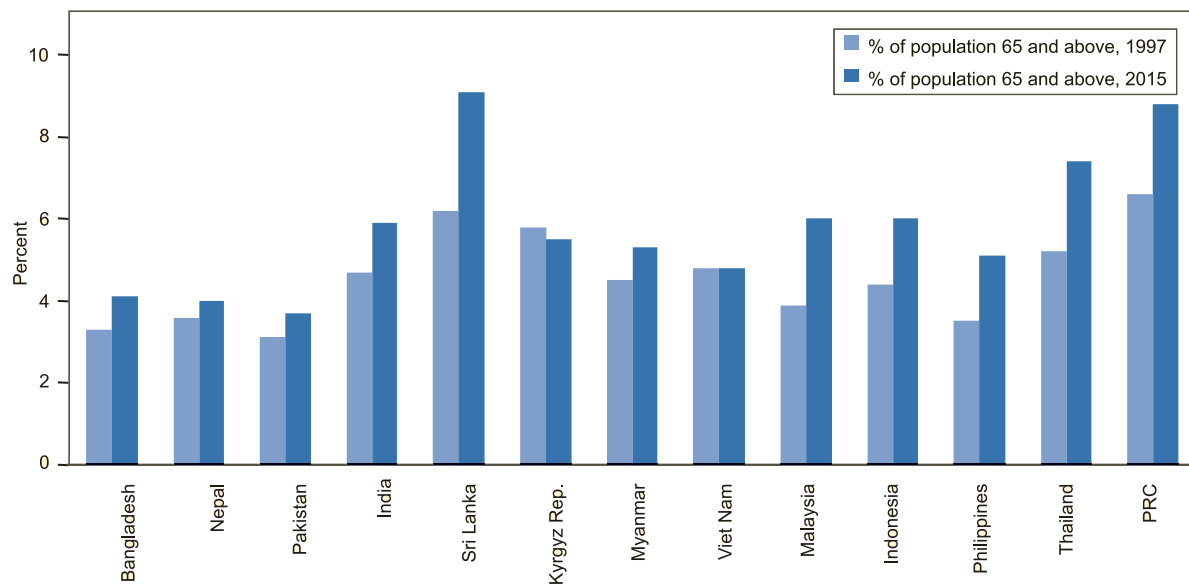
The rate of aging of populations in Asia is fastest for countries that have made the greatest gains in life expectancy in the last 10–15 years, such as Thailand, Malaysia, Sri Lanka, and PRC. These countries will

experience the largest population increases in this age group in the next 20 years. For countries such as India, Nepal, Pakistan, and Viet Nam, the shifts are relatively small—for now.

The aging of Asian populations over the next 20 years will increase the proportion of Disability-adjusted life years (DALYs) accounted for by noncommunicable diseases and will increase the health resources necessary for curative health treatment. This aging trend, combined with the Barker hypothesis (see Chapter 2) effects, places a premium on preventative and promotive policies throughout the life cycle. Aging also decreases the ratio of the working-age to the nonworking-age population.

In general, the ability of households and communities to manage risk will become all the more difficult as this dependency ratio increases. This will place a premium on avoidance of job loss through ill health, or widespread economic shocks. Legislation strengthening the provision of health and disability insurance will become increasingly important. It is clear from the experiences in the upper-income countries of the region that a certain level of per capita national income has to be reached before certain types of health insurance can be financed (Gertler 1998). If such legislation is fast-tracked due to political pressure, such insurance programs may prematurely draw resources away from the fight against undernutrition and overnutrition.

It is also clear from the discussion of labor market reform in the wake of the regional financial and economic crisis that only the Republic of Korea currently has legislation requiring employer provision



Source: World Bank (1999a).

**Figure 5.20 Aging Populations in Asia**

of unemployment insurance. This may well become an issue for Malaysia in the next few years.

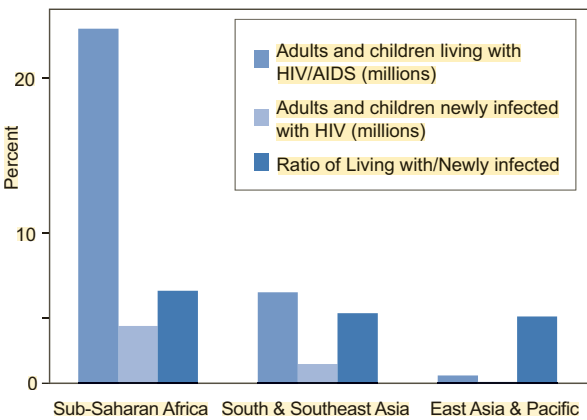
The aging of a population also generates opportunities for reducing malnutrition and they must be seized. For example, aging may relieve the child care constraint that working mothers—particularly in urban areas—face, although care must be taken not to undermine the sanctity of the six-month exclusive breastfeeding period. In Bangladesh, for example, the 1993 national Demographic and Health Survey shows that in rural areas, 25 percent of mothers use relatives for the care of their infants, while in urban areas, 40 percent do so. Where there is no difference between the rural and urban female labor force participation rate of mothers, there is no rural-urban difference in the composition of child caretakers (Ruel, Haddad, and Garrett 1999).

In addition, the presence of grandparents in the household may well increase the ability of rural households to keep small gardens and small livestock, thereby increasing their micronutrient intake from own-food-based sources, although there is little evidence on this. In the presence of increasing incidence of HIV, grandparents may increasingly become the primary caretakers of young children, as is the case in South Africa (Maluccio, Thomas, and Haddad 1999).

## HIV/AIDS

Today, one in every 100 adults in the most sexually active age group (15-49 years) is living with HIV (UNAIDS/WHO 1998). The vast majority lives in sub-Saharan Africa. However, most of the countries where HIV is increasing fastest are in Asia (UNAIDS/WHO 1998). A comparison with Africa is given in Figure 5.21, which indicates that the ratio of existing cases to new cases is lower in Asia, i.e., the rate of new infections in Asia is accelerating faster than in sub-Saharan Africa. Given its population size and the current rate of HIV infection, Asia is set to overtake sub-Saharan Africa in absolute numbers before 2010. By 2020, Asia will be the epicenter of the HIV/AIDS pandemic (Barnett and Rugalema 2000). Also, projections indicate that by 2020, HIV/AIDS will be the 10<sup>th</sup> leading contributor to DALYs in the developing world, behind ischaemic heart disease (1<sup>st</sup> or leading contributor), tuberculosis (4<sup>th</sup>) and lower respiratory tract infections (6<sup>th</sup>) (Murray and Lopez 1996). Some countries in the region are already approaching levels seen in some sub-Saharan countries. In Cambodia, Myanmar, and Thailand, around 2 percent of adults are already HIV positive (Figure 5.22).

What makes this infection particularly relevant for nutrition? First, 90 percent of HIV infection in children is due to transmission of the virus from mother to child during



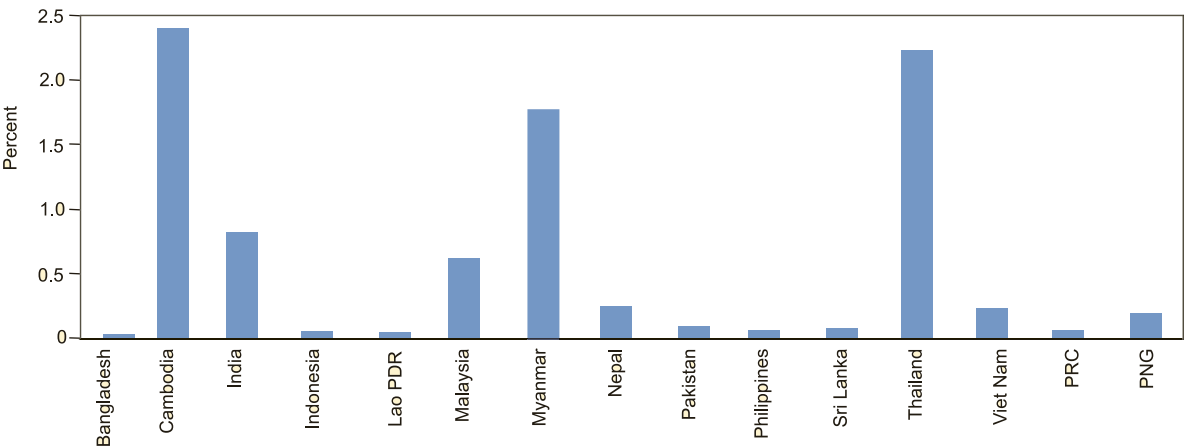
Source: [www.unaids.org/publications/documents/epidemiology/surveillance/wad1999/Una99e53.doc](http://www.unaids.org/publications/documents/epidemiology/surveillance/wad1999/Una99e53.doc).

**Figure 5.21 Those Living with HIV/AIDS and Those Newly Infected, Asia and Sub-Saharan Africa (percent)**

pregnancy, delivery, or breastfeeding. Second, there is evidence to suggest that improved nutrition (e.g., vitamin A supplements) may play a role in preventing the transmission and progression of HIV, although additional basic research needs to be undertaken to confirm this link (ACC/SCN 1998). Third, there is evidence that the orphaning of children from adult mortality due to HIV/AIDS leads to stunting of children—regardless of the

wealth of the adopting household—and lower school enrollment and attendance because children are pulled out of schools as part of the household coping strategy (World Bank 1997a). Fourth, HIV/AIDS mortality and morbidity take labor out of agriculture, resulting in increased cultivation of low-maintenance but less nutritious root crops, and selling of livestock, resulting in the loss of an important dietary source of micronutrients and a valuable asset. Fifth, HIV/AIDS disrupts social networks and forces the sale of other assets that are important for livelihood security. Sixth, the loss of working-age adults increases the dependency ratio, puts severe strain on alternative child caretakers, and makes single-parent households more dependent on income transfers but less able to count on them from private sources (e.g., remittances from urban areas).

Asia must learn from the painful experience in sub-Saharan Africa while there is still time. The prevention of transmission must be stressed (including the use of nutrition interventions when effective), but in such a way that does not compromise breastfeeding (ACC/SCN 1998). Research on affordable drugs to prevent progression is crucial. Agricultural research also needs to play a role in finding crops that are less labor-intensive but still nutritious. Microfinance institutions and group-based lending will continue to be important, especially if HIV/AIDS erodes ownership by the poor of more tangible forms of collateral.



Source: UNAIDS website at [www.unaids.org](http://www.unaids.org).

**Figure 5.22 Proportion of Adults Living with HIV/AIDS, End 1997 (percent)**

## 6. Developing Capacity for Nutrition Action

**T**his chapter considers first, how to bring about the changes—in terms of capacity and institutional functions—that are required for appropriate nutrition actions to be implemented effectively, and second, the means through which extra resources may be raised to support such actions.

### WHY A FOCUS ON CAPACITY?

There are many reasons for an intensified focus on capacity, as described in Gillespie (2001). Capacity is important from a human rights perspective; it relates fundamentally to good governance, particularly in this era of decentralization, as well as to social capital at the community level; and it is fundamentally important for community participation, sustainability and, thus, to long-term project performance.

The last point is an important one for organizations like ADB. A recent review of World Bank Implementation Completion Reports (ICRs) has shown that only 18 percent of the World Bank-assisted Health, Nutrition, and Population (HNP) projects completed between 1991 and 1998 were rated by the Bank's Operations Evaluation Department as having substantially achieved their institutional objectives (Johnston and Stout 1999). The most frequently cited constraint with regard to project

design (in 44 percent of ICRs) was “poor assessment of capacity.” Further, the World Bank-UNICEF joint nutrition assessment has confirmed that, in most countries, it is neither the lack of good interventions nor financial constraints that are the main barrier to project performance, so much as management problems related to limited local capacity to implement what is planned and budgeted (Gillespie 2001).

Recognition of capacity development as process has implications for the roles and approaches used by external agencies such as ADB in working with local organizations. Issues of ownership, commitment, and leadership are central to this notion of capacity as process.

### DEVELOPING CAPACITY

Development of capacity requires first analysis of needs—of the roles of duty-bearers and their importance—and a strategy to develop that capacity.

#### Analyzing Roles and Patterns

An example of the roles of duty-bearers at different levels with respect to nutrition responsibilities is shown in Box 6.1. Tools for developing such “maps” of accountability include stakeholder mapping, using flow

diagrams that chart the power or influence of different groups or organizations, and other methods such as participatory rural appraisal as detailed in Gillespie (2001, Annex II).

Equally important is the range of tools for building coalitions of stakeholders in support of nutrition improvement. This is a fundamental stage of the early project preparation process in many external agencies. UNICEF, for example, conducts consensus-building Triple A workshops; usually two carried out consecutively, with the assessment and analysis stages separated from the action deliberations.

### Box 6.1 Roles and Patterns at Different Levels

It is not only the direct care provider (in most cases the mother) who is responsible for ensuring adequate nutritional status through providing adequate care for the child. Others in the household, the family at large, the community, institutions such as health centers, and local and central government also have roles to play.

- It is the role of the direct care provider to fulfil the right of the child to adequate nutrition through feeding, providing adequate care, and making adequate use of available resources.
- The role of the household is to facilitate the direct care provider in her task by ensuring a conducive environment for adequate care. In cases where the primary care provider is not able to take up her duties (e.g., because she is ill), the household is responsible for taking over her roles.
- It is the role of the community to facilitate and respect the roles of both the family and the direct care provider in ensuring adequate child nutrition.
- The primary role of the local and central government is to respect and protect the right to nutrition and to facilitate the efforts made by communities, households, and care providers by ensuring adequate services such as health care.
- The role of regional governing bodies is to advocate for adequate attention to nutrition by member states and to support their activities.
- Agencies both at the country and regional levels advocate for adequate action by the other duty-bearers and provide supportive actions.

### Capacity Assessment

Assessing capacity needs to be done at different levels, from the individual to the national government. Alley (1999) gives a framework for how this can be done in a way that links the elements of capacity (authority,

responsibility, motivation, leadership, systems, resources, and communications) to factors that influence it (dynamics of change, institutional norms and practices, and linkages) and to the products of capacity (i.e., performance/achievements). It is beyond the scope of this book to elaborate on assessment methodology.

The analysis of capacity should ideally start at the household and community level and be progressively broadened. Note that the outcomes of capacity analysis in the nutrition area can be far reaching, as shown in Box 6.2.

### Capacity Development Strategies

Once capacity has been assessed and analyzed, strategies for developing capacity may be formulated including what to do, how to do it, when to do it, how to monitor and evaluate progress in doing it, who should guide and supervise the process, and what techniques should be used.

*What* to do, in terms of measurable objectives and actions, will emerge from the analysis of which and whose capacities need strengthening (role, pattern, and capacity analysis). In all cases, emphasis would be given to utilizing existing capacities and to developing new capacities only where they are needed.

The wide range of options for *how* to do capacity development, as suggested by Heaver (2000), includes the following: adding staff; adding physical and financial inputs; providing training and technical assistance; introducing new technologies; changing coordination mechanisms; giving particular stakeholders increased voice in planning and implementation; altering the balance between public and private sectors in service delivery; reforming specific organizational systems; changing or enforcing laws, rules, or regulations; changing attitudes, values, organizational cultures, or incentives; providing information; and increasing accountability. In general, the first three options (staff, inputs, and training/technical assistance) are by far the most common, and perhaps overemphasized in relation to the other options.

A recent World Bank review found that “the lack of clarity regarding objectives of organizational capacity-strengthening has contributed to a complete absence—until very recently—of any indicators of organizational capacity or performance. ICRs [Implementation Completion Reports] tend to assert that capacity was built in a given organization because workshops were attended, staff were trained and computers were provided. This focus on inputs also contributes to a lack of attention

### Box 6.2 Examples of Common Issues Emerging from a Capacity Analysis

There are several reasons why duty-bearers are not fulfilling their roles to ensure adequate child nutrition. These reasons have to do with assumption of responsibility and leadership; motivation; access to human, organizational, and financial resources; and the authority the duty-bearer requires to be able to play his/her role. Duty-bearers often lack the capacity to undertake and support effective Triple A processes and communicate effectively within communities. Because they often lack responsibility/commitment, authority, and resources, the duty-bearers often fail, and the child's right to adequate nutrition is not fulfilled.

At the level of the care provider, in most cases the mother, factors such as inadequate information and skills about health, nutrition, and child care contribute to inadequate child nutrition. The situation is often worsened by the unavailability of needed inputs such as clean water, nearby clinics or hospitals, or lack of money to buy adequate food and make use of existing health care facilities. But even in cases where the resources are available, they might not be accessible for the care provider due to cultural/gender divisions of responsibilities and authority within the household and community.

Not all household members have enough interest in children's issues, including child care and nutrition. Often fathers do not think they have a role other than providing resources for food. It is often household members other than the immediate care provider, who have authority over

resources, health seeking behavior, and other issues directly impacting on child care and nutrition. Limited knowledge and skills as well as cultural and religious practices have a direct impact on the care and nutritional status of the child.

At the family and community levels, resources are not always mobilized in favor of, nor priority given to, health or nutrition.

In many cases, organizations such as extension services and clinics are not able to provide adequate assistance, as a result of a lack of financial resources, inadequate training, low prioritization of child and maternal nutrition, and limited motivation and leadership.

At the district and national level, there is limited attention given to nutrition policies and projects. When there is a focus on nutrition, it is on the health or food security aspects of nutrition with little attention given to care aspects. Most of the policymakers and implementers at district and national levels have little knowledge of the importance of nutrition or actions proven successful in improving nutrition. Even if they are aware, child nutrition is often given low priority. The sectoral organization of government is not always conducive to the promotion of nutrition as a multisectoral area that cannot be covered by one ministry or department. The capacity to monitor and evaluate nutrition interventions and nutritional effects of other interventions is also limited. Where this is done, analysis is not always fed into future action; the Triple A cycle is broken.

to proper sequencing, which is often essential to achieving results" (Johnston and Stout 1999).

Such weakness in monitoring progress in capacity-building activities is partly a consequence of poorly defined capacity development objectives, but also relates to the difficulty of finding measures of what are often qualitative changes. Examples of appropriate monitoring indicators are needed.

Broad operational guidelines for the design of capacity indicators are provided by Morgan (1997). Some of the main recommendations are using common sense and some simplification, improving their diagnostic value, focusing their use for project management, building on country commitment, experimenting to find the right indicators, and retaining flexibility to adjust them as circumstances require.

Some indicators of success of the capacity assessment and subsequent capacity development initiative are shown in Box 6.3, based on extensive UNDP and other international experience in development programs, technical cooperation, and capacity development.

### NUTRITION PROGRAMMING

A focus on capacity is fundamental to a rights-based approach to nutrition programming that emphasizes the achievement of outcomes through sustainable processes. A major challenge for the nutrition community is how to use rights-based principles in nutrition programming. The 1999 UN Sub-Committee on Nutrition Symposium in Geneva on human rights and nutrition made some progress in this regard (ACC/SCN 1999), and UNICEF is leading the international community in further articulating practical steps in human rights-based programming.

The shift from the traditional basic-needs-based approach to a rights-based approach will change programming in the following ways:

- it will change the process through which action is undertaken, as shown in the programming steps described below;
- it demands a focus on disparity reduction or

### Box 6.3 Success Factors in UNDP Capacity Development Initiatives

- *Visible Leadership*: meaningful commitment and ownership (and “political will”) at the political and senior bureaucratic levels, sustained throughout the process.
- *Organization-wide and Participatory Process*: highly consultative, with meaningful involvement of all impacted parties or stakeholders.
- *Openness and Transparency*: no hidden agendas, decision making transparent. In some situations, external consultants may help facilitate this process and assure independence and objectivity.
- *Awareness and Understanding*: all impacted parties/stakeholders aware of and understanding the development or capacity initiative, the implied changes, and capacity needs; requires strong internal and external communications, and public relations.
- *General Acceptance and Adoption*: understanding generates acceptance and adoption, and critical mass of commitment; resistance is managed.
- *Appropriate Methodologies*: tools and techniques for program and project management adapted to the local situation and needs; measures of performance established (results, outputs, outcomes); allowance for early successes and pilots, and ongoing monitoring and evaluation.
- *Clear Set of Objectives and Priorities*: built into project/program plans; incremental and phased; available resources appropriate to workload.
- *Clear Management Accountabilities*: transparent processes and decision making; open dialogues; explicit responsibilities and accountabilities set.
- *Sufficient Time and Resources*: committed availability of financial, information, and human resources to plan, develop, and implement the capacity initiative; strong managerial resources.

Source: UNDP (2000).

“reaching the unreached,” rather than an increase in average well-being of the population;

- it views participation as not merely desirable in nutrition programming, but as a fundamental right;
- it demands attention to causes of malnutrition *at all levels*, including basic or structural causes; and
- it will change the rationale for acting because the motivation to realize human rights should derive from concerns for justice and solidarity, not benevolence and charity.

There are seven essential steps in an iterative and fully participatory process for rights-based, capacity-developing nutrition programming according to UNICEF (1999). For this process, they use an elaboration of the Triple A cycle of assessment, analysis, and action (see Figure 3.1), in which the analysis is deepened to focus on causality and vulnerability analysis, role or pattern analysis, and capacity analysis; and the action steps include identifying candidate strategies and actions, and prioritizing and selecting actions. It is important to recognize that the “action” stage does not necessarily relate solely to projects or programs, but can and does encompass steps in the formulation of policy. Capacity assessments can and should be carried out on a continuous or ongoing basis, as the Triple A cycle iterates.

### Program Management

The architecture of community-driven nutrition programs based on community-government partnerships has been described by Tontisirin and Gillespie (1999) (see Figure 3.2). The four most critical aspects with respect to capacity to implement and manage such programs are the capacity for community empowerment, the capacities of mobilizers and facilitators, and the capacity to generate and use information for management. These are described in detail in Gillespie (2001). An illustration of the types of variables conditioning capacity at these levels is provided in Box 6.4 with regard to the Tamil Nadu Integrated Nutrition Project.

### INSTITUTIONS

Malnutrition is an outcome of social, economic, and political processes and their interactions with each other. These interactions are mediated through a range of formal and informal institutions (as shown in Figure 1.2) that are critical to understanding malnutrition and to formulating strategies to reduce it (UNICEF 1990).

Generally, in countries where there are reasonably successful programs there is a duality between the various functions of support to programs and those relating to implementation and management (Table 6.1). Although countries differ significantly, external

### Box 6.4 The Importance of Microlevel Design in the First Tamil Nadu Integrated Nutrition Project

*Community Empowerment:* Women's, children's, and adolescent girls' working groups were created in every village. Women's groups were formed prior to the introduction of services, and had clearly defined roles in community advocacy and communications. Community growth charts were displayed at each Community Nutrition Center (CNC) to help communities understand the nutrition situation. All community nutrition workers (CNWs) had to be from the village and resident in the village, so that they were part of the community.

*Mobilizer Capacity:* Although a minimum educational level was required, equal weight in recruitment was attached to selecting CNWs who were both poor and had well nourished children—since these women would already have key child care skills.

Enough time for professional growth monitoring and promotion was ensured by focusing the CNW on the 0–3 age group where malnutrition was concentrated; paying CNWs for putting in a minimum six-hour day; and having women's group volunteers support the CNW (each women's group member was responsible for mobilizing and supporting about 10 households in her area).

Work routines were designed to make the most efficient use of time and to provide services that maximized participation. Growth monitoring was combined with counseling by the CNW and a health check-up by the local health worker. This was done at group sessions to make efficient use of workers' time, and always on the last three days of each month. Supplementation

was done at the nutrition center in the early morning, when 1) more mothers were available to bring their children, and 2) there was less likelihood of the supplement substituting for a main meal. Taking food home was discouraged because of sharing and because it reduced mothers' participation at the CNC. Each afternoon CNWs systematically home-visited those who did not come for weighing and feeding, and children not growing adequately. A referral slip was used to track referral of severely malnourished children and children who failed to gain weight over several weeks, and to feed back diagnoses.

All CNW training, both pre- and in-service, was carried out at the block level, thus allowing the community nutrition instructress (CNI) (see below) to tailor training to local needs and workers' strengths and weaknesses.

*Facilitator Capacity:* There was one first-level supervisor for every 12–15 CNWs. Also, there was a second-level supervisor/trainer, the CNI, for each population of 60,000 clients. All CNIs were trained at a single home science college in the state, which allowed the program to maintain consistency and quality.

*Program Monitoring:* Monitoring information was displayed at the community nutrition center and updated monthly, serving local needs as well as management needs. The information was processed rapidly enough for program managers to have a detailed picture of performance in each area within one month of raw data reporting by field workers. This allowed managers to rapidly identify areas for corrective action.

Sources: Gillespie and Naidu (1997), Gillespie and Measham (1998), Heaver (2000).

or parastatal institutions usually provide the type of support services discussed here, relating to training, research, monitoring, and evaluation, although there is often overlap with the government agencies.

The quality of nutrition-relevant institutional analysis is generally fairly poor. In the World Bank's 1999 review, its project designs were found paradoxically to be the most complex—with the greatest number of components and organizational units—in countries with weak institutional capacity (Johnston and Stout 1999). A main recommendation was for the World Bank to seek to establish appropriate tools, guidelines, and training programs for institutional and stakeholder analysis in the fields of health, nutrition, and population. These should include strengthening research into major institutional challenges and providing flexible support to task teams facing difficult institutional problems. Some agencies have failed to keep up with the needs of line agencies (Box 6.5).

The key issue is how nutrition program managers can get the services they want, when by definition they are not in control of the support institutions. There are two different kinds of strategies, which can be used separately or in combination.

- Exerting more direct control, whether through getting representation on the governing board of the support institution, or developing improved contractual arrangements, including better planning and monitoring or providing funding for the institutional strengthening of the support institution, through training of staff, providing technical assistance, changing performance incentives, and/or reforming management systems and procedures.
- Building alternative capacity, whether internal capacity for the particular function within the line agency or using competitive contracting to stimulate the development of additional capacity

Table 6.1 Examples of Institutional Involvement in Nutrition in Asia

Country	Support Function	Operational Function
India	National Institute of Nutrition (NIN), involved in research, training, advocacy, and nutrition-outcome monitoring	Department of Women and Child Development in the Ministry of Human Resource Development; nodal state directorates housed in Women and Child Development, Welfare or Health.
Indonesia	Centre for Research and Development for Nutrition; also schools for nutrition (high-school training) and the Academy of Nutrition (undergraduate training)	Nutrition Directorate, Ministry of Health; community volunteers in <i>posyandus</i> (integrated community health posts), established by women’s organizations
Thailand	Nutrition Division in Department of Health with technical, logistic, and supervisory role (coordinates information systems and conducts operational research); Institute of Nutrition at Mahidol University	Different sectors (including Ministries of Public Health, Agriculture, and Education)

Source: Gillespie, Mason, and Martorell (1996).

Box 6.5 Institutional Capacity for Nutrition in India

India’s institutional capacity in nutrition began to decline in the 1970s and today is deplorably weak. Previously, India had a vibrant and internationally renowned set of nutrition institutions. The National Institute of Nutrition was at the forefront of research and training in nutrition science for the country and internationally. Nutrition activities were well developed in agricultural universities, colleges of home science, some medical colleges, and in national institutes such as the All-India Institute of Public Health and Hygiene in Kolkata.

India needs to recognize the present gap openly, and provide the resources to build institutions capable of dealing with its vast and varied malnutrition problems. The ultimate goal must be to ensure that there is sufficient capacity to undertake the policy making, program design, implementation, training, monitoring, and research tasks required to address malnutrition in the country. There is a pressing need to document the nutritional situation, study its determinants and consequences, design appropriate interventions, and manage their

implementation within the context of 21<sup>st</sup>-century science and political economy. There is also urgent need to train people, from village-level workers to medical specialists and policymakers, and greatly expand public awareness of malnutrition through communication and education. Institutions are needed in every major state of the country, as nutrition problem identification and program responses must be region specific.

Rebuilding capacity should begin by mapping existing institutions and their capabilities, and measuring these against what is needed to revitalize nutrition efforts. To understand both the quantitative dimensions and qualitative nature of the rebuilding required, it would be necessary to carry out needs assessments of key institutions and an overall human resource planning exercise. Beyond this, a phased approach should be adopted toward increasing the size and number of institutions and bringing about qualitative improvements in existing institutions.

Source: Measham and Chatterjee (1999).

in the public, NGO, or private sectors—which may in turn necessitate developing the line agency’s capacity to procure, manage, monitor, and evaluate such services.

Training

The realization of the need for a shift in the way nutrition is conceived, investigated, and taught led to the emergence

among academics and practitioners in the mid-1990s of a movement, which was labeled “public nutrition” defined as being “concerned with improving nutrition in populations in both poor and industrialized countries, linking with community and public health nutrition and complementary disciplines” (Mason et al. 1996) and including the type of activities shown in Box 6.6.

### Box 6.6 Public Nutrition

Public nutrition is proposed to include the following activities:

1. understanding and raising awareness of the nature, causes, and consequences of nutrition problems in society;
2. epidemiology, including monitoring, surveillance, and evaluation;
3. nutritional requirements and dietary guidelines for populations;
4. programs and interventions: their design, planning, management, and evaluation;
5. community nutrition and community-based programs;
6. public education, especially nutrition education for behavioral change;
7. timely warning and prevention and mitigation of emergencies, including use of emergency food aid;
8. advocacy and linkage with, for example, population and environmental concerns; and
9. public policies relevant to nutrition in several sectors, for example, economic development, health, agriculture, and education.

Source: Mason et al. (1996).

The key to an effective public nutrition practitioner, at whatever level, is the ability to seek out and integrate knowledge from diverse sources, being guided by the particular characteristics of a given problem and the ecological, social, economic, political, and institutional context within which it occurs (Pelletier 1997). The construct of “public nutrition” should facilitate the development of better practice to improve the well-being of all populations, and to develop the training and research to support that practice (Habicht 1999). Further discussion of the elements of relevant training is provided in Gillespie (2001).

### Research

The vast bulk of malnutrition research focuses on questions of why, who, where, and to some extent

what—as opposed to *how* questions that are often the most critical impediment to program effectiveness (Berg 1991). In an analysis of abstracts for the 1997 International Union on Nutritional Sciences Congress, only 10 percent were found to have focused on the basic causes of malnutrition, and only 10 percent on underlying causes (Beaudry 1999). There are other biases, such as the age-old false equation of nutrition with food.

Following Berg’s provocative “nutrition malpractice” thesis, a feasibility study, commissioned by the Rockefeller Foundation in 1992, provided several structural alternatives, including an International Center for Nutrition Research and Training, an International Nutrition Research and Training Fund housed at an international agency, and regional initiatives. A subsequent workshop at Bellagio opted for a regional action alternative and proposed a series of national assessments of constraints to program effectiveness as a first step (IDRC-ACC/SCN 1995).

Many of the concerns voiced in the section on training pertain to research as well. Researchers and managers need to develop a culture of inquiry into dynamics of societal causes and the mechanics of effective programming. Better collaboration is needed between research and implementing institutions through networking, communications and strengthening the program-policy-research-training networks.

Within the broader scope of applied research, operations research forms a subset that is directly program driven. Operations research needs should be determined on the basis of the problems with project implementation that are identified over time by built-in management information systems. Examples include the most cost-effective systems for targeting, supervision, and service delivery. Qualitative monitoring, in particular, should reveal priority research needs. Research should be simple, timely, and participatory.

One recurring question concerns the role, if any, of supplementary feeding in community-based nutrition programs. This is particularly important, given the highly political aspect of food distribution and its high economic and opportunity costs. Supplementary feeding typically takes about half the budget in food costs, plus large amounts of staff time. The availability of the supplementary food may crowd out other crucial aspects of the program such as counseling. Even if it is effective in closing nutrient gaps in nutritionally vulnerable individuals, there remains a question of its cost

effectiveness and sustainability relative to other interventions. Best practices in supplementary feeding are discussed in Allen and Gillespie (2001).

### *Evaluative research*

The significant absence of evaluation research on the impact of large-scale nutrition-oriented programs has been highlighted elsewhere (Mason et al. 1999; Allen and Gillespie 2001). Case studies of successful programs should be carried out and widely disseminated. A proportion of the project budget should be set aside for these investigations.

To choose an appropriate design for an evaluation, the following three questions must first be answered: Why is the program being evaluated? Who will make decisions on the basis of the evaluation findings? What type of decisions will be made?

Whether an evaluation is complex or simple, it should be rigorous in relating evaluation design to decisions. A useful two-dimensional framework for deciding on an appropriate design has recently been proposed (Habicht, Victoria, and Vaughan 1999). One dimension consists of the indicators of interest: whether these refer to provision or utilization of services, coverage, or impact measures. The other is the type of inference to be made: whether a statement of adequacy, plausibility, or probability. This relates to the question of how confident decision makers need to be that any observed effects (both in terms of performance and impact) are due to an intervention. The difficulties of assessing impact are discussed in Gillespie (2001, Annex IV). In addition to the above framework, other factors that affect the choice of an evaluation design include the efficacy of the intervention, the field of knowledge, timing, and costs.

Although anthropometry provides the main outcome indicators for evaluations, it does not encompass other effects or benefits of improved nutrition such as increased activity and exploration of the child and cognitive skills. Severely underweight children are most likely to respond to nutrition interventions with improved growth, but moderately underweight children are more likely to respond with increased activity, greater disease resistance, and possibly improved cognitive development. These outcomes are important, albeit very difficult to measure. Nevertheless, following the principle of “plausible inference,” it is well known that for a given anthropometric improvement, certain other beneficial

outcomes are likely to be achieved, e.g., relating to cognitive development, productivity, and mortality. These have already been demonstrated in longitudinal studies, for example, the meta analysis that conclusively established the contribution of child malnutrition to child mortality (Pelletier et al. 1994).

Other important factors are relevance or appropriateness of the project, particularly for a long-standing project in a rapidly changing environment. Evaluation should also look to the future and consider issues of sustainability (see the section on Sustainability, Chapter 3).

Consideration should also be given to how success is communicated, internalized, and ultimately used to generate more success. This is often a gap in evaluation planning and results in the shelving of many evaluation reports. In any evaluation, it is simply not enough to carry out a survey, measure changes in a few indicators, and draw conclusions on the degree of programmatic success. The use of evaluations should not be separated from their actual implementation. This requires consideration of a variety of communication strategies and methods for disseminating lessons to those who can best apply them—from the communities involved to national-level policymakers (Box 6.7).

### **Nutrition Surveillance for Early Warning and Crisis Management**

Nutritional surveillance for crisis management is a process of monitoring, analysis, and interpretation of indicators and causal factors in order to make appropriate decisions resulting in improvements in the nutritional status of the population. A general principle of a nutrition surveillance system is that it should be simple, user-driven, based on existing institutional structures, and have the commitment of relevant decision makers for information use in planning and policy design. Tracking the deviations in implementing nutritional surveillance systems from these criteria helps reorient activities toward the ultimate goal of informed nutrition decisions.

Many monitoring systems continue to be heavily donor driven and remain dependent on external funding and technical assistance (Quinn and Kennedy 1994). The lack of evaluation of how well these systems are performing has been frequently suggested as one reason for such low sustainability. Usually, two types of evaluations are necessary: first, evaluating the performance of the nutritional surveillance systems in

### Box 6.7 Evaluating Development Effectiveness: Lessons from the World Bank

The changing global economy and the Comprehensive Development Framework suggest several principles for evaluating development effectiveness. Evaluation should focus on results, and this depends on accurate tracking of progress toward development goals, with a clear focus on poverty reduction and growth. Tracking development outcomes should comply with the comprehensive development agenda agreed upon by the government and its partners.

As the focus of the development effort moves from projects to the higher plane of country programs, so must the evaluation process. Resources and skills should be invested in developing appropriate indicators and information systems. The current preoccupation with project performance and evaluation should be complemented by a sectoral and countrywide focus. Public sector reform needs to include building the evaluation capacity of countries.

*Source: World Bank (1999b).*

Development effectiveness should be evaluated in terms of shared objectives, joint responsibility for outcomes, reciprocal obligations to achieve results, and distinct accountability for performance. In particular, donors and governments should team up to involve civil society and the private sector in monitoring and evaluation, and to help all stakeholders acquire the needed skills and attitudes. Participatory monitoring and evaluation hold significant promise for social learning and managing for results.

Evaluation should be informed by the global perspective of the International Development Goals endorsed by the development community. Far from implying rigid, top-down global planning, this two-way link means adapting the international goals to country conditions and priorities and enhancing partnerships at all levels.

terms of the quality of information generated and in terms of their success in meeting information needs; and second, evaluating the impact of the resultant information in influencing policy decisions. Evaluation criteria are described in Annex II.

## GOVERNMENT

In this section, some of the most important roles of government from the viewpoint of capacity are described, including the capacity to analyze, build, and sustain political commitment to reducing malnutrition, and the capacity for effective advocacy and policy development. The capacity for effective strategic management of the nutrition “sector” is discussed from a new perspective. Finally the implications for nutrition of the accelerating processes of decentralization of government functions are reviewed.

### Political Commitment

Building the capacity to analyze and increase commitment is as important as building the capacity to deliver services (Heaver 2000).

Weak political commitment to combat malnutrition relates partly to low demand for services and programs, which in turn is related to the relative invisibility of both the symptoms and the consequences of general malnutrition. This applies at all levels from care providers

in households to government ministers. It also relates to the fact that nutrition, albeit related to several sectoral concerns, e.g. agriculture, health, and education, is usually low in the pecking order of priorities. The outcome of such weak commitment is limited resource allocation to nutrition and low impact.

Where there is commitment, other constraints to allocating sufficient resources to nutrition may exist, such as inadequacies in governmental resources and other elements of capacity.

Education about the extent and seriousness of malnutrition, and about the impact on health and productivity of improving nutrition, usually leads to increased action to improve nutrition, but not always (Box 6.8). Many countries are aware that they have a serious malnutrition problem, but have not invested adequate skills and resources to deal with it. Sometimes this is because they lack the will to tackle the problem; sometimes it is because they lack the ability, due to financial or capacity constraints. Because the solutions are different in each case, it is crucial to distinguish to what degree poor nutrition program performance is due to lack of understanding, lack of commitment, or lack of capacity.

### Policy Development

Commitment to nutrition at the national level usually begins with the formulation of a national nutrition policy.

### Box 6.8 Decentralizing India's Integrated Child Development Services Program

To achieve community ownership, India's Integrated Child Development Services (ICDS) must first devolve responsibility to the states, for them to adapt the basic model to their particular problems and needs, and to take full charge of program management. In addition to the central Government's announced intention to devolve centrally sponsored schemes to the states, and ICDS's efforts to decentralize training, the emergence of *panchayati raj* institutions (village development committees), charged with major responsibility for the social sectors and growing in capability, make decentralization to communities more feasible now than ever before. Below the state level, decentralized management could, in principle, be achieved by many routes: delegating the implementation of ICDS to the private sector and/or NGOs; setting up bodies at the district or block levels; and/or devolving responsibility to the district, block, and village *panchayats*. Neither the private sector nor NGOs offer a viable option, mainly due to the massive scale of services demanded by the size of the malnutrition problem. NGO efforts can complement ICDS in important ways, notably

by experimenting and disseminating information about innovations that work.

Source: Measham and Chatterjee (1999).

Case studies indicate that the limited capacity of *panchayats* for planning has prevented them from taking up responsibility of self-governance endowed by recent constitutional amendments. Also, without their own resource base, they depend on income transfers from state and central governments under various developmental programs with little flexibility for innovation. Despite these constraints, the *panchayat raj* system has demonstrated that it can bring about better intersectoral coordination and more transparency in selection of beneficiaries under poverty alleviation programs. The major constraint, however, is the poor familiarity of most of the *panchayat* members with the ongoing health and nutrition programs.

Source: ADB-UNICEF India country summary, draft.

A nutrition policy is usually considered as comprising a coherent set of principles, objectives, priorities, and decisions adopted by a government *and implemented* by its institutions as an integral part of its national development plans. It is essential to take the approach that "policy is what it does" (Schaffer 1984) in order to avoid the possibility of "implementation" being seen as something separate. In the past, where implementation was not seen as part and parcel of the policy process, accountability was reduced or absent and "policies" often either failed (e.g., in Thailand in the late 1970s) or continued to exist only on paper (e.g., in India in the mid-1990s).

As with community-based nutrition programming, the process approach has been found to be very important in policy making. National nutrition policy should never be prepared *de novo*. It should emerge from a consensus-building approach that will take time and usually involve political compromises. The actual process of drawing up a policy by involving different sectors in a dialogue on nutrition may often be prolonged but it may serve to raise an awareness, or "nutritional literacy," among different sectors. The development of viable policy will be an ongoing struggle along two axes—vertical and horizontal—between central and peripheral levels, and between different sectoral levels. It is a process, not only of raising nutritional literacy, but of bargaining and compromise, which take time.

Consider the cases of Zimbabwe and Tanzania. In Zimbabwe, the evolution of nutrition programs, with their district-based interministerial management teams, spearheaded the development of a national nutrition policy—in a bottom-up, rather than top-down fashion.

The multifaceted dimensions of the nutrition problem and how it demanded intersectoral action was not understood by policymakers. The painfully slow process of creating awareness toward comprehensive action was necessary. But a policy document without the requisite level of understanding would be no more than a document. Policy development is itself a gradual process incorporating lessons learned in struggling with solving the problems of malnutrition in the local context (Tagwireyi et al. 1992).

Similarly, in Tanzania, the division between process and implementation was viewed as arbitrary in the sense that implementation of the policy was going hand-in-glove with its development. The process of assessment, analysis, and action continued despite the absence of a formal declaration of the policy. The mobilizing effect of the process was more important than the elaboration of the document. The delay in the declaration of the policy was seen by the focal nutrition institute as "a blessing in disguise" because it kept the policy on the

agenda of many high-level bodies until a critical mass of awareness and opinion was mobilized (Kavishe 1993).

Nutrition policy needs to be grounded in operational realities. In the fourth National Economic and Social Development Plan (NESDP) in Thailand (1977–1981), nutrition planning was largely top-down and overseen by a multisectoral national coordinating body, with little emphasis on community participation. Implementation of programs presented major problems. Lessons were learnt and in the fifth NESDP (1982–1986), the incorporation of nutrition objectives into overall developmental goals was found to improve intersectoral efforts, both at central and community levels. The nutrition policy became rooted in the Poverty Alleviation Plan and a greater emphasis was placed on effective resource allocations through targeting and the integration of micro-level program implementation with macrolevel policy (described in Tontisirin and Gillespie 1999).

### Advocacy

Advocacy and social mobilization are communication strategies fundamentally geared to building commitment, which may be seen in changes made to nonnutritional policies, sectors, and resource allocation.

Advocacy goes literally to the heart of the Triple A cycle in that it is also designed to highlight the ethical imperative of acting to reduce malnutrition. Nutrition advocates, using various opportunities and strategies, may succeed in influencing and changing existing policies by demonstrating the potential or actual effects of nonnutritional policies on nutrition outcomes. In the last two decades, nutrition outcomes have increasingly been used as a measure of the degree of equity of development processes. Nutrition advocates can build on this growing awareness and seek leverage to further influence nutrition-improving processes and actions.

In reality, the process of policy making is more complex than that outlined in the standard linear model whereby policy is primarily modified on the basis of new information about the problem or its possible solutions. The various types of events or processes that may actually precipitate or catalyze such policy change include availability of new research results/data; improved networking within or between agencies, which fosters/clarifies ideas on policy directions; a person/agency with authority champions a cause; ideas/problems become simplified and provide an agenda for action; or new opportunities/ideas occur within

influential organizations (Sutton 1999). These change events—which are possible entry points for advocacy—are not mutually exclusive, and any one policy innovation will include some and not others.

Critical contextual factors that need to be taken into account when designing an advocacy strategy include the following.

#### *Perception and understanding of malnutrition*

People's perceptions are governed in part by their personal conceptual frameworks that relate certain problems to likely causes, and ultimately to a course of action. Nutrition has tended in the past to be compartmentalized either as a food problem or a health problem. As a means of communicating the multifaceted nature of malnutrition, UNICEF successfully pioneered the food-health-care conceptual framework shown in Annex I and disseminated it as a tool for assessing and analyzing nutrition situations and designing appropriate actions (UNICEF 1990).

#### *Demand for information*

Impact demand may increase if the nutrition problem begins to be perceived in a different way, particularly if a potential information user expects certain new benefits to result from acting on information. Ways to increase demand may also be found by carrying out a “decision audit” to see what type of information is needed to improve decision making at different levels of nutrition-relevant sectors, as well as how the information should be presented and disseminated (see Information Systems, Chapter 3).

Demand may also be augmented by building accountability into nutrition-relevant actions, perhaps through the formulation of a national nutrition policy (see below) that clearly articulates different sectoral roles—and, thus, each sector's share of responsibility for the problem. Accountability may also derive from the use of certain nutrition outcome indicators to monitor nonnutritional policies and programs and the dissemination of the results.

Overall, perceptions of the nutrition problem and demand for nutritional outcome information are relatively low in Asia and the Pacific. At all levels of organization, outcome information is not consistently available and nutrition objectives are usually not a part of performance criteria for policymakers, program

managers, or care providers. In order to mainstream nutritional considerations at the national level, advocacy activities using tools such as PROFILES (a software that graphically depicts the consequences of various government funding choices on development outcomes such as child nutritional status) can generate political support for country programs. Where possible, influential agencies, both domestic and international, should advocate the incorporation of nutritional indicators into national development plans and monitoring and evaluation systems. In designing country programs, nutritional outcomes—both general and micronutrient outcomes—should be a part of performance evaluation schemes for program managers.

Public advocacy should focus on the extent and severity of the problem of malnutrition; its costs to the individual and the society; the low level of resources going into nutrition (as compared to the military, for example) while cost-effective options for action exist; and the fact that adequate nutrition is a fundamental human right enshrined in conventions ratified by governments.

#### *Motivation of decision makers*

Information needs to be presented in such a way that it motivates people and promotes appropriate action. It is linked again to the need to create demand (see above) and an expectation of success. The decision maker should be presented first with the most negative outcomes, before being shown that solutions are feasible (including success stories), often with multiple benefits, and finally that he/she has the power to achieve at least part of the solution.

#### *Political economy of nutrition*

Information does not exist in a vacuum and actions are not purely determined by information. Powerful political and economic objectives may conflict with and possibly outweigh nutrition considerations. Nutrition may remain relatively marginalized. Greater political weight needs to be attached to the concept of malnutrition to counter its compartmentalization as a scientific problem to be dealt with by “nutritionists” alone. This will require better nutrition advocacy skills training of public nutrition practitioners, and a better grasp of political economy and the human rights and economic dimensions of nutrition policy and programming.

### **Social Mobilization**

Social mobilization is the process of bringing together all feasible social partners or stakeholders to determine felt needs, and raise demand for and sustain progress toward a particular development objective, in this case, malnutrition reduction. Although the emphasis in community-based programming is on community mobilization to foster a growing sense of ownership, social mobilization does not only apply to communities. The mobilization of strategic allies is also a very important tool to help create a supportive environment for change.

The social mobilization component of the Bangladesh Integrated Nutrition Program (BINP) is one example. This involves various nutrition committees in village, ward, union, and *thana* levels, which follow the Triple A cycle at each level as they focus attention on malnutrition, its causes, and its local solutions. Through local community-government partnerships, mobilization and participation are promoted and supported at each level. A continuous interaction and feedback operate between the service providers and recipients through mobilizers. Social mobilization also strengthens local organization and enlists the broader community to work for nutrition.

Advocacy was key to building commitment in Bangladesh. After several years of inaction on a national program, the BINP was finally approved by a Minister of Finance on the basis of a PROFILES exercise specifying the likely losses in national productivity resulting from nutritional stunting.

### **Strategic Management of the Nutrition “Sector”**

Strategic management may be defined as an approach whereby organizations define their overall character and mission, their longer-term objectives or goals, the activities they undertake, and the strategies they adopt, including the allocation of resources. The approach is comprehensive and far reaching. It integrates and addresses all dimensions of capacity at all levels.

While there is consensus in the nutrition community that nutrition lacks an institutional base, with consequences for political support and funding, the institutionalization debate has taken different forms during particular historical contexts and with particular sets of actors. Because of nutrition’s multisectoral nature, the view that prevailed in the 1970s was that nutrition should be managed by multisectoral units in ministries

of planning. These units often had little impact because they had little influence over the line agencies, which were the only institutions with field staff and other resources to mount large-scale nutrition programs.

As the weaknesses of multisectoral nutrition units became apparent, the pendulum swung back, and in the more isolationist period of the 1980s and 1990s, the focus shifted to debates over food versus health with a community orientation, and the balance of science and practice—both with important implications for institutionalization. In many countries the “home” for nutrition moved to one of the line agencies of government. Whether this was the ministry of health or of agriculture depended largely on whether nutrition was more strongly championed by “health and care” stakeholders, or by “food” stakeholders. This approach, too, has had its problems, because single-line ministries seldom understand or are committed to the full range of nutrition activities; have little control over other agencies implementing other parts of the national nutrition strategy; and are not in a strong political position (and may have little political incentive) to secure resources from ministries of planning and finance for other line agencies’ programs.

It has recently been suggested (Levinson 2000) that another opportunity to establish meaningful institutionalization and purpose of nutrition may be provided by new goal-oriented strategic thinking in development agencies, as manifest by the World Bank’s new Comprehensive Development Framework, UNDP’s Multiple Dimensions of Human Development approach, and the new United Nations Development Assistance Framework. This may offer another chance for nutrition to become integrated into the development process, and for nutrition interventions to become part of a larger arsenal of development inputs addressing the same objectives, this time at the behest not of nutrition advocates alone but of governments and development agencies themselves.

But what does this mean in practice? Perhaps we have been asking the wrong question in focusing on where “nutrition” is located. The implementation of national nutrition strategies everywhere involves several ministries, each of which needs to be responsible for and committed to its activities. In any one country, there is usually a network of nutrition programs run by different agencies and local governments.

An alternative approach would be to redefine the issue as being *how* best to manage the nutrition sector,

rather than *where* best to manage it (Heaver 2000). This would open the door for a wider range of pragmatic solutions. Several stakeholder groups are involved directly or indirectly in nutrition-relevant policy making and resource allocation: technical nutrition specialists with specialist knowledge of nutrition and efficacy of possible solutions; national and local politicians promoting some mixture of their constituents’ and their own interests; and finance, planning, and implementing agencies, all with limited budgets and multiple activities competing with nutrition for resources.

Seen from this perspective, the issue is not so much who is in charge of nutrition, but how to bring these different stakeholders together to build consensus in a participatory way, and the means to feed performance results of different programs into decisions about resource allocation.

#### SCALING UP/SCALING DOWN

The allocation of public resources—whether health and nutrition or otherwise—is decentralizing rapidly in many institutions throughout the world. Decentralization is here defined as the ceding of power from the central government to a local government or agency with the central government retaining some measure of oversight over the decisions of the decentralized body.

Decentralization processes need to be accompanied by adequate support and safeguards from the center. Communities also have embedded power structures; in the absence of transparency and accountability mechanisms, local elites can appropriate funds. Moreover, if local communities are to compete for central funds, the better equipped, more cohesive, and less excluded communities will capture them. Communities that are unable to organize proposals or are less likely to be noticed by central authorities will lose out.

There are other potential problems with decentralization, including restrictions due to fiscal austerity; no mechanisms to allow demands to be included in national objectives and strategies; lack of sufficient authority and/or resources to match the delegation of responsibilities; lack of mechanisms to generate own resources for the cofunding of programs; duplication of effort between local and central government; persistence of a paternalistic approach toward the most vulnerable sectors; and the replication at local level of the compartmentalization of public service functions at central level (FAO 2000).

A central challenge for nutrition programs is finding a balance of approaches that work. The nature of community-government partnerships has been described elsewhere (Tontisirin and Gillespie 1999). How can the grass roots and the center be brought together effectively? What balance of top-down (or center-derived) versus bottom-up (community-derived) planning and action is optimal for nutrition?

First, it is important to restate experience that suggests it is not an “either/or” question. Both top-down and bottom-up approaches are potentially relevant, appropriate, and complementary. In practice, a shift toward a more bottom-up or decentralized approach to nutrition programming is often required to redress past imbalances in which the center traditionally assumed control of most critical structures and functions. Nonetheless, there are some nutrition-relevant actions that can be appropriately formulated at higher levels, using wide and more top-down application of appropriate strategies and technologies, based on the best scientific knowledge, e.g., salt iodization and immunization. Legislation is another top-down strategy. The challenge is how to integrate these two approaches for maximum long-term impact on nutrition.

Two promising approaches to nutrition programming in World Bank-supported projects are an adaptive learning process and sequencing (World Bank 1999b).

The adaptive learning process starts small and combines top-down direction with bottom-up experimentation and learning. This shifts the emphasis from up-front analysis and detailed design toward developing flexible solutions, building local capacity, and relying on social processes and monitoring systems for adaptation and learning during implementation.

Sequencing interventions within a long-term strategy that builds on past learning provides a way out of the excessive complexity of projects and programs. Such sequencing can start by piloting comprehensive approaches at the local level, then scaling them up as part of a long-term process of capacity building and decentralization.

The strengthening of community-government partnerships (see Figure 3.2) essentially implies two

processes (Uvin 1999), scaling up from communities and scaling down from more central levels, usually the government.

### Scaling Down

The causes of malnutrition are multifaceted and often interrelated. Multifaceted and interconnected activities work better at the village level than at higher organizational levels because people’s lives naturally comprise such diversity. Decentralization increases the potential for intersectoral action, which can maximize impact on nutrition outcomes. It is only when attempts are made to interface the diverse community-level realities with the sectoral interests of governments, agencies, and even NGOs, that problems often emerge.

Scaling down has been promoted in recent years through the following types of processes:

- erosion of legitimacy of the state<sup>1</sup> and the rise of civil society, particularly NGOs;
- NGO pressure brought to bear upon governments, and bilateral and multilateral institutions;
- financial crises, which force the need to tap new resources (by favoring disengagement, privatization, and community self-help);
- the information technology revolution, freeing up and reducing cost of information access.

### Scaling Up

Scaling up is the process by which community-based organizations expand their impact and enter into relations with more central administrative levels, e.g., the government.

Scaling up has been conventionally equated with expansion in scale or replicability, the condition that a program can be applied in another geographic setting (regional, national, and/or international). The issue is usually raised by donors who would like to copy certain positive aspects of a program or project elsewhere, with the common expectation that such a copy be implemented at a substantially lower cost, and often more quickly.

<sup>1</sup> Although government remains a critical duty-bearer that should be held accountable to the people it serves.

Processes are more replicable than projects or programs. In this sense, for improved nutrition, the most important element to adapt is the elaborated approach to the Triple-A cycle and support for it. Early community- and district-level involvement helps assure replicability.

Thus, the enduring question—“how to go to scale?”—may be missing the point to some degree. Where successful community-based nutrition projects have accelerated nationwide, governments have usually changed their policies (i.e., scaled down) in ways that have triggered the emergence of appropriate community-based initiatives elsewhere. This is a truly bottom-up approach to policy, where the micro informs

the macro, and where policy levers are used to create conditions—that is, the essential contextual factors—for community-based initiatives to emerge, grow, and mushroom across the country. Capacity is one of these contextual factors and capacity development must accompany scaling-up processes. International agencies should be prepared to learn from and to support such processes, as described in the next chapter.

Experiences reviewed in the *World Development Report 2000–2001* show that a key lesson for practitioners and policymakers is the importance of using existing forms of social capital in poor communities as a basis for scaling up the efforts of local community-level organizations (World Bank 2000a).



## 7. Financing Nutrition Interventions

**T**his chapter revisits the rationale for public investment in nutrition interventions. It notes the market failures that make public sector intervention plausible. (The large human and economic costs involved were discussed in Chapter 2.) The allocation of health and education expenditures is then examined by income group, by sector, by region, and over time. The lack of national nutrition accounts for the countries in the region is noted as a serious impediment to the formulation of more effective nutrition investments. Methods for understanding whether a particular intervention should be financed by the government (cost-benefit analysis) and how it should be designed (cost-effectiveness analysis) are described and estimates are presented for the countries of the region—both for existing and hypothetical interventions for addressing under- and overnutrition. The resources required and sources of funding for unmet needs are described for countries in the region.

### THE ECONOMIC RATIONALE FOR PUBLIC SECTOR INVOLVEMENT

A necessary condition for public sector investment in nutrition is that the private sector will not provide it. Market failures prevent the private sector from investing in various activities. The public sector is justified in

considering investing in goods that (1) are public (in that no one can be excluded from them once they are provided and use by one person does not preclude use by others, e.g., nutrition education campaigns); (2) generate large externalities (benefits or costs accruing to someone not party to the transaction, resulting in a divergence of private and social levels of production, e.g., immunization to reduce the spread of infectious disease); (3) are characterized by a large difference between the provider and user about the value of the product (e.g., micronutrient interventions); or (4) are of particular importance for equity.

Capital market failures are key issues that affect nutrition. Nutrition, like education, is a very long-term investment of a type not financed by capital markets, particularly because the poor generally have no collateral to offer. Hence, investments by the poor in nutrition are likely to be too low, even if the households know that the returns are high. This is exacerbated in some countries of the region with strong discrimination against women. In these societies, parents are likely to further underinvest in nutrition of girls. Lack of investment in girls' nutrition helps transmit poverty between generations because stunted women have smaller babies, as discussed in Chapter 1. Table 7.1 lists some of the key market failures affecting nutrition, and the type of public intervention that is justified.

**Table 7.1 Market Failures and Public Nutrition Interventions**

Type of Market Failure	Broad Area in which Public Intervention is Justified		
	Food	Care	Health
Public Good (i.e., no one can be excluded from it once it is provided and use by one person does not preclude use by others)	Agricultural research—although the move to private goods is occurring where the price of the product is high enough	Some forms of nutrition education via mass media	Vector control Collection and dissemination of malnutrition data Clean water provision
Externalities (i.e., benefits or costs accruing to someone not party to the transaction resulting in levels of production that are socially too high [for negative externalities] or too low [for positive externalities])	Pest control measures	Programs for young girls and pregnant and lactating mothers to reduce intergenerational externalities	Immunization programs to reduce infectious diseases
Information Asymmetries (i.e., private mechanisms for delivering accurate information on the value of certain measures are weak)	Agricultural extension agents Food fortification Plant breeding for micronutrient-dense foods	Hygiene and care practices Infant feeding interventions	Micronutrient supplementation
Capital Market Failure	Poor cannot borrow money for long-term investment in nutrition		
Universal Access and Equity	Targeted food price subsidies Microfinance	Community day-care centers	High subsidies to nonpoor and some crowding out of private sector, e.g., hospital services
Health Insurance Market Failure			Policies to prevent chronic diseases Enable private health insurance

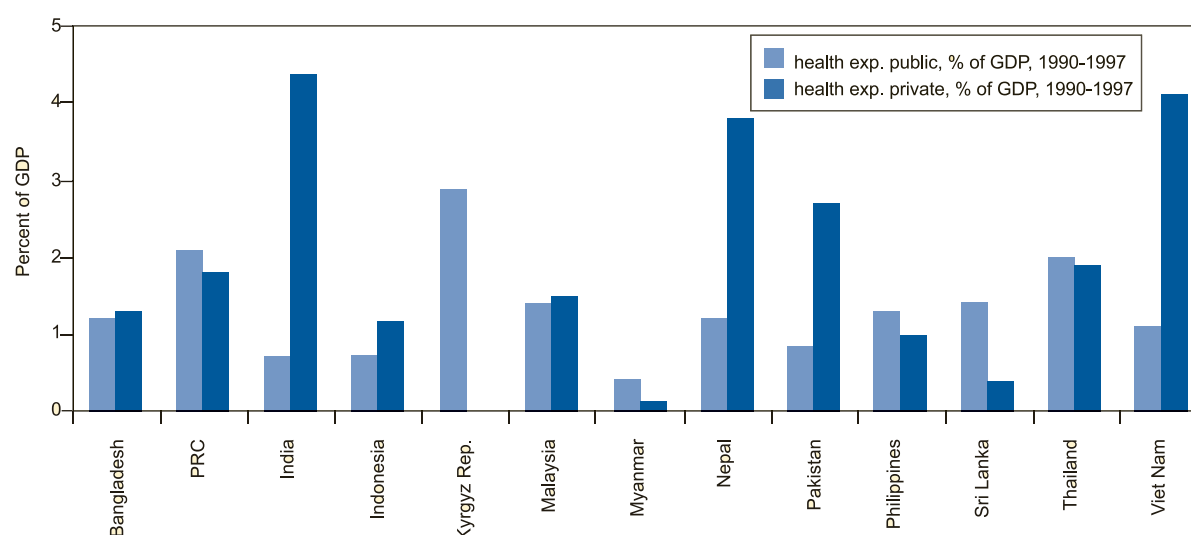
Another rationale for public sector involvement derives from a human rights perspective. Elected governments are critical duty-bearers with regard to many human rights including the right to adequate nutrition, and are directly accountable to the populations they serve.

#### PUBLIC EXPENDITURE PATTERNS IN NUTRITION

The multifaceted nature of malnutrition (see Figure 1.2) means that nutrition falls within the remit of many ministries including health, agriculture, food, education, planning, water, and infrastructure. Public finance data

on nutrition are very scarce and national nutrition accounts do not yet exist. National accounts allow expenditures to be mapped onto sources of funds. In this way the use of public funds (as opposed to expenditures on public services) becomes clear, and adjustments can be made if politically and administratively feasible. An example of a set of national *health* accounts, which are themselves rare, is given for Viet Nam (Table 7.2).

First, Table 7.2 shows that only 50.8 percent of total national expenditures on health are from the public sector in Viet Nam. Almost all of the private (or out-of-pocket) expenditure is for the purchase of drugs. Nearly all of the funds raised from the public (through, for example,



Source: World Bank (1999a).

**Figure 7.1 Public and Private Health Care Costs, 1990-1997**

**Table 7.2 National Health Accounts for Viet Nam, 1993**

Use of Funds (Expenditures)	Sources of Funds (%)		
	Public Subsidies	Private Sources	All Sources
Total Public Expenditures	16.2	34.5	50.8
Hospital	14.8	2.9	17.7
Drugs	na	31.5	31.5
Primary Care	0.4	0	0.4
Public Health Activities	0.4	0	0.4
Other	0.7	0.1	0.7
Total Private Expenditures	0	49.3	49.3
Providers	0	0.7	0.7
Drugs	0	48.6	48.6
All Uses	16.2	83.8	100

Source: Gertler (1998).

general income and sales taxes) are used for hospitals, with very little of them used for primary care and public health (0.8/16.2 or approximately 5 percent). More than 60 percent of public expenditures are derived from private sources spent on drugs. Other national health accounts in the region demonstrate similar patterns: (1) most health expenditures are from private sources (Figure 7.1); (2) little

is spent on primary health care and preventative measures, either from public or private funds; and (3) hospitals account for much of the public funds (Gertler 1998).

National nutrition accounts need to be constructed within public expenditure reviews for the countries in the region to effectively identify and reallocate nutrition funds, if such a reallocation is necessary.

### Trends in Public Health Expenditures

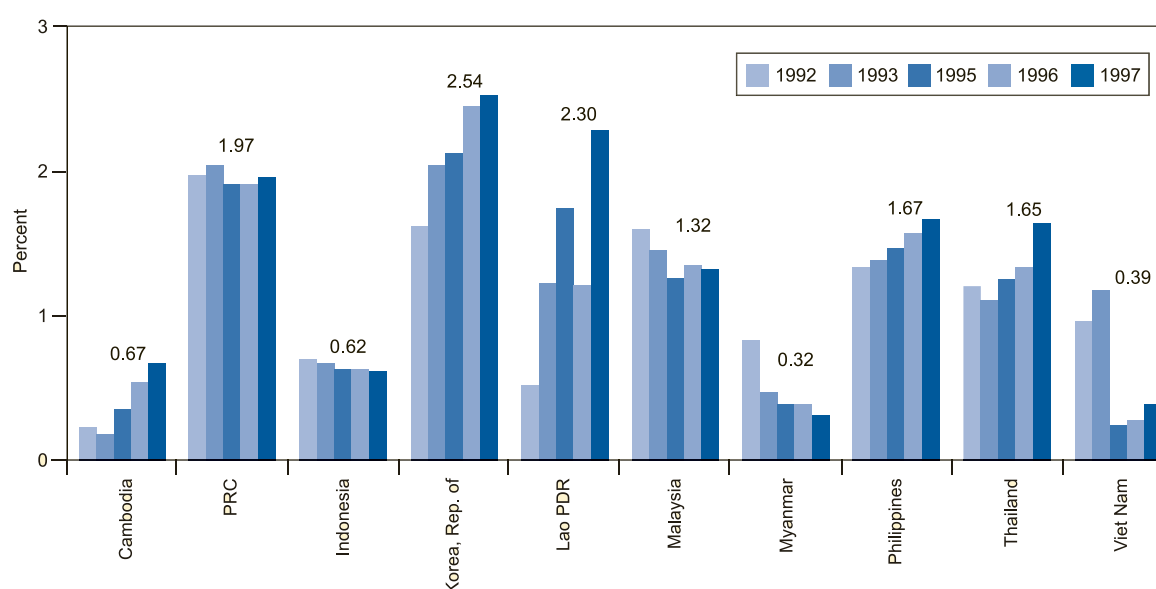
The proportion of central government expenditures allocated to health has increased in Cambodia, Republic of Korea, Lao PDR, Philippines, and Thailand (Figure 7.2). It has declined in Indonesia, Malaysia, Myanmar, and Viet Nam. The absolute levels are not too meaningful given that some health expenditure occurs at other levels of government. Moreover, with much decentralization of social sector expenditure (in the PRC and Indonesia for example), the trends in the data are hard to interpret. For South Asia (Figure 7.3), the relative allocations have been fairly steady, with slight increases in Sri Lanka and Bhutan and decreases in India. It is well known that expenditures allocated to health care do not correlate well with improvements in health outcomes. This may be due to a placement effect—whether resources get allocated to the areas with the worst health outcomes—or it may be due to the quality of services and the ability of the poor to access them.

The ability of the poor to access health care in the region is generally low. In Indonesia and Viet Nam, a disproportionate share of public spending on health is captured by the upper income groups (Figure 7.4). The highest-income group in both countries benefits from twice as much public spending as does the lowest-income group. In Malaysia, the poor capture more than 20 percent

of the public spending on health. This is probably due to the ability of nonpoor Malaysians to move from public to private health service provision.

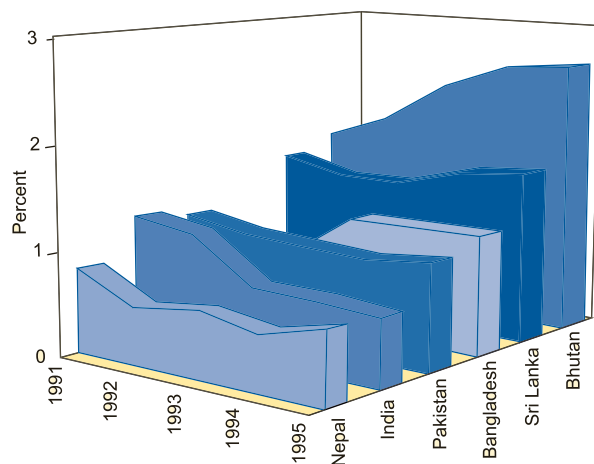
### Public expenditures by sector

Studies to determine which sectoral and intrasectoral expenditures are most effective at reducing malnutrition are needed. For poverty as an outcome, some answers are emerging for the two largest countries in the region: the PRC and India. Using state-level data from India for 1970–1993, Fan, Hazell, and Thorat (1999) found that public investments in education were the third-best way for the Government of India to allocate resources if its goal were reduction of rural poverty. Investments in roads (first) and in agricultural research and development (second) were assessed to be better investments. For the PRC, it is a similar, but stronger, story for education. Using poverty and public investment data from the PRC for 1978–1997 disaggregated into coastal, central, and western regions, Fan, Zhang, and Zhang (1999) described education investment as a “win-win” strategy in that it easily maximizes overall poverty reduction and is very close to agricultural research and development in maximizing agricultural production. The level of public health expenditures does not seem to be significantly associated with declines in poverty.



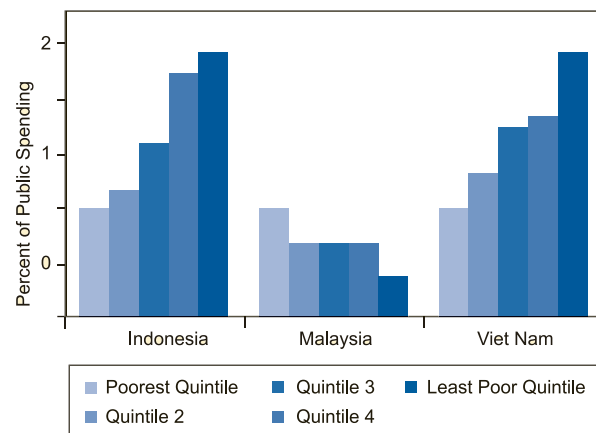
Source: World Bank (1999b).

**Figure 7.2 Proportion of Central Government Expenditures on Health in East Asian Countries, 1992-1997 (values for 1997 indicated) (percent)**



Source: World Bank (2000b).

**Figure 7.3 Proportion of Central Government Expenditures on Health, South Asian Countries, 1991-1995 (percent)**



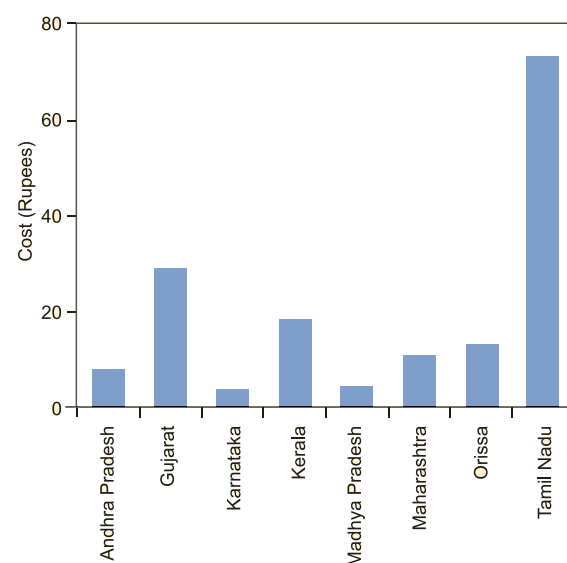
Source: World Bank (2000b).

**Figure 7.4 Distribution of Public Spending on Health, by Income Quintile**

#### *Public expenditures by region*

For nutrition, there is very little easily-accessible information on nutrition-relevant public expenditures within countries. The only credible numbers are from India (Figure 7.5), where public expenditures on nutrition vary tremendously by state, with Tamil Nadu, Gujarat, and Kerala leading the way. Why some states allocate more to nutrition than others—controlling for need—needs to be subjected to serious analysis.

There is a much longer time series of comparable poverty data in India than there is for nutrition outcomes. The existence of this long time series creates possibilities to examine factors responsible for poverty changes over time. Chapter 4 describes some of the studies that have exploited these data. Fan and Hazell (1999) used public sector expenditure data to try to explain changes in poverty rates over time. They found that investing in less favored (or marginal) areas in India may well be the best way to generate increased agricultural productivity and poverty reduction simultaneously. Using data from the 1970s through the 1990s, disaggregated down to the district level, they explored the implications of government investment in less favored (primarily rainfed) and more favored (primarily irrigated) lands. Their results are striking. They found that public investments in less favored lands may well have larger poverty reducing impact than investments in more favored lands. They speculated that this is due in part to overinvestment in the latter

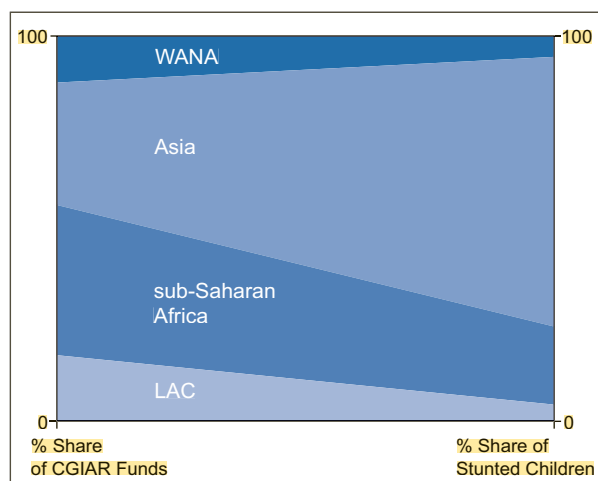


Source: Measham and Chatterjee (1999).

**Figure 7.5 Nutrition Expenditure (rupees) per Malnourished Child in Eight Indian States**

regions. This kind of work needs to be done for malnutrition in India and elsewhere in the region.

In terms of international agricultural research as a whole, the regional allocation does not match up with the regional allocation of stunting (Figure 7.6). For example, Asia contains 70 percent of the stunted children in the world, but received 32 percent of Consultative Group on International Agricultural Research (CGIAR)



Sources: CGIAR (1998), ACC/SCN-IFPRI (2000).  
 WANA = West Asia and North Africa  
 LAC = Latin America and Caribbean

**Figure 7.6 Regional Shares of Child Undernutrition and CGIAR Resource Allocation, 1995**

resources in 1995. There may be valid reasons for this mismatch. For example, the national agricultural systems might be playing a much larger role in Asia than elsewhere. Also, in larger countries such as the PRC and India, the CGIAR probably does not need to spend as much per person to influence national systems to the same extent as in smaller countries. In addition, the CGIAR's resource allocation may reflect *trends* in undernutrition (undernutrition is increasing in sub-Saharan Africa, and slowly improving in Asia). Moreover, much of the research generated in one area has spillover or positive externality effects for other regions with similar ecosystems.

Nevertheless, a review of the regional allocation of CGIAR resources with respect to malnutrition levels might identify new ways of maximizing the nutrition impact per dollar of international agricultural research spending via the agriculture-nutrition pathways identified in Chapter 4. The CGIAR began to address the nutrition potential of its agricultural research at a conference hosted by the International Rice Research Institute in October 1999, with papers published in a special issue of *Food and Nutrition Bulletin* (Bouis 2000) and a follow-up series of activities including a stakeholder analysis, led by the

International Food Policy Research Institute, of 600 individuals as to the appropriate nature of collaboration between the nutrition and agriculture communities (Levin 2000).

### PRIORITIZING PUBLIC EXPENDITURE

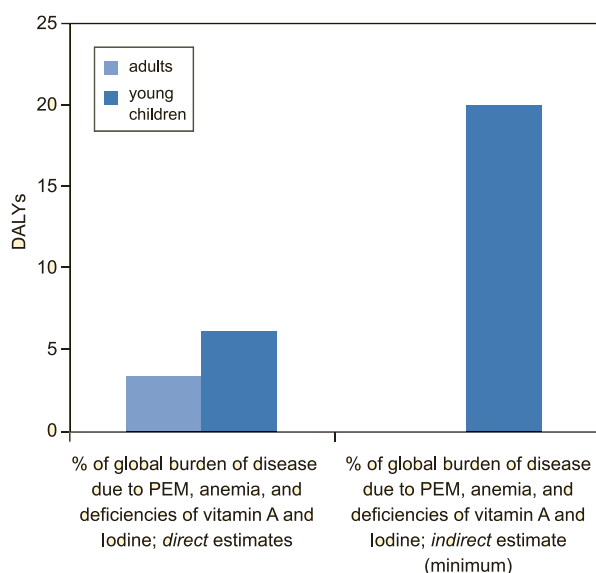
Once the case for public investment in nutrition (market failures combined with a large return to investments) has been made, one needs to know how to prioritize expenditures. Benefit-cost and cost-effectiveness estimates are essential for this purpose. Benefit-cost analysis asks whether a nutrition investment should be made in the first place or, if it exists, whether it should be expanded or contracted. A stream of benefits is calculated and discounted into a net present value. The ratio of discounted benefits to discounted costs is the benefit-cost ratio. Benefit-cost analysis is also useful for comparing interventions that have an impact on nutrition, but through very different routes (e.g., a school feeding program versus an infant growth monitoring program). In these cases money can often serve as a common denominator for different outcome measures (e.g., improving school attendance, increasing employment and improving child nutrition status).

Once a specific public investment in nutrition is justified by a sufficiently high benefit-cost ratio, cost-effectiveness analysis is used to examine alternative project design options for delivering expected impacts in the lowest cost manner. Cost-effectiveness analyses ask "how can we effect a change in outcome x at the lowest cost?" A cost-effectiveness analysis can, for example, compare three different project designs and evaluate them in terms of how much they cost to increase the weight of 1,000 target malnourished preschool children by 10 percent.<sup>1</sup>

One commonly used effectiveness measure for health interventions is the disability-adjusted life year (DALY), which combines years lost due to mortality with years lost due to morbidity and disability. Nutrition interventions as general preventive public health measures have an extensive estimated benefit in terms of reducing the burden of disease as measured by DALYs. The global

<sup>1</sup> The calculation of cost-benefit and cost-effectiveness measures is complex. For cost-benefit analyses, one has to determine what would have happened to outcome x in the absence of the intervention. Would the private sector or an NGO have stepped in to deliver the services instead? In other words, the gross change in outcome x will not be the same as the net change. One also has to decide if one is going to give a higher weight to an intervention that, for a given cost, delivers a change in x to the poor as opposed to another intervention that delivers the change in x to the nonpoor. Most estimates—including those here—do not address these important considerations.

burden of disease estimates from the 1993 *World Development Report* (World Bank 1993) attribute between 20 and 25 percent of the burden of disease in children to undernutrition (Figure 7.7). The global burden of disease



Source: World Bank (1993).

PEM = protein-energy malnutrition

**Figure 7.7 Disability Adjusted Life Years (DALYs) Due to Undernutrition: Direct and Indirect Estimates, 1990**

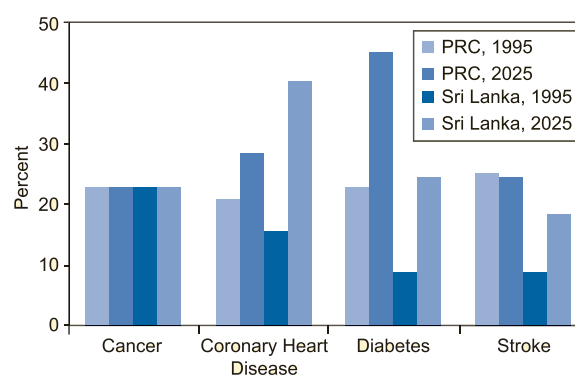
estimates from WHO attribute 15.9 percent of total global DALYs to “malnutrition.” This figure is 18 percent of total developing world DALYs, 22.4 percent of Indian DALYs, 5.3 percent of PRC DALYs, and 14.5 percent of “Other Asia and Islands” (Murray and Lopez 1996, p.312).

The definition used for “malnutrition” in both these estimates is narrow. For example, the direct impact of deficiencies in micronutrients other than iron, vitamin A, and iodine (such as calcium, zinc, and vitamin C) is not included, nor are the direct health consequences of overnutrition. Moreover, the estimates of the indirect impact of malnutrition as a contributing risk factor for illness and death were partial (restricted to children, and to protein-energy malnutrition and vitamin A deficiency) and conservative. Were these to be included they would not be perfectly additive, but one would expect them to add substantially to malnutrition’s overall contribution

of 15.9 percent. Some commentators have made informal estimates that suggest the complete contribution of malnutrition could be as high as 50 percent of the global burden of disease (World Watch 2000).

Until recently, there were no estimates of the proportion of diet-related chronic disease that can be traced back to current diets, and even more ambitiously to undernutrition in early childhood. However, Popkin, Horton, and Kim (2001) have generated such estimates for the PRC and Sri Lanka based on extensive collaboration with their in-country counterparts. Figure 7.8 shows the proportion of diet-related chronic disease that can be attributed to current diet for these two countries in 1995 and projected to 2025, ranging between 8 and 44 percent. For the PRC, the percentage attributable to diet is higher than for Sri Lanka, reflecting the more rapid growth in overweight accompanying economic growth in the PRC. For both countries, the proportion of chronic disease attributable to current diet will increase over time.<sup>2</sup>

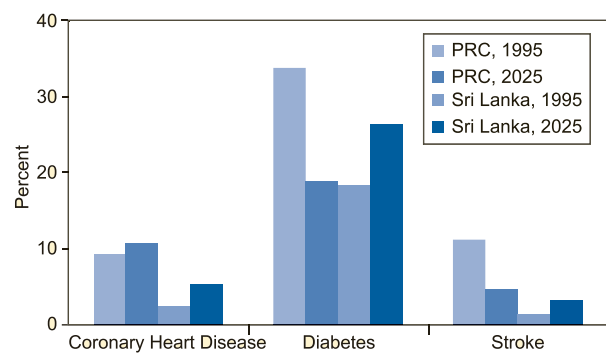
The situation is similar for the contributions of child undernutrition (Figure 7.9). In the PRC in 1995, one third of coronary heart disease, and one tenth of diabetes and stroke can be traced back to undernutrition in childhood. For Sri Lanka, the corresponding figures are 2.4 percent, 18 percent, and 1.4 percent and will increase toward 2025 if current trends continue. For the PRC, the contributions of childhood undernutrition to



Source: Popkin, Horton, and Kim (2001).

**Figure 7.8 What Proportion of Diet-related Chronic Disease can be Attributed to Current Diet? PRC and Sri Lanka, 1995 and 2025 (percent)**

<sup>2</sup> Note that the contribution of current diet to cancer remains constant across both countries and over time. This is an assumption from the World Cancer Research Foundation. Data to model cancer incidence based on diet do not yet exist (Popkin, Horton, and Kim 2001).



Source: Popkin, Horton, and Kim (2001).

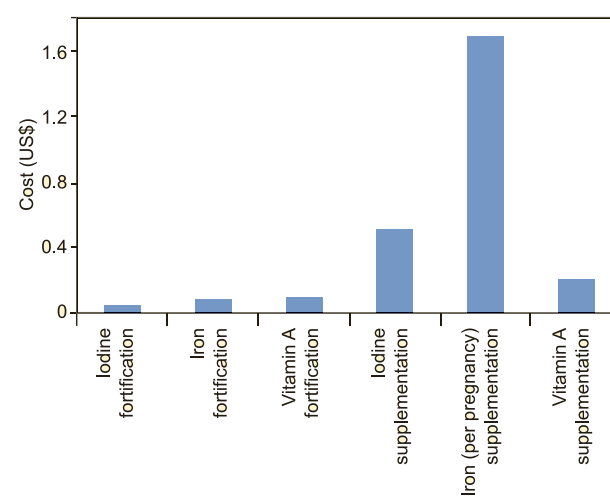
**Figure 7.9 What Proportion of Diet-related Chronic Disease can be Traced Back to Malnutrition in Childhood (Low Birth Weight and Stunting)? PRC and Sri Lanka, 1995 and 2025 (percent)**

coronary heart disease will increase over time (as overweight increases), but will decrease for diabetes and stroke (as birth weights improve).

These numbers point to a very important role for current diet and child undernutrition as contributing factors to diet-related chronic diseases. For example, in the PRC in 1990, 22.8 million DALYs out of 208.4 million from all causes were due to cardiovascular diseases. These estimates, from Popkin, Horton, and Kim (2001), suggest that current diet is responsible for 20.6 percent of the 22.8 million DALYs lost, or 2.4 percent (4.7 million) of DALYs from all causes. For Sri Lanka, the corresponding contribution of current diet to overall DALYs is 1.6 percent of DALYs lost from all causes (Murray and Lopez 1996, p. 553–559). Although undernutrition probably contributes more to DALYs than overnutrition for the whole of Asia, the contribution of overnutrition is likely to be increasing, whereas that of undernutrition is decreasing.

Determining Unit Costs of Interventions

The important first step in generating cost-benefit and cost-effectiveness calculations is to obtain the unit costs of different interventions. Figures 7.10 and 7.11 present the latest figures for nutrition programs. As the figures indicate, fortification and supplementation are clearly interventions with the lowest unit costs, ranging from US\$0.05 per person per year for iodine fortification to US\$1.70 for iron supplementation per pregnancy. Data for Latin America (Table 7.3) show how fortification unit



Source: Horton (1999).

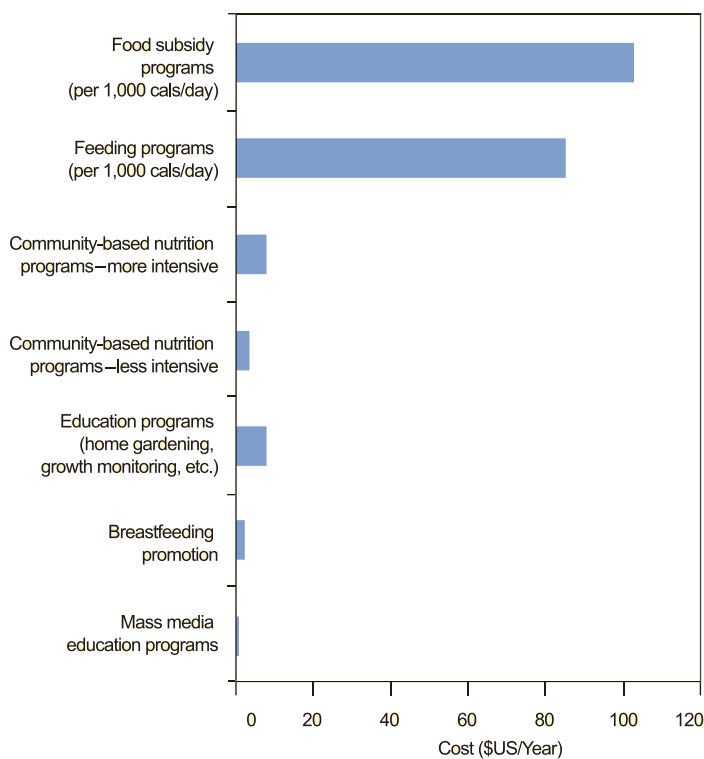
**Figure 7.10 Approximate Unit Costs of Interventions With Effects on Malnutrition (cost/beneficiary/year, US\$)**

costs vary by food and country and the extent to which they may affect the consumer price (Mannar 2000).

The unit costs of other nutrition programs are higher. As Figure 7.11 shows, mass-media programs cost around US\$1 a person per year, while community-based programs cost about US\$3–8 per person per year, depending on their intensity. Feeding programs and food subsidies from the 1980s and early 1990s (e.g., the Public Distribution System in India) are by far the most expensive nutrition interventions per capita, although similar unit cost calculations have not been undertaken for more recent targeted food-based programs such as *Progres*a in Mexico and the Food For Education program in Bangladesh, both of which are discussed in Chapter 4. However, it is misleading to rank interventions based solely on cost. Perhaps the more expensive programs are better able to reach the poor, to have a larger effect on them, and to help them reduce their future need for the intervention. To assess interventions in this light, we need to look at cost-benefit and cost-effectiveness measures.

Benefit-cost Estimates

Using the PROFILES model, Horton (1999) estimated the benefit cost ratios for hypothetical nutrition intervention programs in seven Asian countries. The hypothetical program is the same in all countries, incorporating intensive education, breastfeeding promotion, salt iodization, vitamin A mass dose, and (for



Source: Horton (1999).

**Figure 7.11 Approximate Unit Costs of Interventions with Effects on Malnutrition (cost/beneficiary/year, US\$)**

pregnant women) iron supplementation. Some countries already have salt iodization or community-level growth promotion in selected regions. No attempt is made to analyze the benefit-cost ratio for iron fortification (which would be feasible in some countries for a portion of their population). Unit costs of interventions are assumed identical in each country due to lack of data. However, unit costs are likely to be higher in the countries without preexisting primary health care systems (Bangladesh, Cambodia, parts of India, Lao PDR, Nepal, and Pakistan).

The resulting benefit-cost ratios are given in Figure 7.12. In interpreting the Figure, it is important to bear in mind that for protein-energy malnutrition (PEM) information, education, and communication efforts, and for iron supplementation, two outcomes are used to derive the estimates of benefits (productivity gains and deaths averted), but for iodine fortification only one is used (productivity losses). It is also important to note that the iron benefits exclude the cognitive benefits to infants.

The calculations suggest that nutrition interventions in these countries have high benefit-cost ratios that compare favorably to such ratios for other types of public

investment (World Bank 1993). The lowest estimate is for iron supplementation in Pakistan where women's labor force participation is very low; hence, effects on marketed output are small: this is not to suggest that iron fortification in Pakistan is not socially valuable, simply that it is not captured by market-based indicators. Iodine fortification has the highest benefit-cost ratio of all interventions in all countries except India (where the goiter figures are suspiciously low). Benefit-cost ratios for protein-energy interventions and iron supplementation tend to be correlated with prevalence of deficiencies and with women's participation in agriculture.

Benefit-cost ratios are available also for the plant-breeding strategy of increasing micronutrient density of staple food crops, as outlined in Chapter 4, but only for zinc in wheat grown in Turkey. There are no other credible estimates for the agronomic impact of the high-loading zinc variety (Bouis 1999). Preliminary benefit-cost analyses (Table 7.4) generate ratios that range from 0.7 to 47.3 under a set of conservative assumptions.

Estimates of benefit-cost ratios are very sensitive to the discount rate used. In the World Bank's Nutrition Toolkit (Phillips and Sanghvi 1996), there is an example by Pinstrip-Andersen, Burger, and Habicht (1993) for the Philippines that gives a benefit-cost ratio of 16.6 for an intervention that costs US\$10 per person and leads to a 1-centimeter increase in the adult height of manual workers in the rural Philippines. However, a discount rate of 3 percent was used, together with an assumption that the annual increase in real wages was 2 percent. This is a very low real discount rate. Figure 7.13 traces the benefit-cost ratio for different real discount rates. For the real discount rate of 9 percent used in the PRC and Sri Lanka examples in Chapter 2 (12 percent minus 3 percent annual increase in real wages), the benefit-cost ratio for the Philippine example would be 1.5 (15/10). For a real discount rate of 3 percent the ratio would be 8.4, which is in agreement with the estimates in Figure 7.12. In general, the 3 percent discount rate is the appropriate rate to use for social sector and environmental sector investments, and is the rate used by the World Bank. If such a rate had been used in the PRC and Sri Lanka benefit-cost estimates presented in Chapter 2, the ratios would have been even higher.

**Table 7.3 Comparative Cost of Several Food Fortification Programs in Latin America and the Caribbean**

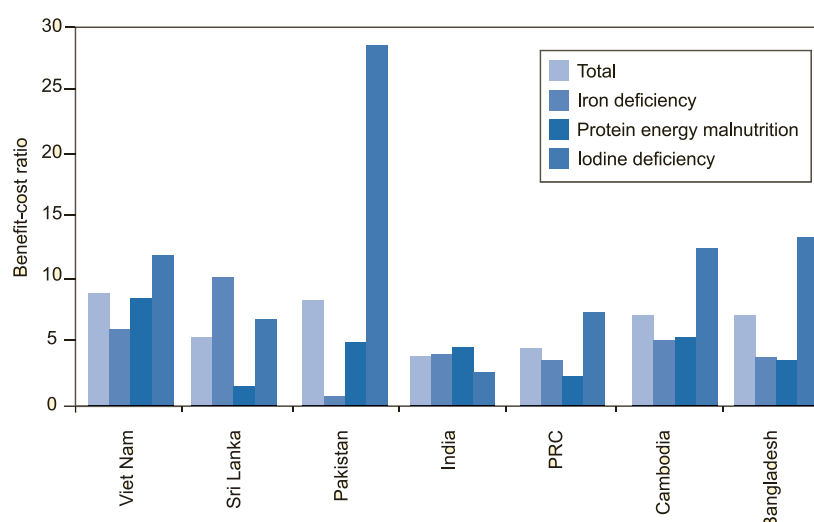
Food Vehicle/Micronutrients	Country	US\$ per Person per Year	% of Consumer Price
Salt with Iodine and Fluoride	Costa Rica	0.100	9.0
Breakfast Meal with Multivitamins	Peru	1.750	2.3
Sugar with Vitamin A	Universal, Central America	0.370	2.0
Salt with Iodine	Guatemala	0.015	1.0
Pre-cooked Corn Flour with Iron and Vitamins	Venezuela	0.120	0.4

Source: Mannar (2000).

Note: The costs indicated are only approximate and indicate order-of-magnitude figures for actual processing and chemical cost at the source only. They exclude program management and product promotion/marketing and monitoring costs. In most cases, this additional cost is between 5 and 10 percent of the micronutrient cost.

### Cost Effectiveness

The nutrition interventions profiled in Figure 7.12 also appear to be very cost effective as public health interventions. Costs per death averted by breastfeeding promotion and by information, education, and communication efforts related to protein-energy malnutrition are estimated at US\$100–300 in the poorest countries (Bangladesh, Cambodia, India, Viet Nam) and are also in the same range in Pakistan, which has surprisingly high levels of malnutrition given its higher per capita income (Figure 7.14). Estimated costs per death averted for vitamin A mass dose are in the same range for all countries except Sri Lanka, which has by far the lowest infant mortality rate in this group of countries. The estimated costs per death averted for iron supplementation are markedly higher than for other interventions, because maternal death rates are lower than infant mortality rates (but note that iron supplementation also has effects on productivity). Across all the countries, costs per death averted are inversely related to levels of mortality.



Source: Horton (1999).

Note: A 3% real discount rate was used for the protein energy malnutrition and iodine interventions. The iron intervention is not contingent on the selection of a discount rate because it captures the immediate work effects on adults.

**Figure 7.12 Benefit-cost Ratios for Nutrition Investments**

The results again suggest that nutrition interventions in low-income Asia are a high priority in terms of high benefit-cost ratios, and low costs per death averted. If program costs are identical across countries, then the countries where interventions are highest priority are those with highest current death rates and prevalence of nutritional deficiency (Bangladesh, Cambodia, and Viet Nam, the poorest countries, and Pakistan, which has

**Table 7.4 Benefit-cost Ratios for the Development and Release of Zinc-dense Wheat Cultivars in Turkey**

Assumptions Regarding Central Research Costs	Assumptions Regarding Magnitude of Benefits	Benefit-cost Ratio	
		Benefits Applied in Years 11–20	Benefits Applied in Years 16–25 with 5 Additional Years of Research Costs in Turkey
All Central Research Costs Borne by Turkey	(A) Agronomic (yield increment and seed savings) + human nutrition benefits	20.9	7.8
	(B) Half yield increment and half the seed savings in (A)	11.5	4.3
	(C) Human nutrition benefits only	2.0	0.7
One-Tenth of Central Research Costs Borne by Turkey	(A) Agronomic (yield increment and seed savings) + human nutrition benefits	47.3	14.6
	(B) Half yield increment and half the seed savings in (A)	25.9	8.0
	(C) Human nutrition benefits only	4.5	1.4

Source: Bouis (1999).

Notes: Bioavailability is assumed constant; 50 percent of zinc is assumed to be derived from traditional wheat in diet. Human nutrition benefits are assumed to be \$1/person/year (compared to the range of \$3–9/person/year from the combination of more direct and hence more effective undernutrition interventions in Horton 1999, such as fortification). A very conservative real discount rate of 12 percent is used.

surprisingly poor human resource indicators given its level of income). India is also a country of high priority, although the prevalence figures for micronutrient deficiencies appear to be underestimates. If costs of nutrition intervention are lower in countries with better primary health care systems, this would tend to improve the benefit-cost and cost-effectiveness ranking of PRC, Sri Lanka, and Viet Nam. However, good data on the variation of program costs across countries do not exist.

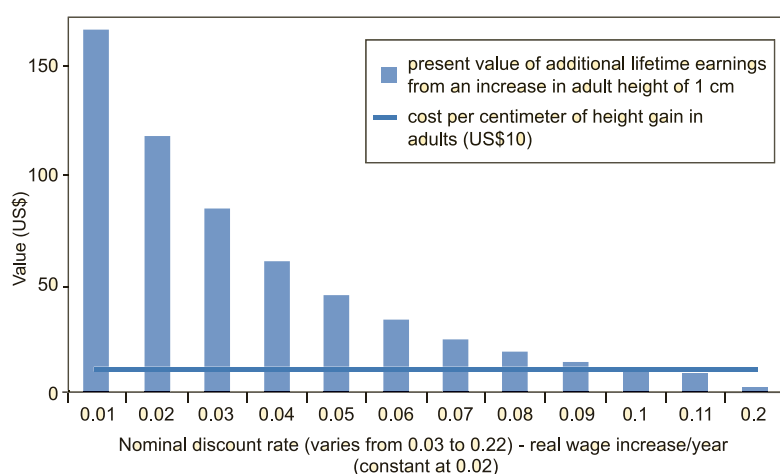
Current best estimates for the cost effectiveness of fortification programs (Table 7.5) confirm the above findings from Horton (1999). The cost per death averted (or life saved) via vitamin A supplementation is similar (US\$200–400) for the two sets of estimates. Note also that fortification outperforms supplementation for iodine and iron deficiency, but not for vitamin A deficiency. The reason is that supplementation is about 10 times more costly than fortification, and hence is most appropriate when the target group is less than 10 percent of the population (such as the under-twos who are the target for vitamin A supplements). Supplementation is also the intervention of choice for population groups that cannot be reached by fortification.

In practice, the analysis of the cost effectiveness of nutrition interventions is not as straightforward as portrayed here. Context is important. The nature of the problem, the ability to target and minimize leakage, the level of capacity to implement the intervention, and the bundling together of interventions in the field make it very difficult to make generic statements about the cost effectiveness of different types of intervention. All of these factors need to be taken into account more fully in future cost-effectiveness estimates.

#### **FILLING THE RESOURCE GAPS: WHAT IS NEEDED?**

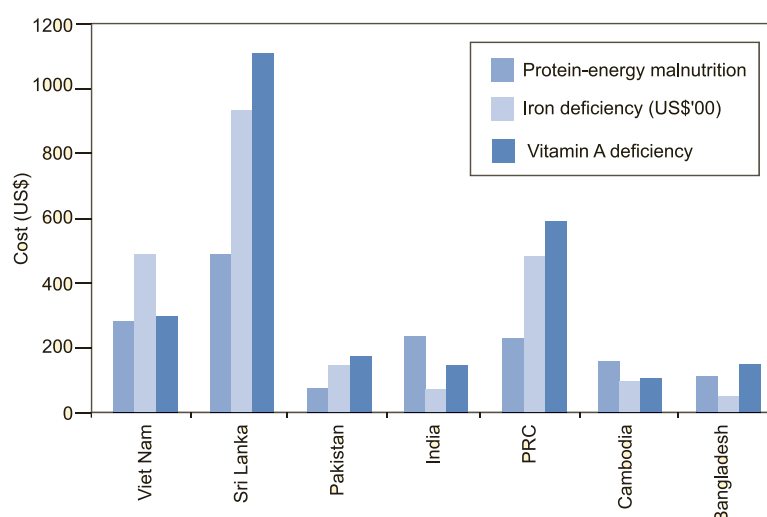
What increases in public expenditures are needed to cover the unmet nutrition needs within the region?

A method for generating such an estimate for child undernutrition for eight countries in the region is given here (Table 7.6), based on data from Mason et al. (1999) and the *World Development Indicators* of 1999 (World Bank 1999a). As a proportion of government expenditures on health, the increased expenditures to cover unmet child nutrition needs are modest, ranging from less than 0.2



Source: Adapted from Pinstrup-Andersen et al. (1993).

**Figure 7.13 Sensitivity of Present Value of Additional Lifetime Earnings from Improved Adult Height to Different Real Discount Rates: Rural Philippines**



Source: Horton (1999).

**Figure 7.14 Cost Per Death Averted for Nutrition Investments (US\$)**

percent for the PRC to 4 percent for India (from a low base). These numbers assume perfect targeting, but even with realistic leakage rates of 50 percent the numbers would range from 0.4 to 8 percent. Is this a large reallocation within the national political context? It is difficult to say in the absence of a political economy assessment on a country-by-country basis, but as will be shown later in this chapter, the technocratic potential for reallocating resources within the health sector and from other sectors with similar stated goals is considerable.

The estimates in Table 7.6 are based on an expansion of community-based interventions funded at levels thought necessary for them to be effective (US\$5/person/year, with the costs being incurred by central and local governments; communities also bear costs due to their use of voluntary labor, but these are not included in the estimates). The countries themselves have also estimated the costs of filling unmet child nutrition needs (Table 7.7). These are estimates (from the country teams established under the Asian Development Bank-United Nations Children's Fund regional technical assistance grant, RETA 5671) of the costs of a 10-year program to combat child undernutrition. The estimated annual budgets range between US\$0.40 and \$11.00 of additional expenditures per child. Some of these estimates seem low in comparison with data from Thailand, which suggests a rule of thumb that an additional expenditure per child per year of US\$5–15 might be expected to lead to an additional 1–2 percent per year reduction in underweight prevalence (Mason et al. 1999).

### Reallocating Existing Resources

Are there existing indirect expenditures on nutrition that can be reallocated? Some existing interventions and projects are not well designed or efficient at reaching their goals, and some effort to assess outcomes and redesign interventions is desirable. Food distribution and food subsidy programs within the region generally have

large leakages to the nonpoor (Table 7.8) primarily due to important political economy goals (for example, to generate support among the nonpoor in general). This is no different from other regions. However, even within tight political constraints these interventions can be streamlined as recent experiences in Egypt show (Ahmed et al. 2000).

Moreover, within countries there is considerable variation among the panoply of food interventions in terms of the efficiency with which resources are transferred to

**Table 7.5 Costs and Effects of Micronutrient Interventions**

Deficiency	Cost/ Beneficiary/Year (US\$)	Cost/Life Saved (US\$)
Iron Deficiency:	1.70 (per pregnancy)	
Supplementation of pregnant women	0.09	800
Fortification		2,000
Iodine Deficiency:	0.50	
Supplementation (reproductive age only)	0.50	1,250
Supplementation (all)	0.05	4,650
Fortification		1,000
Vitamin A Deficiency:	0.20	
Supplementation for under-fives	0.05-0.15	325
Fortification	5.0	1,000
Nutrition education		238

Source: Mannar (2000).

**Table 7.6 Approximate Costs of Covering Unmet Child Undernutrition Needs in the Region\***

Country	Number of Preschool Children (million)	Latest Estimates of % Preschool Children with Low Weight for Age	Number of Preschool Children with Low Weight for Age (million)	Total Population in 1998 (million)	Public Sector Health Expenditures / Year/Capita (US\$, PPP 1997)	Cost of Unmet Nutrition Needs as % of Public Sector Health Expenditures
Bangladesh	16.4	56.3	9.233	127	12	3.03
India	117.4	53.4	62.692	983	8	3.99
Pakistan	20.5	38.2	7.831	135	10	2.90
Viet Nam	8.25	39.8	3.284	76	13	1.66
Sri Lanka	1.7	37.7	0.641	19	28	0.60
Philippines	10.5	29.6	3.108	78	36	0.55
PRC	97.3	17.4	16.930	1237	50	0.14

\* Assuming a US\$5 per head per year unit cost (in line with estimates of community-based nutrition programs, as in Figure 7.10).  
PPP = purchasing power parity

Sources: Mason et al. (1999) and World Bank (1999a).

the poor. Some examples are given here for Bangladesh (Table 7.9; see also Workfare Programs, Chapter 4).

The Public Distribution System (PDS) for food in India (US\$1.4 billion or US\$9 per child in 1994–1995, according to the ADB India country study) exhibits a clear need for improved targeting and integration with other services that promote nutrition status (Figure 7.15). The Integrated Child Development Services program (which itself could be much more efficient in

addressing child undernutrition, for example, by improving targeting to under-twos) delivers R1.0 to intended beneficiaries at a cost of R1.8, while the PDS costs R5.4 to do the same.

The estimates in Table 7.7 suggest that a reallocation of one fifth of the annual PDS budget toward child undernutrition interventions would almost halve child underweight prevalence in India (this, of course, does not take into account the negative impact

**Table 7.7 Estimated Costs and Benefits of Proposed Programs from Recent Investment Plans to Reduce Child Undernutrition**

Country	Estimated Annual Budget Based on 10-year Plan (Except Sri Lanka: 5-year plan) (US\$ million)	Estimated Annual Budget (US\$/child/year)	Reduction in Child Undernutrition Expected from Program Expenditure
Bangladesh	89.2	5	65% underweight prevalence reduced to 50% in 10 years or a 1.5% reduction per year
Cambodia	9	6	50% reduction in prevalence rates of underweight and stunting over 10 years
India	1,580	11	25% reduction in prevalence over 10 years
Pakistan	51	2	50% reduction in prevalence of underweight and stunting over 10 years
Sri Lanka	9	3	30% reduction in underweight prevalence over 10 years
Viet Nam	5	0.4	50% reduction in prevalence rates of underweight and stunting over 10 years

Source: Mason et al. (1999).

of withdrawing one fifth of PDS expenditures on child malnutrition, but this impact is not thought to be large). If the above estimates were revised to include leakage to the nonneedy, the differences would likely be larger and the case for reallocation even stronger. For example, in the Philippines, the National Food Authority's consumer rice subsidy costs P1 to administer for every P1 of subsidy transferred to the general public, or P2 for P1 transferred (Heaver and Hunt 1995). At a national poverty rate of 37.5 percent (World Bank 1999c), this translates into a cost of P5.3 to transfer P1.0 to the poor.

Political and administrative issues frequently frustrate program reforms that make sense at the purely technical level. Existing programs support groups that have either heavily invested in the design of the current program, or are deriving "rents" from their unique access to the program's resources. Often, it is more straightforward politically to gradually reduce funding to existing programs, pilot-test new programs out of new sources of funds, and gradually expand the pilots that appear to be effective and popular.

An alternative to such overt reallocation of resources between sectors would be to combine nutrition interventions with other social programs. This is being

successfully done in Latin America (e.g., *Progres* in Mexico, which is to be expanded under the new President; see Income Transfer Programs, Chapter 4). The technical case for doing this is strong. As indicated in Chapter 1 and elsewhere in this report, improved nutrition at an early age substantially enhances the use of resources in the pursuit of other social goals such as improved educational achievement. More attention needs to be given to this type of intervention in the region.

If the political economy of intersectoral resource reallocation makes it impractical to increase the resources available to nutrition efforts, what are the possibilities for intrasectoral reallocation? Data presented in the first section of this chapter indicate that there is certainly scope for improving the distribution of health resources toward the poor. But as Chapter 6 points out, resources are not sufficient. The translation of resources into improved health requires a health system imbued with the capacity to make resources count.

Some data on the efficiency of the region's health systems and on the proportion of central government expenditures to health are presented in Figure 7.16. There is a wide variation in the efficiency of health systems that does not seem to be correlated with level of health

**Table 7.8 International Comparison of Leakage from Food Subsidy Programs**

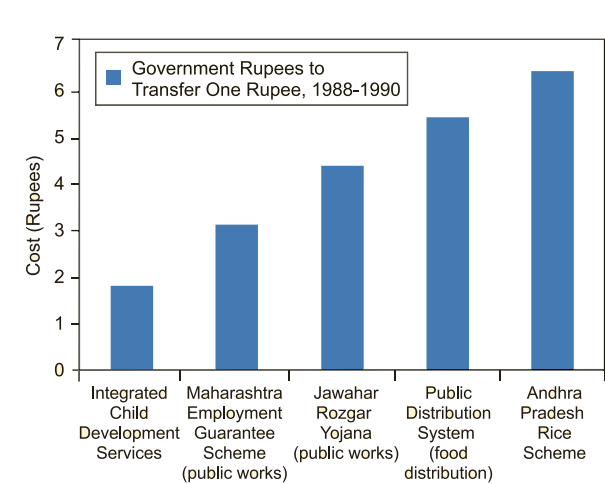
Type of Program	Country	Leakage to Non-needy
Untargeted Food Rations (i.e., ration shops)	India Pakistan	High (50–60%)
Ration Shops Targeted Geographically	India	Low (5–10%)
Self-targeting Food Rations	Bangladesh (sorghum) Pakistan	Low (10–20%)
Food Stamps Targeted by Income	Sri Lanka (post-1979)	Low-moderate (10–30%)
Supplementation Schemes On-site or Take-home, Preschooler Plus Mother	India Indonesia	Moderate (30–60%)
Supplementation Schemes On-site, Targeting Most Vulnerable Group	India	Low (3–10%)
Food-for-work Programs	Bangladesh India Indonesia	Low-moderate (~35%)
Targeted Food-for-Education Program (free ration for school enrollment of children)	Bangladesh	Low (7%)
Targeted Vulnerable Group Development Program (free ration for training of destitute women)	Bangladesh	Low (8–14%)

Source: Ahmed and Bouis (1998).

**Table 7.9 Efficiency of Food Programs in Bangladesh**

Food Intervention	Leakage to Nonpoor (% of total transfer)	Taka Cost per Taka Transferred to Recipients
<b>Rural Rationing</b> (rice subsidy targeted to poor in rural areas, 1990–1992)	70	6.55
<b>Vulnerable Group Development Program</b> (free wheat ration to destitute women, since 1975)	14	1.68
<b>Food for Work (CARE)</b> (cash and wheat wages to self-selected rural workers, since 1975)	36	2.81
<b>Food for Work (World Food Programme)</b> (cash and wheat wages to self-selected rural workers, since 1975)	28	2.06
<b>Food-for-education Program</b> (wheat transfers to poor families that send their children to school, since 1994)	7	1.59

Source: Adapted from Ahmed (2000).

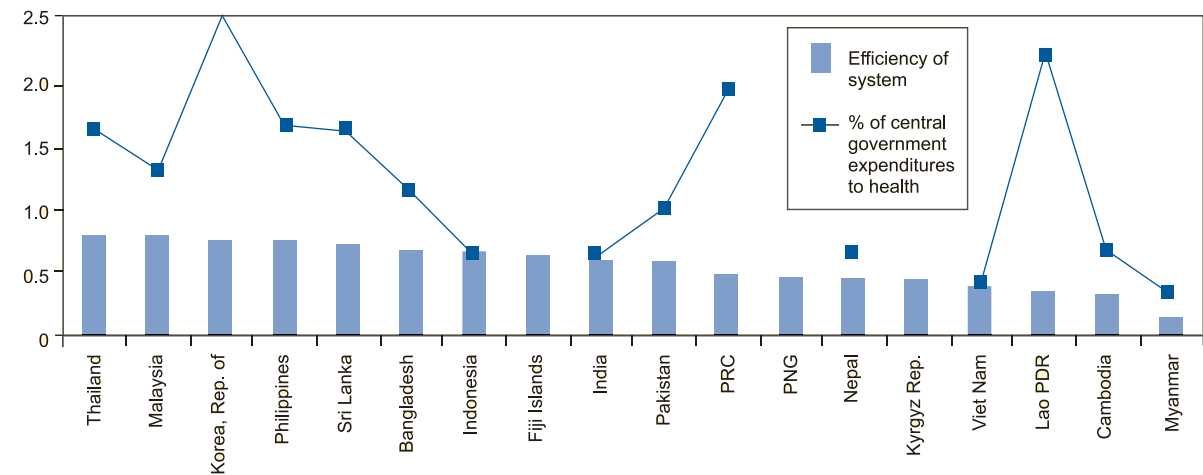


Source: Radhakrishna et al. (1997).

Figure 7.15 Efficiency of Delivering Resources of Various Programs in India, 1988-1990

Does the level at which government resources are spent matter? Chapter 5 shows that the share of subnational government expenditure as a proportion of the total is increasing in all countries in the region for which there are data over time, with the exception of Malaysia. Based on the arguments in Chapter 5, one can certainly make the case that increased decentralization is, overall, beneficial for poverty and malnutrition reduction. Studies are needed to confirm that this is true, and under what conditions (adequate capacity at the local level).

What about cost sharing at the community level? Again, the evidence is very thin as to what has been achieved and what potential there is for expansion. Among the 101 South African public works projects cited in Chapter 5 (Table 5.8), those that had the most community participation were the most successful in leveraging community resources, but only to the point



Source: WHO (2000).  
Note: The efficiency index is 1.0 when current health expenditures maximize the disability adjusted life expectancy.

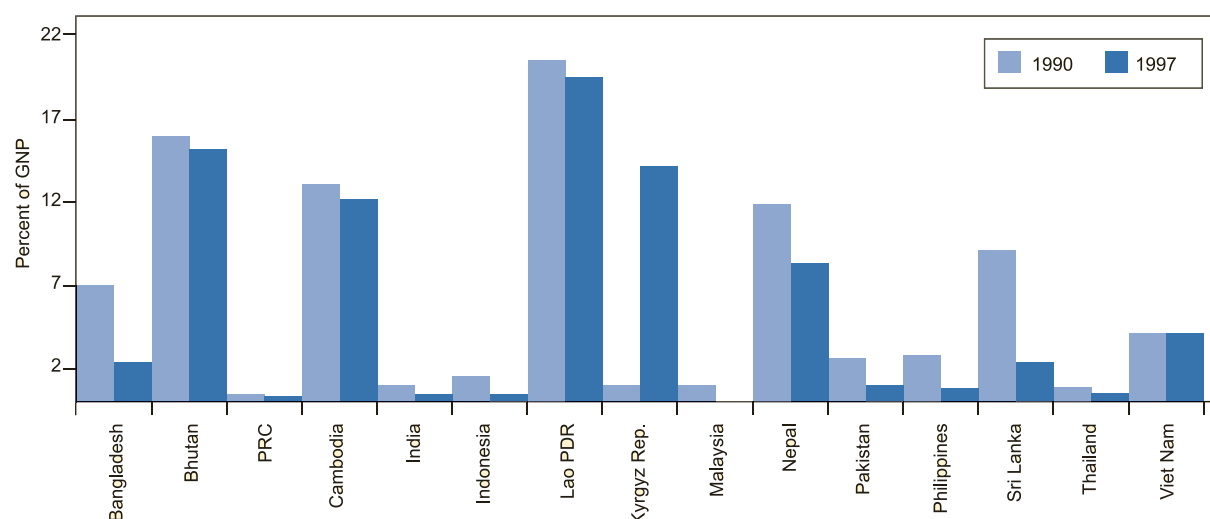
Figure 7.16 Efficiency of Health Systems in the Region and the Proportion of Central Government Expenditure on Health, 1999 (percent)

expenditures. For example, the PRC has a strong commitment to health, but the impact of that expenditure could be greater; in Bangladesh, the allocation by the central government to health is about average for the region, but the efficiency of allocation of that expenditure is relatively high. This reinforces the need to strengthen the capacity of the public sector to deliver scarce resources to malnourished people. Again, more research is needed on the political economy of intrasectoral allocation.

where 12 percent of the costs were covered from these sources. Nevertheless these projects tended to be the most successful in generating employment for a given cost (Hoddinott et al. 2000).

External Funding Sources

A large component of most health expenditure comes from private sources of funds (see Figure 7.1). Public



Source: World Bank (1999a).

**Figure 7.17 Aid as a Percentage of GNP in Selected Asian Countries, 1990 and 1997**

funds come from taxes and foreign aid. The countries of the region are dependent on foreign aid to varying degrees and this dependency is declining (Figure 7.17). Only in the Kyrgyz Republic did foreign aid increase as a proportion of GNP between 1990 and 1997.

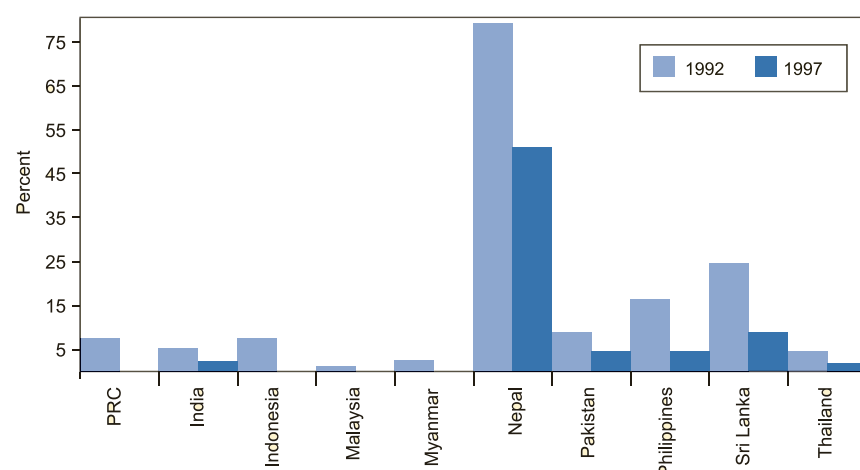
The poorest countries in the region — Bangladesh, Bhutan, Cambodia, Kyrgyz Republic, Lao PDR, Nepal, Sri Lanka, and Viet Nam—are the most aid-dependent. In terms of its contribution to central government expenditure (Figure 7.18), aid is crucial for Nepal, being equivalent to 51 percent of such expenditures in 1997. Sri Lanka (8.9 percent), Pakistan (4.5 percent), and Philippines (4.4 percent) are the next most dependent in these terms (note that figures are not available for Bangladesh, Bhutan, Cambodia, and Lao PDR, but would be expected to be high).

The principles of cost-benefit analysis and cost-effectiveness analysis apply to all sources of funds—whether public or private, domestic or foreign. There is one component of foreign aid that one

might expect to have a larger effect on nutrition than other forms, and that is food aid.

### Food Aid

Many view food aid as a simultaneous solution to developed country overproduction of food (due to price and income support to the farm lobby) and developing country food deficits. Flows of food aid, of which there



Source: World Bank (1999a).

**Figure 7.18 Aid as a Percentage of Central Government Expenditures in Selected Asian Countries, 1992 and 1997**

are three types—program, emergency, and project—can be sizable for some countries.

*Program food aid* is usually supplied as a resource transfer for balance-of-payments or/and budgetary support objectives. It is provided as a grant or a loan on a bilateral basis. Unlike food aid provided for project or relief purposes, it is not targeted to specific beneficiary groups but sold on the market of the recipient country. Asia received 1.9 million tons, or 26 percent of the deliveries of program food aid in 1999. The main recipients of the program food aid were Bangladesh, Pakistan, and Russia, which together received 73 percent of the 1999 program food aid.

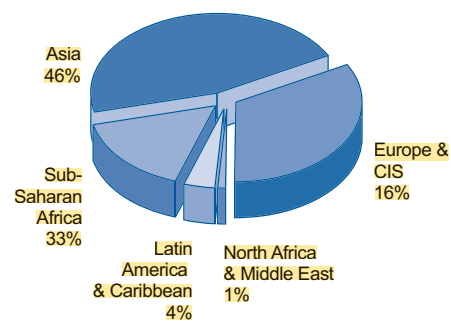
*Emergency food aid* is targeted, and freely distributed, to victims of natural or man-made disasters. In 1999, 45 percent of the 4.7 million tons of the worldwide emergency food aid went to Asia. Compared with 1998, emergency food aid deliveries increased in all regions. The major recipients of emergency food aid in 1999 were Ethiopia, Indonesia, and the Democratic People's Republic of Korea, which together received 36 percent of the total emergency food aid.

*Project food aid* is distributed to targeted beneficiary groups to support specific development and disaster prevention objectives. It is always supplied on a grant basis. Sub-Saharan Africa was the main recipient of project food aid in 1999. The region received about 0.96 million tons, 40 percent of the 2.4 million tons delivered as project food aid worldwide. Asia, traditionally the major recipient of project food aid, received 0.86 million tons, 35 percent of the 1999 total. The major recipients of the project food aid were Ethiopia, India, and Bangladesh, which together received 45 percent of the project food aid delivered worldwide (World Food Programme at [www.wfp.org](http://www.wfp.org)).

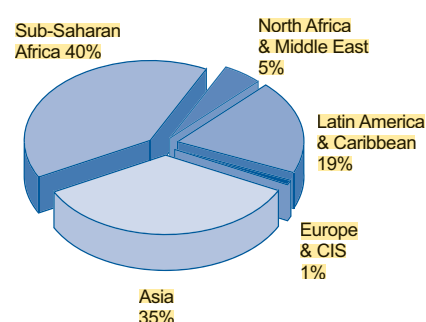
Regional food aid resource flows in 1999 are given in Figure 7.19 and flows in a number of Asian countries over the last four years are given in Figure 7.20. The largest recipients in the region have been Bangladesh, the Democratic People's Republic of Korea, India, and recently Indonesia.

Food aid has generated much controversy as a source of aid. Perhaps the main concern is that food aid undermines domestic food markets and more generally domestic development efforts (negative externalities). Food aid also offers some potential positive externalities by virtue of the fact that the resource is food. For targeted food aid distribution programs in Bangladesh, research has shown that higher marginal propensities to consume

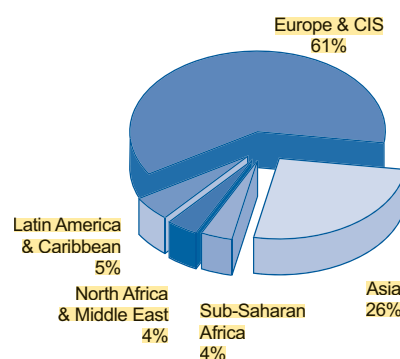
**Emergency Food Aid**



**Project Food Aid**



**Program Food Aid**

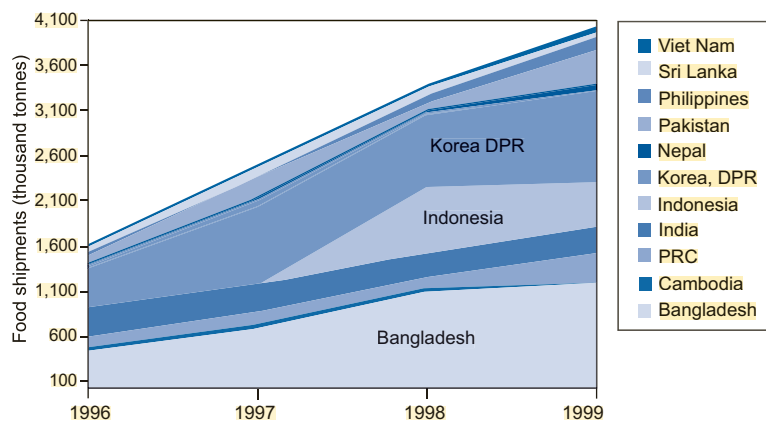


Source: World Food Programme ([www.wfp.org](http://www.wfp.org)).

**Figure 7.19 Food Aid Flows in 1999 by Type**

food are generated by food transfers than by equivalent transfers of cash (Del Ninno and Roy 2000).

In general, Bangladesh has been innovative in finding ways to use food aid so that it (1) does not distort domestic food markets, (2) is targeted to vulnerable groups, and (3) is used in such a way as to develop human capital. One of these programs, Food for Education, is described in Chapter 4. These programs channel wheat, which is a product with a low-income elasticity that reduces leakage



Source: World Food Programme ([www.wfp.org](http://www.wfp.org)).

**Figure 7.20 Global Food Aid Shipments by Asian Country by Year (thousand tonnes)**

to the nonpoor and is not domestically produced at high levels. In addition, there are quite specific targeting mechanisms at the district, village, and even household levels for reaching the poor and vulnerable. Finally, receipt of food aid is often tied to some kind of human capital development such as a certain level of attendance at school.

Food aid is probably not the most efficient way of transferring resources from rich to poor countries. Food

is costly to ship, it can distort domestic food markets, and it is not always culturally or nutritionally appropriate to local consumers. Attempts to replace food aid with other types of aid could well result in a diminution of the overall size of aid, but could result in an improvement in the poverty-reducing impact of the aid that is provided if spent appropriately (e.g., on developing biotechnology for crops on which poor consumers rely). But food aid has the support of developed country producers as it generates an outlet for the overproduction that is a consequence of developed country support for domestic agriculture.

Food aid will probably remain a second-best resource for years to come, but a greater effort must be made to make it more effective. For example, the impact of food aid—in all its modalities—on food security and nutrition is poorly understood due to the lack of attention to monitoring and evaluation (Clay, Pillai, and Benson 1998). More work needs to be done to find ways in which food aid, particularly project food aid, can be used to promote future resilience to shocks, future income streams, and improved nutrition status.



## 8. Conclusions and Recommendations

### THE SCALE AND NATURE OF THE MALNUTRITION PROBLEM

**B**oth under- and overnutrition and micronutrient deficiencies occur in Asia. Undernutrition, characterized by low birth weight, stunting, and wasting during early childhood, and vitamin and mineral deficiencies throughout the life cycle, is found in all countries, but particularly in South Asia: Bangladesh, India, Nepal, and Pakistan. Malnutrition in mothers is passed on to their children in a vicious cycle of undernutrition.

The undernutrition numbers are shocking (Table 8.1). One in five babies from the South and Central Asian subregions has low birth weight at term. For the Asia and Pacific region as a whole, about 4 in 10 infants are stunted. In this region, apart from the PRC, about 7 in 10 preschoolers and almost 8 in 10 pregnant women are anemic. More than one third of the Asian population is iodine deficient, with a similar proportion being deficient in Vitamin A.

Overnutrition is also found in all countries, but mostly in upper-low-income and middle-income countries such as PRC, Indonesia, Philippines, Sri Lanka, and Thailand. Overnutrition is characterized by diets that are poorly balanced, high levels of

overweight in children and adults, low levels of exercise, and high levels of diet-related chronic diseases such as coronary heart disease, diabetes, and hypertension. In PRC, Indonesia, and Philippines, about 3 in 10 individuals are overweight. In Malaysia and the Kyrgyz Republic, this ratio is a little higher, 1 in 3.

In most countries, both phenomena exist, sometimes in the same household (e.g., PRC, Indonesia, and Kyrgyz Republic). In Indonesia, almost 1 in 10 households has both underweight and overweight members. The strong emerging evidence that fetal and infant undernutrition paves the way for overnutrition later in life only strengthens the argument for intervening positively as early in the life cycle as possible.

The human costs of malnutrition are high: death, illness, mental impairment, pain, and humiliation. Some estimates, as noted in Chapter 7, suggest that malnutrition contributes to half the global burden of disease. The economic costs are also high via reduced educability (including cognitive underdevelopment, later entry into school, and a lower ability to learn in school) and a reduced capacity to do physical work. Conservative estimates of foregone GDP are in the range of 5 to 10 percent.

**Table 8.1 A Profile of Malnutrition in the Region**

Grouping 1	Eastern Asia	South Central Asia	South-Eastern Asia	Source
(UN Population Groupings)	PRC; Korea, Rep. of; Macau, PRC; Mongolia; Korea, DPR of	Afghanistan, Bangladesh, Bhutan, India, Iran, Kazakhstan, Kyrgyz Rep., Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, Uzbekistan	Brunei Darussalam, Cambodia, East Timor, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam	ACC/SCN-IFPRI (2000, p.83)
Low Weight at Birth (full term)	1.9	20.9	5.6	ACC/SCN-IFPRI (2000, p.4)
(% IUGR-LBW)	31.4	43.7	32.8	ACC/SCN-IFPRI (2000, p.8)
Stunted Preschoolers (% stunted in 2000)	(only PRC in 1992)			
Wasted Preschoolers (% wasted in 1995)	3.4	15.4	10.4	ACC/SCN-IFPRI (2000, p.11)
Overweight Preschoolers (% >2 SD WH )	4.3	2.1	2.4	ACC/SCN-IFPRI (2000, p. 102)
Grouping 2	Western Pacific		South-Eastern Asia	Source
(WHO Groupings)	Cambodia, PRC, Fiji Islands, Lao PDR, Malaysia, Mongolia, Papua New Guinea, Philippines, Viet Nam		Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand (Pakistan classified as in E. Mediterranean)	ACC/SCN-IFPRI (2000, p.103)
Anemic Preschoolers (%)	~21		~65	ACC/SCN-IFPRI (2000, p.25)
Anemic Pregnant Women (%)	~41		~78	ACC/SCN-IFPRI (2000, p.26)
Iodine Deficiency Disorder (% population at risk)	31		41	ACC/SCN-IFPRI (2000, p.28)
Total Goiter Rate (%)	8		12 (44 for Nepal)	ACC/SCN-IFPRI (2000, p.28)
Subclinical Vitamin A Deficiency (% of preschoolers)	PRC	18	50 (Pakistan)	ACC/SCN-IFPRI (2000) as cited in Allen and Gillespie (2001)
Overweight (% of population BMI > 25)	Philippines	10		
	PRC	~12.5	Indonesia	~14
	Malaysia	~27	Kyrgyz Rep.	~34
	Philippines	~14	(classified as in Europe)	
	Viet Nam	~1.75		Popkin, Horton, and Kim (2001)

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**Table 8.1 (Cont.)****Table 3.1  
(Cont.)**

Grouping 3	Middle Income	Upper Low Income	Lower Low Income	Small Islands	Source
(Popkin, Horton, and Kim 2001 Groupings)	Malaysia, Philippines, Thailand	PRC, Indonesia, Sri Lanka	Bangladesh, Bhutan, Cambodia, India, Kyrgyz Rep., Lao PDR, Mongolia, Nepal, Pakistan, Papua New Guinea, Viet Nam		
Trends in National Food Supply					Popkin, Horton, and Kim (2001)
Cereals	Static	Static	Up	Down	
Animal Fat	Up	Up	Up	Up	
Vegetable Oils	Up	Up	Up	Up	
Dairy	Strong growth	Up	Up	Static	
Added Sweeteners	Strong growth	Slow growth	Slow growth	Static	
Vegetables and Fruits	Static	Strong growth	Slow growth	Down	

Note: BMI = body mass index; IUGR = intrauterine growth retardation (or approximately low birth weight at term); LBW = low birth weight at or before term; SD = standard deviation; WH = weight for height.

### DIRECT ACTION TO REDUCE MALNUTRITION

Much is known about how to combat the different forms of malnutrition found in the region. Efficacy trials tell us what can work under controlled conditions, and effectiveness trials tell us what works under real-life conditions. The interventions, when they work, produce benefit-cost ratios (at a 12 percent discount rate) that are competitive with other investments: in the range of 4 to 8. When discounted at the more appropriate social sector rate of 3 percent, the benefit-cost ratios are much higher. The rationale for public investment in overcoming malnutrition is strong: various market failures make it impossible for the market to deliver the necessary inputs to overcome malnutrition, especially for the poor. The human rationale for investing in nutrition is equally compelling: food and nutrition are recognized as fundamental rights in the United Nation's Universal Declaration of Human Rights.

Why then, does malnutrition persist in the region? One major reason is that not enough resources are put into the interventions that we know will work to reduce malnutrition (Table 8.2). Community-based nutrition interventions that stress behavior change in the areas of infant feeding, hygiene, and other forms of care provision to children and their mothers are known to work. Micronutrient programs such as fortification and supplementation also have been shown to be cost effective.

The menu of effective direct action is clear. For children, this includes growth promotion (comprising growth monitoring, protection and promotion of breastfeeding, and the promotion of appropriate complementary feeding practices); disease management including feeding during and after diarrhea and oral rehydration therapy; micronutrient supplementation including vitamin A megadoses for children from age 6 months, and possibly iron supplements where anemia is prevalent; the promotion of consumption of iodized salt; deworming; and

**Table 8.2 Direct and Indirect Actions to Reduce Malnutrition**

Objective	Direct Intervention	Indirect Actions
Improving Pregnancy Outcome	<p>Target supplements to undernourished women; preconception weight &lt;40–45 kg, or low attained weight during pregnancy; low body mass index or height are less useful indicators.</p> <p>Third trimester is most effective to improve birth weight, but intervene as soon as possible, and for as long as possible.</p> <p>Provide energy or encourage consumption of more of normal diet (if protein intake is adequate).</p> <p>Improve dietary quality and provide multiple micronutrients.</p> <p>Provide iodine in areas with endemic deficiency.</p> <p>Other risk factors for low birth weight are young maternal age at conception, so target interventions at those still growing.</p>	<p>Improve the status of women to lower age at first marriage</p> <p>Microcredit, targeted to women</p> <p>More emphasis on education of girls</p> <p>Improve maternity benefits</p>
Improving Child Growth	<p>Improve breastfeeding with exclusive breastfeeding for six months.</p> <p>Continue breastfeeding during complementary feeding.</p> <p>National and international guidelines are needed on complementary feeding; when, what/dietary quality, how much, micronutrients?</p> <p>Energy intake improves weight, not length. Increases in energy density are most often needed (via reductions in water content of food).</p> <p>Protein: extra intake usually has limited benefit.</p> <p>Animal sources: dried skim milk improved growth in 12/15 trials, but fewer showed impact from fish and meat.</p> <p>Micronutrient fortification of cereal staples is important.</p> <p>Multiple micronutrient supplementation is promising.</p>	<p>Agricultural research more focused on diet quality and nutrition outcomes</p> <p>Agricultural production systems more in tune with child care needs</p> <p>Improve water, sanitation, and health service delivery (better quality, better targeted)</p>
Preventing and Treating Anemia	<p><i>Pregnancy</i></p> <p>Iron supplements increase maternal hemoglobin and iron status and increase infant iron status for six months after birth.</p> <p>No conclusions are available on benefits of iron for maternal and infant health and function.</p> <p>Daily (as opposed to weekly) iron supplements during pregnancy are more effective.</p> <p><i>Infancy</i></p> <p>Supplement all low-birth-weight infants with iron from two months.</p> <p>Other need for iron supplements is uncertain (cutoffs? morbidity? benefits for function?).</p> <p><i>Children</i></p> <p>Daily or weekly iron supplements give improved mental and motor function.</p> <p><i>Adults</i></p> <p>Iron supplements improve work performance even for iron deficiency/mild anemia, and tasks with moderate effort.</p> <p>Increased ascorbic acid from local foods is not effective.</p> <p>Iron fortification of wheat (Venezuela), salt (+iodine in India), and dry milk (Chile) is effective.</p>	<p>Agricultural research more focused on diet quality and nutrition outcomes</p> <p>Improve status of women for improved intrahousehold food distribution</p> <p>Improve legislation for fortification</p> <p>Improve technology for fortification</p>

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**Table 8.2 (Cont.)**

Objective	Direct Interventions	Indirect Actions
Preventing and Treating Anemia	NaFeEDTA (an iron fortificant) shows good potential and increased iron status when added to salt, soy sauce, etc. Multiple micronutrients may be more effective. Plant breeding for iron-dense cereals shows some promise, but awaits efficacy and effectiveness trials. Food-based solutions cannot rely on plant sources—animal sources are critical.	
Preventing and Treating Iodine Deficiency	Salt iodization is crucial. Prevent cretinism by iodine to the mother during first trimester but no later than second trimester. Supplementation late in pregnancy may improve infant function. It is not clear whether iodine supplementation in deficient children improves cognition or growth. Iodized oil to six-week-old infants reduces mortality in first two months by 72%.	Improve legislation for fortification
Preventing and Treating Vitamin A Deficiency	<i>Pregnancy</i> Low-dose vitamin A or beta-carotene supplements in pregnancy decrease maternal mortality by 40%; also increase hemoglobin <i>Infants and Children</i> High-dose maternal supplementation at birth followed by breastfeeding leads to a 64% reduction in mortality in under-12 months, 23% reduction in mortality in 6–60 month age group and major reduction (40%) in HIV mortality. Supplementation can also increase growth of malnourished children. There is an urgent need to (1) accelerate food fortification and (2) improve the availability of vitamin A-rich foods. Continue approaches using genetic modification, but with appropriate safety standards.	Improve legislation for fortification  Agricultural research to be more focused on diet quality and nutrition outcomes  Improve status of women for improved intrahousehold food distribution
Preventing Diet-related Chronic Disease	<i>Mass media</i> may be able to play a role in nutrition education, but there is not enough experience of what will work in Asia. <i>Dietary Guidelines</i> to shift the diet explicitly toward healthy components are useful, but difficult when large pockets of undernutrition coexist; the PRC is a good example. <i>Food processing</i> modifications, (e.g., changes resulting in differing fat absorption) by shifts in breeding, feeding, and market-trim practices in the livestock sector can contribute to lower levels of fat in meat over time. <i>School-based initiatives</i> offer important possibilities for improving diet and activity patterns; however, few initiatives have made a marked improvement in this area and surprisingly few have been carefully evaluated.	Food price policy to encourage the consumption of healthier foods  Regulation: little used in Asian countries relative to nutrient content of the diet

Note: BMI = body mass index

targeted food supplementation, where found to be relevant, feasible, and cost effective.

For women, activities within ante- and postnatal care strategies comprise tetanus toxoid immunization, micronutrient supplementation (including iron and folic acid tablets for pregnant women and possibly a postpartum vitamin A megadose where vitamin A deficiency is known to be a problem), iodized salt consumption, food supplementation during pregnancy, malaria chemoprophylaxis in endemic areas, and reproductive health education including the need to delay conception until after adolescence and ensure safe birth intervals.

While this represents the menu, the choice is context specific. The optimal mix of actions should derive from an understanding of the nature, distribution, and causes of the problem and the existing context including infrastructure, resources, and capacity for implementation. Some prioritizing will be required initially with regard to population target groups and the mix and phasing of actions. Under-two-year-old children and pregnant women are priority groups within the life cycle. As well as targeting, significant coverage is required to achieve large-scale impact. And intensity—or the concentrations of resources or person-power per unit target group—is a fundamental issue, albeit often neglected. Many programs in Asia have failed because, in going for coverage without the requisite degree of intensity, they are “spread too thin” for impact.

Success in Asia has been demonstrated where community-based programs are linked operationally to service delivery structures, which are often village-based primary health care outlets. Government employees at such levels may be oriented to act as facilitators of nutrition-relevant actions that are coordinated and managed by community-based mobilizers, often volunteers selected by local communities. The mobilizer-facilitator nexus should be supported and managed by a series of organizational structures from the grass roots to national level, and underpinned by broad-based social mobilization and communication strategies. Thailand has led the way in Asia with regard to such community-government partnerships.

Many of the generic lessons from past experience with community-based nutrition programming relate more to the way things were done, than to what was actually done—more *how* than *what*. Both process and outcome orientations have merit over different time

spans, but for maximum long-term sustainable impact they need to be integrated. Community ownership and empowerment are fundamental to success, both with respect to means and ends.

For financing direct actions, rough estimates presented in this report suggest that the cost of covering the unmet direct nutrition needs of children in the region, with a leakage rate of 50 percent, is equivalent to between 1 and 8 percent of current public sector health budgets. The diversion of a small amount of resources from less effective food assistance programs through improved targeting toward direct nutrition programs would have a strong impact on the current generation of infants, and on the infants they themselves will eventually parent.

But more than extra resources are needed. Where there is little accountability to the local communities and an absence of performance-related pay increases, the incentives to improve program performance will be weak. Even in the presence of sufficiently strong incentives, good information as to the performance of interventions may be missing. Sufficient levels of technical and managerial capacity are also identified as key constraints. Resources, information, and incentives will not be sufficient in the absence of adequate capacity.

The emergence and articulation of a human rights-based approach to nutrition action not only justifies but implicitly demands such a focus on capacity. Malnourished people are no longer seen as passive recipients of food or health transfers, but rather as subjects of their own actions. Moreover, the performance of duties relating to human rights depends on capacities. Any duty-bearer, whether it be the parent of a malnourished child or a national government, cannot be held accountable for the realization of that child's right to adequate nutrition unless the capacity exists for the duty to be carried out. A fundamental purpose of development cooperation should thus be to improve the capacity or capability (including responsibility, motivation, authority, and resources) of the duty-bearer to meet various obligations.

With regard to direct actions to combat overnutrition in the region, it should first be emphasized that an obvious arsenal of tested programs and policies does not exist. Countries in the region are not ready for large-scale massive program and policy initiatives to combat diet-related noncommunicable diseases. However, there is great urgency that such efforts begin. Moreover, development of food and nutrition and health policies for countries where problems of dietary excess and deficit exist side by side represents a new and pressing

agenda. In such countries, the prevailing policies to promote agricultural and health change to address problems of deficit are quite different from those needed to address problems of excess.

In Asia, one important current effort has been related to the preparation and use of food-based dietary guidelines, although less has been done systematically to promote consumption of this healthful diet. Pilot programs in the area of behavior change need to be developed and evaluated for effectiveness and cost effectiveness.

### SUPPORTING ACTIONS TO REDUCE MALNUTRITION

In themselves, direct interventions will not be enough, at least not in the long term. The multifaceted nature of malnutrition means that it may be effectively addressed only when several sectors and strategies are brought to bear. Where food, health, and care are all problems, combining improved infant feeding, better household access to food, and improved and more accessible health services and sanitation is more effective in reducing malnutrition than any of these measures taken alone. Given the well-documented synergies between many such actions, the combined effects are often not merely additive, but multiplicative.

It is also important to emphasize that attention to nutrition in the design of indirect policies and programs—that is, those that impact on some of the more basic causes of malnutrition—will also have direct pay offs for these sectors. A well-nourished population is better able to learn and is more productive and healthier. It is, thus, important for policies and programs that can indirectly affect malnutrition to do so in a positive manner. Aside from their important income-generation impact, agriculture and agricultural research can have a large positive effect on nutrition through productivity increases that lower the price of micronutrient-rich crops and through efforts to improve the bioavailable micronutrient content of cereals.

Food price policy can also be used to influence dietary shifts away from fats and added sugars. Policies to promote the status of women are key to more informed decisions about the age of first marriage, fertility decisions, the control of food allocation within the household, the provision of care to infants and mothers, and the accessing of education and health care systems for female infants and children.

Health, water, and sanitation systems must be in close proximity to the poor and malnourished. But that is not enough: they must be tailored to their needs in terms of the services offered and their quality, and the poor must be able to afford to use them. The willingness of communities to contribute resources—cash or in-kind—to services that help them should not be underestimated. Legislation that is nutrition focused and enforceable is critical to efforts to establish food fortification systems that serve the malnourished and to efforts to promote exclusive breastfeeding. Our recommendations for these indirect actions are summarized in Table 8.3.

Underpinning all of this is the need for strong economic growth that is poverty reducing. This type of economic growth will have important long-term effects on undernutrition rates. Economic growth rates in line with historical trends for the region suggest that future income increases will decrease undernutrition rates by a substantial margin, but only one third of the way toward United Nations goals for malnutrition reductions by 2020. Direct nutrition interventions supported by pro nutrition indirect actions are essential.

Economic growth in the context of strong democratic institutions will accelerate reductions in malnutrition. Democracy fosters respect for civil, political, economic, social, and cultural rights and so underpins efforts to support the status of women and the right to adequate food and services. Democracy also fosters stronger information flows and levels of accountability. The decentralization of governments that is occurring in the region offers the possibility of greater accountability of elected officials to their communities, but it also offers opportunities for consolidating inequalities in power and influence at the district and community level.

These efforts to improve nutrition outcomes are being shaped by the rapidly changing context within which they must operate (Table 8.4). The rapidly increasing levels of global food trade, financial flows, and information flows present opportunities to be seized and risks to be managed in the pursuit of improved nutrition in the region. Better information and safety net systems need to be in place in countries that may have thought they no longer needed them. The capacity of the region to represent itself in the World Trade Organization and, in particular, to ensure that food safety standards do not become insurmountable barriers to trade, needs to be strengthened. Improved communication and information technology needs to be used to design more effective

**Table 8.3 Summary of How to Support Reductions in Malnutrition via Underlying Determinants**

Underlying Determinant of Malnutrition	What to Do to Make Policy More Nutrition Friendly	How to Do It
Household Food Security	Make agriculture more productive in ways that are consistent with improved nutrition.	Increase investment in agricultural research, particularly that which is sensitive to poverty and nutrition impact, drawing, in particular, on community knowledge and preferences. Encourage the development of plant breeding methods that improve the nutrition content of staples. Improve research resource allocation toward reducing the price of nonstaple food crops. Encourage the development of agriculture-communications-health partnerships that improve the impact of food-based interventions.
	Make income-generation programs more pro-poor and for the malnourished.	Target programs at poor and malnourished and reallocate saved resources to nutrition interventions. Encourage community-based development and ownership. Ensure that women are not excluded. Ensure that participation of women is consistent with needs for child care. Conduct more evidence-based evaluations of impact.
	Make income-transfer programs more pro-poor and for the malnourished.	Target programs at the poor and malnourished and reallocate saved resources to nutrition interventions. Encourage community-based development and ownership. Ensure that women are not excluded. Ensure that participation of women is consistent with needs for child care. Conduct more evidence-based evaluations of impact.
	Improve the monitoring of food insecurity.	Create a global database on food consumption. Strengthen the capacity of countries to collect and use information on food consumption. Create food insecurity maps for planning and advocacy purposes.
Care Provision to Women and Infants	Strengthen the role of women in society and in home.	Monitor the extent to which gender asymmetries are embedded in law and custom. Change and enforce laws to eliminate gender inequalities in access to information and other assets. Develop gender-based budgets in government departments. Recruit more women within organizations that allocate resources. Encourage the enrollment of girls in school through incentives. Conduct gender reviews of program designs to ensure that women are not excluded, particularly at the community level. In some cases deliberately target program resources at women. Design safety nets that are targeted at the needs of female-headed households with young children. Involve women in the design of interventions. Conduct research that demonstrates the costs of gender asymmetries.

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**Table 8.3 (Cont.)**

Underlying Determinant of Malnutrition	What to Do to Make Policy More Nutrition Friendly	How to Do It
Health, Water, and Sanitation	Expand the coverage of public health clinics.	Increase the supply of health clinics by targeting new ones in areas of greatest need. Increase the cofinancing of clinics by local communities. Increase allocation of funds to preventative and primary health care.
	Strengthen the quality of service delivery.	Increase the demand for services by improving their quality. Provide higher salaries for employees. Provide better training of employees. Give more authority to health clinic heads. Conduct better and more transparent monitoring of performance of clinics. Enhance accountability to local communities.
	Integrate nutrition into the delivery of other health services.	Provide better training of doctors in nutrition issues and best practices. Learn from the integrated management of child illness (IMCI) initiative. Provide more baby-friendly hospitals, clinics, and professionals.
	Improve access to water in sufficient quantity and quality.	Move away from public sector allocation of water to agriculture toward user-group allocations and toward some form of water pricing to ensure sufficient allocation of water to consumers. Develop water user groups that have high levels of participation from community user groups, with a strong representation from women.
	Improve access to good quality sanitation.	Give communities a greater say in selection of community infrastructure. Develop demand for improved dwelling-specific sanitation through communication programs. Develop more effective solutions for the hygienic disposal of waste.

behavior change campaigns in remote rural areas and urban slums and in middle-income neighborhoods, towns, and cities.

Urbanization is progressing rapidly in Asia. Not only are people shifting to urban areas, but so, too, is the concentration of under- and overnutrition. The poor in urban areas are equally at risk of undernutrition as are the poor in rural areas. Interventions that work in rural areas cannot be assumed to work in urban areas. A reliance on food purchase and the large numbers of mothers working away from home are difficult challenges to families pursuing good nutrition and to those working to support them.

The demographic breakdown of the population is changing rapidly. The aging of Asian populations is a result of lower infant mortality rates and increasing life expectancy within the region, and as such is a good indicator of past progress in the fight against malnutrition. It does, however, place new pressure on efforts to finance undernutrition efforts adequately through public finance due to the new demands for spending on overnutrition-related issues, although the presence of older family members should help parents cope with the multiple demands of work and child rearing.

Finally, HIV/AIDS is looming over the Asian region. Prevalence levels in adults are as high as 2 percent in a

**Table 8.4 Summary of How to Support Reductions in Malnutrition via Basic Determinants and Contextual Factors**

Basic Determinant of Malnutrition	What to Do to Make Policy More Nutrition Friendly	How to Do It
Economic Growth	Maximize the poverty-reducing impact of economic growth.	Encourage the development of small-scale agriculture. Develop appropriate tax policies. Encourage the development of small and medium enterprises. Monitor inequality.
Democracy	Encourage democracy and social capital formation.	Document violations of human rights by governments and others. Develop governance structures that are embedded in local communities. Make community groups a required partner in new development initiatives.
Changes in Contextual Factors	What to Do to Make Changes More Nutrition Friendly	How to Do It
Urbanization	Maximize the nutrition impact of resources currently available in the urban setting.	Pay more attention to the work-child care tradeoffs faced by women and encourage institutional innovation. Capitalize on more densely settled populations by more effective use of mass media for behavior change. Reform government restrictions on informal income generation (e.g., urban agriculture and street trading). Strengthen the responsibility, authority, and accountability of municipal authorities. Target resources at poor neighborhoods. Recognize that recent migrants support many in the rural areas. Pay more attention to environmental pollution, particularly of heavy metals. Stimulate the formation of community groups. Encourage the formation of groups to locate and care for street children.
Decentralization	Ensure that decentralization of responsibility is accompanied by decentralization of authority, resources, and accountability.	Build on community-based nutrition interventions in developing bottom-up district-level plans. Develop district-level profiles of poverty and malnutrition. Develop district-level indicators of progress.
Globalization	Protect the poor from the shocks inherent in globalization while expanding their opportunities and ability to become integrated into global phenomena.	Link the poor into international insurance markets. Improve early-warning systems. Develop employment guarantee schemes that can be switched on during a crisis and switched off when the crisis has passed. Develop protocols for public spending on health and education during crises.

Continued next page

**Table 8.4 (Cont.)**

Changes in Contextual Factors	What to Do to Make Changes More Nutrition Friendly	How to Do It
Globalization (cont.)		Use communication technology to improve access to nutrition information, and to increase the sharing of best practices across communities and across countries in the region. Lobby for the opening of developed-country export markets.
HIV/AIDS	Minimize the spread of new cases; develop treatments for existing cases; recognize constraints to development initiatives by loss of adults in their prime; minimize impact on future generations.	Behavior change programs must be widespread and context specific. Involve community nutrition workers. Draw the private sector into the provision of low-cost HIV/AIDS drugs. Develop productive technologies that take into account increased children-to-adult dependency ratios.
Aging of Populations	Develop policies to care for the elderly, recognizing their role in child care.	Emphasize preventive health care programs to minimize diversion of health resources from infants, children, and adolescents. Learn from technology and institutional experiences in developed countries. Initiate publicly funded retirement accounts for those who pay taxes. Increase formal definitions of child caretakers to include grandparents. Develop health insurance programs funded by employees or by the state.

few countries of the region. Even more worrying is the fact that new cases are appearing at an accelerating rate—faster even than in sub-Saharan Africa. Asia needs to learn from the experiences in sub-Saharan Africa, because HIVS/AIDS has the capacity to undermine drastically the human development that has preceded it, including the crucial role played by improved human nutrition.

#### AN AGENDA FOR ACTION

What should be done? Action has to be guided by the nature of the problem. It also has to be guided by the extent of administrative and physical infrastructure, its outreach, and the extent of various elements of local capacity. These then can allow flows of resources to help support nutrition activities at the local level. Figure 8.1 presents a typology to guide action along the two dimensions: the nature of the problem and capacity in each country to apply it. The typology represents a

cumulative agenda for action with new initiatives added as public sector capacity increases. Each decision as to the location of a particular country in a particular cell of the Figure will no doubt be the subject of heated debate. Our assessment as to country location is simply illustrative. The test of usefulness of the typology will be the value it adds to decisions taken at different levels—regional, national, district, and community—by many actors (national policymakers, multilateral agencies, local governments, and poor communities).

We can use the above typology to prioritize actions at the direct level (as outlined in Table 8.2) for the reduction of under- and overnutrition. This is attempted in Figure 8.2. For very poor regions with extremely limited human, economic, and organizational infrastructure, the first priority will be to establish accessible and relevant preventive and curative health care, and to ensure access to adequate food. One step above this minimal level of community or government resources and infrastructure, community-based

Ability of Public Sector to Address Malnutrition	Nature of Malnutrition Problem		
	Mainly Under-nutrition	Both Under- and over-Nutrition	Mainly Overnutrition
High		Thailand	Korea, Rep of Malaysia
Medium	Viet Nam Rural PRC Sri Lanka	Philippines Urban PRC Indonesia	PNG
Low	Bangladesh Cambodia Lao PDR Myanmar Rural India Nepal	Urban India Pakistan Kyrgyz Rep.	

**Figure 8.1 Country Groupings to Guide Action**

nutrition programs represent an affordable priority. Such countries generally have levels of nutritional deprivation that warrant direct forms of action. Moreover, such programs have a role whether or not the underlying trend is one of nutritional improvement. Underlying trends are too slow to combat malnutrition in Asia within an acceptable time (ACC/SCN-IFPRI 2000). An analogy can be drawn with public health measures, which are

still essential even when health conditions are tending to improve. Overnutrition is less of an immediate visible concern for these countries currently, although the long-term chronic disease risks imposed by low birth weight provide even greater justification for a particular focus on adolescents and young women in these countries.

In upper low-income countries (e.g., PRC, Indonesia, and Sri Lanka), additional nutrition programs are even more feasible due to improved capacity, but not so universally needed because the problem is usually less prevalent or less severe. The social and regional targeting of well-organized and effective nutrition programs should be increasingly attempted. Nutrition programs in this group may also have important beneficial interactions (through human capital formation) with economic growth.

In middle-income countries (e.g., Malaysia, Philippines, and Thailand), direct programs aimed at undernutrition eventually merge with social welfare and health services. They may not be such a priority for the whole country, but will need to be targeted to reduce disparity where it exists and buffer any social groups marginalized during the growth process. As countries industrialize, food becomes more accessible and health care more extensive and of better quality; social welfare and services and legislation become relatively more

Ability of Public Sector to Address Malnutrition	Nature of Malnutrition Problem	
	Undernutrition	Overweight and Obesity
High	<ul style="list-style-type: none"> <li>Targeted nutrition programs</li> </ul>	<ul style="list-style-type: none"> <li>Screening for high blood pressure</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Early childhood development</li> <li>Other food fortification</li> <li>National guidelines on complementary foods</li> <li>Community-based behavior change</li> </ul>	<ul style="list-style-type: none"> <li>National dietary guidelines</li> <li>Health "program" loans for policy reform</li> <li>Efforts to address LBW and the nutrition of girls and women</li> <li>Mass media campaigns for healthier diets</li> </ul>
Low	<ul style="list-style-type: none"> <li>Community-based behavior change</li> <li>Safe motherhood: Strategies for LBW and the nutrition of girls and women</li> <li>Breastfeeding promotion</li> <li>Iron supplementation</li> <li>Salt iodization</li> <li>Vitamin A mass dose with immunizations</li> <li>Deworming schoolchildren</li> </ul>	<ul style="list-style-type: none"> <li>School exercise and diet changes</li> </ul>

**Figure 8.2 Emphasis on *Direct* Interventions, by Country Typology**

Ability of Public Sector to Address Malnutrition	Nature of Malnutrition Problem	
	Undernutrition	Overweight and Obesity
High	<ul style="list-style-type: none"> <li>Improved crisis prevention, information networks</li> </ul>	<ul style="list-style-type: none"> <li>Changes in food processing guidelines</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Encourage network of community-based child care centers for poor mothers</li> <li>Reform universal food subsidies to target the poor</li> <li>Target microcredit at women</li> <li>Improve access to sanitation for poor</li> </ul>	<ul style="list-style-type: none"> <li>Begin to develop health insurance</li> <li>Develop data-collection capacity</li> </ul>
Low	<ul style="list-style-type: none"> <li>Agriculture and food price policy to focus on improving availability of micronutrient-rich foods</li> <li>Greater access to education for girls</li> <li>AIDS prevention campaigns</li> <li>Improve safe water access</li> </ul>	<ul style="list-style-type: none"> <li>Food price policy to focus on access to fats and oil</li> </ul>

**Figure 8.3** Emphasis on *Indirect* Interventions, by Country Typology

important, and these may serve to buffer the nutrition of vulnerable groups during economic shocks.

In middle-income countries and in some areas of lower-income countries, overnutrition has emerged as a significant problem alongside undernutrition. Here new program approaches aimed at the preventative (e.g., monitoring blood pressure) and the promotive (e.g., improving diet and increasing exercise) need piloting. In some cases, e.g., small island states such as the Fiji Islands and Tonga, overnutrition, not undernutrition, is the dominant public health problem.

The typology in Figure 8.1 can also be used to prioritize actions at the indirect level as in Figure 8.3. For undernutrition, there are a few very basic activities that can be undertaken at lower levels of capacity, such as HIV prevention, safe water access, greater access to primary and secondary education for girls, the abolition of state-sponsored discrimination against women, and the development of agricultural price policies that do not discriminate against micronutrient-rich foods. At higher levels of capacity, safety net programs that are flexible and monitoring systems that are sustainable can be introduced. In terms of overnutrition, the ability of food price policy to modulate the fat content of diets must be explored, while higher levels of capacity will be needed to instigate meaningful health insurance and to instigate

legislation for food-processing standards that is enforceable.

## AN AGENDA FOR OPERATIONS RESEARCH

Throughout this report we have strived to indicate where we feel that additional analysis and research would facilitate the development of policies and programs that would have a significant positive impact on the lives of malnourished people. These areas are organized by direct and indirect action and are summarized in Table 8.5.

In general terms, the challenge for the nutrition research community is to do more work on interventions in the field. This will mean a move beyond the traditional units of observation (individuals and households) toward (1) the behavior of agents such as project managers, policymakers, and community health workers; and (2) the organization of structures such as NGOs, local government, nutrition projects, and ministries of health. To do this, the community will need to work more closely than before with disciplines that are more familiar with the study of human behavior. Why, for example, do some countries invest more in nutrition than others? Why are some communities more successful in reducing malnutrition than others using the same (at least on paper) intervention? When is capacity a constraint and how can it be relieved?

**Table 8.5 A Research Agenda for the Nutrition Community**

Area	Questions to be Addressed
General: Resources and Capacity	<p>What are the political considerations behind resource allocation to nutrition?</p> <p>What are the medium-term returns to poverty reduction of public investments in nutrition vis-à-vis other public investments in roads, education, agriculture, sanitation, etc.?</p> <p>Exactly what proportion of developing country DALYs is due to malnutrition?</p> <p>Why are the implementing agents of some nutrition projects more successful than others?</p> <p>When is capacity a constraint to effective nutrition programming and what can be done to relax that constraint?</p> <p>What are the long-term consequences of fetal malnutrition?</p>
Direct: Undernutrition	<p>A new generation of cost-effectiveness studies of direct interventions is needed.</p> <p>Research is needed on the potential for mutually beneficial partnerships between the private and public sectors, beginning with the under-researched areas of food fortification and integrated water supply and sanitation.</p>
Direct: Overnutrition	<p>More pilot tests are required of approaches to communication and demand creation that have been successful in developed countries.</p>
Indirect: Food Security	<p>Can plant breeding be successful in increasing the micronutrient content of staple crops?</p> <p>Can agricultural research resources be reallocated in a cost-neutral way to have a bigger impact on nutrition via reductions in the price of micronutrient-rich crops?</p> <p>Establishment of an Asian food security database is necessary. More work is needed on rapid indexes of food insecurity.</p> <p>An electronic library of evaluations of human development programs should be set up.</p> <p>More work is needed on how food aid can be better used to set up flexible safety nets.</p>
Indirect: Care and Women	<p>There is a need for better quantification of care and its incorporation in economic models of nutrition determination.</p> <p>Can social networks ease the increasing nutrition tensions caused by the dislocation of women's work and child care?</p> <p>How different would sanitation and water systems look if viewed through a care lens?</p>
Indirect: Water, Sanitation, and Health	<p>Better ways of targeting water and sanitation interventions should be sought.</p> <p>More work is needed on why some health systems are more effective than others at converting resources into health.</p>
Underlying Trends	<p>More work needs to be done on the determinants of and solutions to malnutrition in urban areas. What is different and what is not?</p> <p>How important is urban agriculture in Asia? Should and can it be made more important?</p> <p>What kinds of decentralization are most beneficial to the malnourished?</p>

### WHAT DEVELOPMENT PARTNERS CAN DO

Many suggestions have been made here for cost-effective action in terms of direct nutrition interventions and indirect supporting actions against the backdrop of evolving macrolevel conditions and processes. Obviously, the ability of the broad nutrition community to effect immediate change is strongest at the level of direct nutrition intervention. Much needs to be done and can be done at this level given modest amounts of additional

resources and due attention to capacity and incentives. But what then are the roles of development organizations such as the Asian Development Bank (ADB)? Six are highlighted here.

### Promotion and Support of Nutrition-relevant Policies and Programs

First, there is a need for development agencies to provide sustained support for appropriate policies and programs

aimed at attacking the double burden of malnutrition in Asia. The size of the problem and its massive consequences demand this. But there is another justification: applied science has clearly demonstrated what works and why in different situations, so that a strong regional impact is likely if this knowledge is brought to bear in the form of concerted nutrition-relevant policies and programs.

Actions are needed on two major fronts, direct and indirect, both taking account of evolving contexts. Development partners, including ADB, can use the menu for action in this chapter, linking indirect and direct options with levels of in-country capacity as starting points in assessing their specific roles in policy and program support.

### **Building Partnerships**

As well as dealing with the nuts and bolts issues of programming, regional nutrition advocates need to engage more forcefully in the broader development debate by forming strategic alliances with communities in agriculture, health, education, industry, governance, trade, and infrastructure. The same applies to development partners such as ADB, as the effectiveness of regional support to nutrition-improving country processes can be significantly enhanced through forging active policy-program-research-training networks and partnerships. The emerging role of the private sector, particularly the food industry and the international agricultural research network, should be accentuated. Development partners like ADB can bridge public-private sector initiatives with the needs and rights of civil society.

As a regional organization, ADB is well placed to play a lead role in forging international partnerships. For a partnership to make sense, the whole needs to be at least as great as the sum of its parts, and it needs to be based on consensus—consensus first on the need to prioritize malnutrition reduction throughout the life cycle, and second, on the main lessons of past experience, as encapsulated in this book, which point the way toward more effective and more sustainable policies and programs.

New forms of subnational partnership are required, too, including partnerships between local governments and community organizations, which worked so well in Thailand, between governments and civil society, and between the public and private sectors, particularly with regard to micronutrient fortification.

### **Advocacy and Social Mobilization**

Advocacy is both a necessary requirement for the formation of relevant partnerships and an important function of them. ADB and partners can make a powerful contribution through its advocacy and support for national ‘nutrition champions’, who actively engage in the policy change and public sector reform processes. The crux of a new advocacy strategy is that the widely endorsed International Development Goals on poverty, education, and health cannot be achieved and sustained without a concerted attack on the pernicious life cycle effects of different forms of malnutrition. Past definitions of poverty, focusing as they did on household income, tended to emphasize nutrition improvement as a downstream bonus, a welcome outcome but not the main one. Given the new paradigm of poverty as a lack of capability, along with growing evidence of the intergenerational drain on economic resources through malnutrition, nutrition is clearly very much upstream—a critical input into poverty reduction processes—as well as an outcome. The ADB’s new thrust on “develop a child, develop a nation” clearly recognizes this.

The nutrition community, including nutrition-friendly donors, needs to speak with one voice and be more strategic in the use of opportunities created by the changing development context. To do this, there has to be better recognition of the fact that advocacy is not just information dissemination. A greater understanding is required of the values, interests, beliefs, and goals of all stakeholders, including those of nutrition actors themselves. Only through such a better understanding of the political economy “black box” will the opportunities for positioning nutrition effectively in the new development arena become apparent.

### **Capacity Development**

The importance of capacity development needs to be recognized throughout. It should be integral to country support, not something tacked on as a capacity-building component. The review of nutrition-relevant capacity in this book has led to clear recommendations for development partners. The traditional project cycle, predicated as it is on the assumption that solutions to known problems can be fully determined at the outset and that projects can be fully designed, costed in advance, and successfully implemented to a fixed timetable, is not well aligned with a learning-by-doing approach that is

the foundation of true capacity development. Ongoing decentralization processes further back the need to provide more flexibility in planning.

### **Information for Action**

The bedrock of capacity is information. Monitoring and evaluation systems in past nutrition programs have tended to be weak. It remains essential that appropriate information systems be set up and supported to provide relevant and timely information to those who can use it to improve decisions leading to better actions and ultimately impact. Key data empower decision makers—from the mother discussing her child's growth that month, to the government official in the planning commission weighing the costs and benefits of different options. Processes as well as outcomes need to be tracked, and the strengthening of such processes viewed as a fundamental indicator of both quality and sustainability. One such process indicator would be the degree to which capacity gaps identified in the causal analysis are being closed. Donor performance also needs evaluating from this perspective.

Nutrition data are inexpensive to collect and nutrition indicators are reliable, sensitive, and timely enough to be used for decision making. They complement poverty measures and can be used for targeting and designing programs, and for tracking progress of a country's poverty reduction strategy.

In recent years, ADB has played an important role in gathering, generating, and disseminating useful knowledge and experience on what works in nutrition. Such a role of building the evidence base and broadcasting success stories is extremely important in fostering change.

### **Operations Research**

With regard to research priorities, the focus needs to be squarely on operations research. A decade ago, the international community was charged with shifting the emphasis from generating *what* and *why* knowledge about nutrition problems and their causes to addressing questions of “how” to deal with them. Such operations research is fundamental to improved programs. As with capacity development, it should not be thought of as an ad hoc exercise, but rather as a fundamental component of the management information system, and one that has a clear budget line. While funds should be allocated to support such research, the actual research questions will only become known as the program evolves.

Overall, ADB and partners now have a major opportunity to operationalize their emerging commitment to nutrition in these ways. In so doing, they could help pave the way to realizing the common vision uniting all actors in these pursuits—that is, a world in which children are no longer being born malnourished.

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# Annex I

## Best Practice Guidelines for Key Nutrition Interventions

### GROWTH MONITORING AND PROMOTION

Following are best practices in growth monitoring and promotion.

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

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

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

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

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

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

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

### INTEGRATED CARE AND NUTRITION INTERVENTIONS

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

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

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

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

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

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

### Box A.2 Examples of Combined Nutrition and Care Interventions

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

Source: WHO (1999).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Source: Tontisirin and Gillespie (1999).

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

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

## COMMUNICATIONS FOR BEHAVIORAL CHANGE

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

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

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

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

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

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

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

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

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

### Box A.4 The Hearth Model

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

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

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

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

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

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

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

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

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

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

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

### Specific nutrition-related recommendations

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

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

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

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

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

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

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

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

### SUPPLEMENTARY FEEDING OF YOUNG CHILDREN AND WOMEN

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

The most common purpose of supplementary feeding is to prevent or alleviate malnutrition through reducing the nutrient gap between an individual’s actual consumption and his/her requirement. A secondary objective may be to improve household food security through a food or income-transfer effect, and thus facilitate the caring capacity of the household.

Prior to any consideration of appropriate nutrition-relevant action, it is essential to ensure that the problem of malnutrition has been assessed and its causes analyzed. The essential stages in problem analysis may be broken down into the following four stages:

1. assessment of the nature, extent, severity, and distribution of malnutrition;
2. analysis of the main causes of malnutrition to clarify whether supplementary feeding is a potentially relevant action;

3. analysis of the resources and institutional capacity for action to reveal whether it is feasible; and
4. cost-effectiveness analysis, as far as data permit, of supplementary feeding and other alternative, relevant and feasible interventions aimed at malnutrition reduction. This will lead to a decision on whether supplementary feeding is ultimately the most appropriate intervention to initiate, given the existing context.

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

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

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

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

If it appears from the causal and resource analysis that supplementary feeding is relevant to the problem and its causes, and the selected infrastructure appears capable of supporting it, is supplementary feeding the most efficient or cost-effective approach in this situation? Cost-effectiveness analysis may be carried out prior to the choice of intervention—providing the data are available to enable a comparison between options on the grounds of efficiency—and/or it may be carried out as part of the evaluation process.

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

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

The most common causes for failure of supplementary feeding programs are

- irregular or inefficient supply, delivery, and/or distribution of food for various reasons, including corruption;
- inadequacies in institutional capacity, training, supervision, monitoring, evaluation, and community involvement;
- leakages due to poor targeting;
- irregular participation of the target group;
- inappropriate timing or duration of supplementary feeding;
- leakages due to intrahousehold sharing of food with the nonneedy, or sale of take-home rations;
- Leakages due to the substitution of a portion of the normal diet by the on-site food consumed by the target individual;

- inadequate quantity or quality of food basket to close nutrient gaps;
- insufficient calorie density of foods, rendering it difficult for the target child to consume enough to meet the nutrient gap;
- types of food culturally inappropriate;
- lack of understanding of beliefs and perceptions underlying intrahousehold food distribution practices;
- lack of counseling on the need to actually feed supplementary foods to the targeted child; and
- lack of attention paid to combatting other important causes of malnutrition, e.g., through communications approaches aimed at improving home-based caring practices.

Source: Gillespie (1999).

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

It is recognized that in many situations, the choice of “food or no food,” of supplementary feeding versus some other intervention, is not one that can be completely determined by the foregoing logic. Food is political and giving food is an effective vote-catching device for populist governments (e.g., Box A.6). Nevertheless, in such situations, there should be some scope for influencing the actual use of food to improve nutrition outcomes more efficiently by employing nutritional logic.

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

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

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

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

The next design stage concerns the food strategy, i.e., the strategy adopted to distribute food in the supplementary feeding program, including consideration of the nutrient content of the food supplement, type of foods used, systems of supply and distribution, and the timing, frequency, and duration of feeding. Supplementary foods should be culturally acceptable and permit the preparation of meals that are digestible, palatable, energy dense and micronutrient rich, without being bulky. Other important prerequisites include cost effectiveness in closing nutrient gaps of recipients; reliability of supply; feasibility of transport, storage, and processing; short cooking time; low fuel costs; and adequate shelf life. The choice of local versus external production should be based on such criteria.

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

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

“A fundamental problem of program philosophy affected the implementation of this and the ICDS II project. ICDS is widely viewed, by political leaders, bureaucrats, functionaries and beneficiaries alike, as a government program providing pre-school education and child feeding. In contrast to TINP, no major effort has been taken to market the program as one aimed at *preventing* malnutrition through behavior change among mothers. This accounts in large measure for the preoccupation of GOI and the states with quantity over quality, and their related lack of interest in research and evaluation. As a result, and as shown in multiple evaluations, ICDS has relatively limited impact on its main objective of reducing malnutrition.”

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

Source: Gillespie and Measham (1998).

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

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

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

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

### SCHOOL FEEDING

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

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

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

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

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

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

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

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

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

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

### HEALTH-RELATED SERVICES

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

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

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

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

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

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

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

### Box A.7 The BASICS Nutrition Minimum Package

The BASICS project has recently provided a strong justification for a concerted focus on interventions through the health system that aim to improve the following six key nutrition-related behaviors.

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

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

Source: BASICS/WHO/UNICEF (1999).

BASICS = Basic Support for Institutionalizing Child Survival, a global child survival project funded by USAID.

### Complementarities between health service delivery and community nutrition

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

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

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

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

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

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

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

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

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

#### MICRONUTRIENT SUPPLEMENTATION

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

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

#### Iron

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## Vitamin A

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

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

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

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

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

## FOOD-BASED STRATEGIES FOR MICRONUTRIENT DEFICIENCY CONTROL

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

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

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

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

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

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

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

## Annex II

# An Assessment of Nutritional Surveillance Systems for Crisis Management in Asia

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

### Criteria for Evaluating Nutritional Surveillance Systems in Asia

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

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

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

# **Annex III**

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

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

### **PRINCIPLES: VISION FOR 2010**

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

supplementation, dietary diversification, breastfeeding promotion, and other public health measures.

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

### **NATIONAL STRATEGIES**

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

### **NATIONAL ACTIONS**

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

factors needed to identify appropriate and effective vehicles for fortification.

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

### REGIONAL STRATEGIES

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

### REGIONAL ACTIONS

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

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

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

# GLOSSARY

**Body mass index (BMI).** A measure of adult nutritional status, essentially thinness, defined as weight in kilograms of an adult divided by the square of the height in meters.

**Capacity assessment.** A structured and analytical process whereby the various ingredients and influences of capacity are assessed within a broader systems context.

**Complementary feeding.** The process of introducing semisolid foods into the diet of young children, in addition to continued breastfeeding, from around six months of age.

**Disability-adjusted life year (DALY).** A measure of the consequence of a particular condition of ill health or malnutrition, which combines years of life lost to premature death with years lived with a disability of specified severity and duration. One DALY is thus one lost year of healthy life.

**Effectiveness.** The impact of an intervention under real world conditions, when programs are scaled up to reach large populations.

**Efficacy of an intervention.** Essentially its potential effect, or its impact under ideal conditions, when the components of the intervention are delivered directly to all individuals in the target group.

**Governance.** The norms, traditions, and institutions through which a country exercises authority for the common good.

**Height for age.** An indicator of the degree of stunting of a child (see Stunting), defined as his/her height in relation to the median height of a reference population of that age.

**Low birth weight (LBW).** Weighing less than 2,500 grams at birth.

**Prelacteal feeding.** This is the potentially harmful practice of delaying breastfeeding and feeding the newborn such foods as milk, honey, or sugar water. These prelacteal feeds are unnecessary and can introduce infection in the baby. They also interfere with the physiology of lactation and delay establishment of breast milk.

**Social capital.** The ability of individuals to secure benefits as a result of membership in social networks or other social structures. The strong ties connecting family members, neighbors, and close friends can be referred to as “bonding” social capital. The weak ties connecting individuals to work colleagues, fellow members of religious or civic organizations, and business associates can be referred to as “bridging” social capital, which implies horizontal connections, to people with similar economic status and political power. “Linking” social capital refers to vertical ties between the poor and people in positions of influence in formal organizations, such as the state.

**Stunting.** The anthropometric index height-for-age reflects linear growth achieved pre- and postnatally with its deficits indicating long-term, cumulative effects of inadequacies of nutrition and/or health. Shortness in height refers to a child who exhibits low height-for-age that may reflect either normal variation in growth or a deficit in growth. Stunting refers only to shortness that is a deficit, or linear growth that has failed to reach genetic potential as a result, most proximally, of the interaction between poor diet and disease. Stunting is defined as low height-for-age, i.e., below -2 standard deviations (SD) (or -2 Z scores) of the median value of the National Center for Health Statistics/World Health Organization International Growth Reference for length- or height-for-age

**Total goiter rate (TGR).** The prevalence of goiter—enlargement of the thyroid gland—in a specific population group, usually expressed as a percentage. Goiter reflects significant iodine deficiency in the population.

**Triple A cycle.** Pioneered by UNICEF (UNICEF 1990), this is a participatory decision-making process whereby the problem of malnutrition is assessed (in terms of its nature, extent, and distribution) and its causes analyzed, along with the available resources to combat it, followed by a decision on an appropriate mix of actions.

**Underweight.** The anthropometric index weight-for-age represents body mass relative to age. Weight-for-age is influenced by the height of the child and his or her weight and is thus a composite of stunting and wasting (which makes its interpretation difficult). In the absence of wasting, both weight-for-age and height-for-age reflect the long-term nutrition and health experience of the individual or population. General lightness in weight refers to a child having a low weight-for-age. Lightness may represent either normal variation or a deficit. Underweight specifically refers to lightness that is a deficit and is defined as low weight-for-age, i.e., below -2 SD (or -2 Z scores) of the median value of the National Center for Health Statistics/World Health Organization International Growth Reference for weight for age.

**Wasting.** A recent and severe process that has produced a substantial weight loss, usually as a consequence of acute starvation and/or severe disease. Chronic dietary deficit or disease can also lead to wasting. The anthropometric index weight-for-height reflects body weight relative to height. Thinness refers to low weight-for-height and may indicate normal variation or a deficit in weight. Wasting refers to thinness that is a deficit, defined as low weight-for-height, i.e., below -2 SD (or -2 Z scores) of the median value of the National Center for Health Statistics/World Health Organization International Growth Reference for weight for height. The statistically expected prevalence of wasting (as with underweight and stunting) is between 2 and 3 percent, given the normal distribution of wasting rates.

**Weight for age.** An indicator of the degree of underweight of a child (see Underweight), defined as his/her weight in relation to the median weight of a reference population of that age.

**Weight for height.** An indicator of the degree of wasting of a child (see Wasting), defined as his/her weight in relation to the median height of a reference population of that age.

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**Z-Score.** The standard deviation of an international growth reference for an anthropometric indicator (such as weight-for-age, height-for-age, or weight-for-height).

# ABBREVIATIONS

BMI	body mass index
CGIAR	Consultative Group on International Agricultural Research
CHD	coronary heart disease
DALY	disability-adjusted life year
FFE	Food For Education Program
Hb	hemoglobin
GDP	gross domestic product
GMP	growth monitoring and promotion
HIV	human immuno-deficiency virus
ICCIDD	International Council for the Control of Iodine Deficiency Disorders
ICDS	Integrated Child Development Services
IDA	iron deficiency anemia
IDD	iodine deficiency disorders
IUGR	intrauterine growth retardation
LBW	low birth weight
MIS	management information system
NIDS	national immunization days
NIS	nutrition information system
NGO	nongovernment organization
PRC	People's Republic of China
RETA	regional technical assistance
TGR	total goiter rate
UNICEF	United Nations Children's Fund
VAD	vitamin A deficiency
WHO	World Health Organization