3
Routes to Better Nutrition

This chapter summarizes what we know about the main interventions for improving nutrition, on both the demand and the supply side, and identifies areas where we need to know more. It outlines two routes to improving nutrition—the long route via birth spacing, food policies, and women's education, and the shorter route via health and nutrition services, micronutrient supplementation, conditional cash transfers, and nutrition education. This chapter also draws two main conclusions about nutrition programs. When it comes to dealing with low birthweight, overweight, and diet-related noncommunicable diseases (NCDs), and with the complex interactions between malnutrition and HIV/AIDS, there are no tried and tested models for effective large-scale programs; action research and learning-by-doing are the priority in these areas. Large-scale HIV initiatives must incorporate attention to nutrition if they are to succeed. By contrast, when it comes to tackling child undernutrition and micronutrient malnutrition, there are several examples of large-scale programs that have led to substantial improvements in nutrition and health behavior and outcomes; scaling up such programs in other countries is the obvious next step. This chapter emphasizes the importance of policy as well as programs. The conclusions are that more attention needs to be paid to the policy process, to ensure that paper policies get translated into action, and that more attention needs to be focused on the unintended effects on nutrition of macroeconomic policies and sectoral policies outside nutrition because they often have haphazard or negative effects that work against the objectives of improving nutrition.

Long and Short Routes to Better Nutrition

A wide variety of policies and programs can improve nutrition (table 3.1). Table 3.1 also illustrates that there are supply- and demand-side approaches to reducing undernutrition. Supply-side approaches include increasing the availability of appropriate foods at affordable prices, improving access to micronutrients, and improving basic health services—immunization, for example, prevents diseases that set back children's growth. There are two types of demand-side approaches. One consists of ways to increase the demand for food, or for health or nutrition services (column 2 of table 3.1). The other consists of changes to behavioral practices related to what is eaten and fed, and to workloads and exercise (column 3 of table 3.1). Most nutrition interventions require changing eating, feeding, or exercise behaviors to have an effect. The fact that many poor children are adequately nourished and many nonpoor children are malnourished emphasizes the critical importance of child-care behavior.

Each country needs to decide on the appropriate balance between the long route and the short route and between supply-side and demand-side approaches to improving nutrition, depending on their capacities, the epidemiology of the problem, and political and institutional considerations. Although both long and short routes are important and should be part of national strategies, this report focuses on the short routes and emphasizes the importance of improving child feeding and caring practices in pregnancy and infancy, for the following reasons:

- Malnutrition's most serious and lasting damage is either during pregnancy or to very young children (chapter 2).
- Several short route interventions can improve child nutrition fast—in two to five years, within the time frame in which politicians need to see results.
- These interventions are affordable at scale by all but the very poorest countries.
- Reducing income poverty or improving the food supply without changing the way young children are cared for often does little to improve nutrition (box 3.1 and see table 1.4).
- Most countries have invested more in food and health than in improving mothers' knowledge and practice of child care and feeding.

Annex 1 lists more than 25 countries where different short route interventions have been successful, while annex 2 discusses long routes to improving nutrition in more detail. The remainder of this chapter discusses some key lessons learned in four types of short route programs—growth

Table 3.1 Routes to better nutrition

Supply-side incentives	*Demand-side incentives*	*Demand-side behavior change*
Long routes		
• Primary health services (such as family planning) and infectious disease control • Safe water and sanitation • Policies on marketing breast milk substitutes • Food and agricultural policies to increase supply of safe and healthy food, or of healthier foods • Food industry development and market incentives (disincentives) for developing healthy (unhealthy) food • Fruit and vegetable production • Parks, bike paths, recreation centers	• Economic development (incomes of the poor) • Participatory programs and policy development • Employment creation • Fiscal and food price policies to increase poor peoples' purchasing power for the right kind of foods • Marketing regulation of unhealthy foods	• Improving women's status • Reducing women's workload, especially in pregnancy • Increasing women's education
Short routes		
• Community-based nutrition and health services (community growth promotion programs, community Integrated Management of Childhood Illnesses [C-IMCI]) • Facility-based nutrition and health services (health and nutrition services, and antenatal care) • Micronutrient supplements • Micronutrient fortification • Targeted food aid • Biofortification	• Conditional cash transfers • Microcredit cum nutrition education • Food supplementation • Micronutrient supplements • Food stamps • Targeted food aid	• Maternal nutrition, knowledge, and care-seeking during pregnancy and lactation • Infant and young child feeding • Weight control education • Hygiene education • Promoting healthy life styles (increase physical activity; consume more fruits and vegetables and less salt, sugar, and fat, and so on)

promotion programs for young children, low birth-weight prevention programs, micronutrient programs, and food assistance and social protection programs—before summarizing the less well-developed state-of-the-art with regard to tackling undernutrition associated with HIV/AIDS and issues of overweight and obesity.

Community-Based Growth Promotion Programs

These programs' main interventions are nutrition education or counseling (either with or without growth monitoring)—especially concerning maternal care and rest during pregnancy, exclusive breastfeeding and appropriate complementary feeding practices, birth spacing, and how to care for sick children—and links to essential health services. Some programs have also provided micronutrient supplements or food supplements for children and pregnant and lactating women. Throughout this report, we use the term "growth promotion" to refer to such community-based programs.

Box 3.1 Why malnutrition persists in many food-secure households

- Pregnant and nursing women eat too few calories and too little protein, have untreated infections, such as sexually transmitted diseases that lead to low birthweight, or do not get enough rest.
- Mothers have too little time to take care of their young children or themselves during pregnancy.
- Mothers of newborns discard colostrum, the first milk, which strengthens the child's immune system.
- Mothers often feed children under age 6 months foods other than breast milk even though exclusive breastfeeding is the best source of nutrients and the best protection against many infectious and chronic diseases.
- Caregivers start introducing complementary solid foods too late.
- Caregivers feed children under age two years too little food, or foods that are not energy dense.
- Though food is available, because of inappropriate household food allocation women and young children's needs are not met and their diets often do not contain enough of the right micronutrients or protein.
- Caregivers do not know how to feed children during and following diarrhea or fever.
- Caregivers' poor hygiene contaminates food with bacteria or parasites.

Box 3.2 Food security versus nutrition security?

It is important to distinguish between food security and nutrition security, two quite different terms often used interchangeably in the literature. Food security, an important input for improved nutrition outcomes, is concerned with physical and economic access to food of sufficient quality and quantity in a socially and culturally acceptable manner. Nutrition security is an outcome of good health, a healthy environment, and good caring practices in addition to household-level food security. For example, a mother may have reliable access to the components of a healthy diet, but because of poor health or improper care, ignorance, gender, or personal preferences, she may not be able to or may choose not to use the food in a nutritionally sound manner, thereby becoming nutritionally insecure. Nutrition security is achieved for a household when secure access to food is coupled with a sanitary environment, adequate health services, and knowledgeable care to ensure a healthy life for all household members.

A family (or country) may be food secure, yet have many individuals who are nutritionally insecure. Food security is therefore often a necessary but not sufficient condition for nutrition security.

Program experience

Successful, large-scale child growth promotion programs were established as long ago as the 1980s in India's Tamil Nadu state,[1] Indonesia,[2] and Thailand,[3] and continue in Bangladesh,[4] Honduras,[5] Madagascar,[6] and Senegal,[7] among other countries. Such programs lead to a sharp decline in severe malnutrition in the first one to two years, with a slower rate of decline in moderate and mild malnutrition thereafter. A recent cross-country review of successful programs concludes that they led to an average fall in young child malnutrition of one to two percentage points a year—two to four times the 0.5 percent rate calculated as the average trend in the absence of such programs.[8]

Aside from the importance of targeting pregnant women and children under two years of age, those most vulnerable to malnutrition, key lessons about designing growth promotion programs include the following:

- Female community workers are the best people to deliver services because they are less expensive than skilled health workers, on the spot,

and able to communicate with mothers better than men. Low levels of formal education are not an impediment to workers' effectiveness so long as they are well trained.
- Because moderate and mild malnutrition are not readily apparent, regular monitoring of children's weights on a growth chart is important, so mothers know whether their children are growing properly and can see the benefits of changes in practices; however, growth monitoring and promotion only work where programs can provide good training and effective supervision in weighing, recording, and counseling mothers, as well as other options for establishing regular contact with mothers.
- Well-designed and consistent nutrition education, aimed at changing specific practices, is key. There are two ways to ensure that recommended child feeding and care practices make sense for poor people in their cultural and economic context (box 3.3).

Breastfeeding promotion and appropriate complementary feeding for children are a central part of growth promotion programs listed as a short route to improving nutrition in table 3.1. But they deserve special mention, both because adequate breastfeeding and complementary feeding could prevent more than twice as many deaths of children under age five as any other intervention[9] and because there are ways to improve these interventions besides growth promotion programs. An important policy intervention is enforcing the International Code on the Marketing of Breast Milk Substitutes, which prevents inappropriate promotion and marketing of commercial infant formula products. A second way to improve breastfeeding is through the Baby-Friendly Hospital Initiative, which applies a 10-step process to improve practices in the labor and delivery wards of hospitals. The tenth step, focusing on follow-up at the community level, has been among the most challenging to implement. A third intervention, peer-to-peer counseling on breastfeeding (such as through La Leche League), has been used throughout the world to extend breastfeeding support to communities.

Where we need to know more

Key questions remain:

- Inadequate training, support, and motivation for community workers are often the main reasons for unsuccessful implementation of growth promotion programs. What would be the most appropriate and sustainable human resource strategies for community health workers to

Box 3.3 Ensuring that new behavioral practices make sense for poor people

Learning from "positive deviants"
A good way to ensure new practices make sense is to see what positive deviants—poor women with well-nourished children—are doing right. Positive practices include everything from breastfeeding from both breasts in Indonesia, to building crude playpens in Bangladesh to keep children from contracting disease from dirty floors, to actively feeding fussy eaters in Mexico and Nicaragua, to adding locally scavenged protein sources to complementary foods in Vietnam.

Source: Marsh and Schroeder (2002); Zeitlin, Ghassemi, and Mansour (1990).

Trials of improved practices (TIPs)
TIPs is a consultative process to develop locally appropriate, culturally acceptable counseling messages that address resistance points and play to motivating factors. Formative researchers visit mothers to discuss child-feeding problems and possible solutions and negotiate changes in practice. They revisit when mothers have tried out the new practices and make modifications depending on what is found to be feasible. Experience with TIPs in more than 15 countries in Africa, Asia, and Latin America shows that trials with as few as 50 families, at a cost of $8,000 to $30,000 per country, can generate valid, programwide findings. For a how-to manual, see Dicken, Griffiths, and Piwoz (1997).

Source: Costing information, personal communication with Marcia Griffiths.

complement health care systems (for example, remuneration and incentives, pre- and in-service training methodologies, and good continuing education for community workers and supervisors) in resource-poor settings where capacity is weak?

- Mothers and caregivers often face challenges in implementing advice on improving the care and feeding of young children. How best can we maximize family and community involvement to help them implement improved child-care and feeding practices at home?
- Food supplementation is expensive, often taking up to 50 percent of the cost of a community-based nutrition program. Supplementing food for pregnant women and adolescent girls, which can improve birthweight and reduce maternal depletion, is especially expensive because they eat

more than children. Under what circumstances is it cost-effective for countries to fund food supplementation for children (or mothers) as part of growth promotion or nutrition education programs, and how best can this food be targeted?

Low-Birthweight Prevention Programs

About 16 percent of infants globally have low birthweight, though these figures vary considerably from region to region.[10] As noted in chapter 2, infants with low birthweights are more likely to die, more likely to become malnourished, and more vulnerable to adult-onset chronic diseases than children born at normal weight. Preventing low birthweight, however, requires attention to more than nutrition. Prematurity, short maternal stature, infections, cigarette smoking, alcohol and drug use, very young maternal age, indoor air pollution, domestic violence, closely spaced pregnancies, hypertension, stress, and malaria all contribute to low birthweight.[11] Some strategies for preventing low birthweight are short route (malaria prophylaxis and treatment programs, iron and folate supplementation, food supplementation); others are longer route (smoking cessation, domestic violence, birth spacing). Some causes are easier to deal with; some can be dealt with through prenatal care; and others require intervention before pregnancy, even as early as childhood.

The technical efficiency of some of the shorter route interventions is relatively well known: iron and folate supplementation, malaria prophylaxis, and food supplementation, when well targeted and implemented, have all been shown to have a positive effect on low birthweight or the health outcomes of the mother-child dyad during and after pregnancy. Other relevant interventions—such as preventing unwanted pregnancy, reaching women before and during pregnancy with appropriate services, overcoming social and cultural barriers to care seeking and behavior change (for instance, women in many regions of the world are thought to "eat down" during pregnancy to avoid having a large baby and a difficult birth), and convincing the woman and her family that her health is worthy of investment—may take longer. Furthermore, because many of the decisions or the circumstances happen either before marriage or soon after marriage, a focus on adolescent girls and newly married couples seems appropriate.

Program experience

Recent evaluation results from the large-scale Bangladesh Integrated Nutrition Project (BINP) project[12] suggest that BINP improved selected knowledge and practices related to pregnancy by 20 to 40 percentage points.

There is some evidence that one of these practices (eating more during pregnancy) is associated with an 88-gram increment in birthweight among those reporting the practice. The evidence suggests little or no additional effect on pregnancy weight gain or birthweight for the population as a whole; however, consistent with theoretical expectations, subgroup analysis suggests sizable effects on birthweight among women who report that they eat more during pregnancy (an additional 88 grams), and an even greater impact among the destitute who report that they eat more during pregnancy (an additional 270 grams).

Such large effects have not been demonstrated in effectiveness trials, primarily because few studies have looked at the mother-child dyad as a combination, instead focusing on the effect on either the mother or the child. Also, most evaluations have looked at a population as a whole, rather than at groups that have a potential to benefit. In the United States, the Women, Infants, and Children Program has successfully reduced low birthweight through a combination of providing food coupons and linking pregnant women to prenatal health care. This approach is akin to the conditional cash (food) transfers referred to in earlier sections, albeit not the same. Its applicability to less developed countries still needs to be tested. Results from the recent community trials of micronutrient supplementation in Nepal also demonstrated that iron and folic acid supplementation can reduce low birthweight by 16 percent, with mixed results on the added value of multiple micronutrient supplementation.[13]

Most mother-child food supplementation programs have documented more success with the child than with the mother. Until recently, the effect of food supplementation on birthweight has been demonstrated primarily in research settings (Narangwal in India, Four Village Study in Guatemala, Dunn Nutrition Centre studies in The Gambia, milk fortification in Chile).[14] The size of this effect was 50 grams of birthweight for every 10,000 additional calories in pregnancy (in Guatemala and Indonesia). Programs have tried creative ways to overcome the cultural resistance to eating more during pregnancy or to resting during pregnancy. The Tamil Nadu Integrated Nutrition Project (TINP) project in India provided a supplementary snack food to pregnant women, which was accepted largely because of its timing, convenience, and image as a snack, though there is little documented evidence of improvements in birthweight in TINP.[15]

Family planning, antismoking, malaria prevention, adolescent health, and reproductive health programs have all had some success, sometimes at large scale, but primarily as vertical efforts.[16] The challenge in preventing low birthweight at large scale is to combine forces, collaborate across departmental lines within and beyond ministries of health, and overcome

the formidable problems of health service access, cultural barriers, and women's powerlessness and lack of self-confidence, while combining preventive, therapeutic, and behavioral change approaches. Although this approach has not been demonstrated at scale yet, the potential for success through such integrated programming is there, especially as countries move from projects to programmatic and sectorwide approaches.

Where we need to know more

The evidence for large-scale programs that improve birthweight is much thinner than that for growth promotion or micronutrient programs. Intervention strategies for addressing low birthweight need to be tested at scale in more countries and in more integrated programmatic environments, rather than in vertical project approaches that are rarely sustainable. The scaled-up experience from Bangladesh needs to be reviewed carefully to see how strategies can be fine-tuned to maximize impact. Because food supplementation is a large part of the cost of such programs,[17] the targeting and cost-effectiveness of food supplementation in pregnancy needs to be reviewed very carefully to maximize effects for the mother-child dyad (as opposed to effects on birthweight alone).

Micronutrient Programs

Fortifying foods and providing vitamin and mineral supplements are inexpensive ways to address the widespread problem of micronutrient malnutrition. They can improve economic productivity and economic growth, enhance child and maternal survival, and improve mental development and intelligence in children (chapter 1). "No other technology offers as large an opportunity to improve lives at such low cost and in such a short time."[18]

Program experience

Several countries have successfully iodized their salt supplies, thus reducing goiter and cretinism, preventing mental retardation and subclinical iodine deficiency disorders (IDD), and contributing to improving national productivity. Iodized salt coverage rates of more than 75 percent have been achieved in 26 countries (Burundi, Cameroon, the Central African Republic, Eritrea, Kenya, Nigeria, Rwanda, Uganda, and Zimbabwe; Bolivia, El Salvador, Honduras, Nicaragua, Paraguay, Peru, and Venezuela; Armenia, Kazakhstan, and Turkmenistan; Bhutan, China, Lao PDR, and Vietnam; and Iran, Lebanon, and Syria; see map 1.4).[19] Success with salt iodization, as with other forms of fortification, depends partly on how many

manufacturers there are, especially small-scale producers—the smaller the number, the easier it is to develop and regulate the program; how strong the legislative and regulatory system in the country is; and what proportion of the vulnerable have access to commercially fortified foods. Other success factors, more under the control of governments, include the need to:

- Mount public awareness and advocacy campaigns so people know the benefits of using iodized salt.
- Complement the carrot of awareness campaigns with the stick of legislation requiring iodization.
- Back legislation with effective enforcement by ensuring that the amount of iodine in salt is monitored and that only iodized salt is sold in shops and markets.

Developed countries have long fortified milk and breakfast cereals with vitamin A (and other vitamins and minerals), but in developing countries sugar has so far been the most successful vehicle. In Central America, Guatemala's sugar fortification program has virtually eliminated vitamin A deficiency; big reductions have also been seen in El Salvador and Honduras, where fortification was combined with supplementation.[20] Sugar fortification and vitamin A supplementation were also combined in Zambia beginning in 1998, with demonstrated success so far in urban areas.[21] But in much of Africa and Asia the poor do not consume as much sugar as they do in Latin America, so other countries are experimenting with fortifying wheat flour, cooking oil, and MSG (monosodium glutamate) with vitamin A.

Research has shown that vitamin A supplementation can reduce young child mortality in deficient populations by an average of 23 percent.[22] Vitamin A supplements lend themselves to distribution through a campaign approach because children require only two annual doses. Countries as different as Nicaragua,[23] Niger,[24] and Nepal[25] have reached coverage levels of more than 80 percent (see map 1.3). Most campaigns were originally attached to National Immunization Days, but as these are phased out in favor of immunization as a routine part of health services, countries have found other focuses for campaigns—for example, piggybacking on the Day of the African Child and World AIDS Day in Tanzania,[26] or creating twice-yearly National Micronutrient Days, following the example of the Philippines and Niger.

Iron programs to combat anemia have been less successful than iodized salt and vitamin A programs, yet models exist here too. Flour fortification with iron has substantially improved iron status across all population groups in Chile and Venezuela,[27] and rice fortification with iron improved the iron status of school children in the Philippines.[28] A promising large-scale

trial of fortifying soy sauce in China also showed that it is a cost-effective way to reduce the prevalence of anemia ($0.0007 per person per year)[29] among all population groups. Several small-scale community-based trials on home fortification with sprinkles for young children in Africa and in Asia have demonstrated that such innovations are feasible and as effective as commonly used ferrous sulphate drops in reducing the prevalence of anemia.[30] The challenge of scaling up these programs remains.

Where anemia is serious and widespread, as in much of South Asia, fortification may not meet the iron needs of vulnerable groups such as pregnant women, and supplementation is also required. Iron supplementation has proved more challenging than vitamin A supplementation because the supplement has to be taken daily and sometimes has perceived side effects. Consequently, there have been problems with the logistics of supply and sometimes with compliance. Indonesia and Thailand have made the most progress in reducing anemia. A practical publication called "What Works in Anemia Control"[31] provides guidelines based on their experience and that of more than 20 other countries that have programs with aspects worth replicating.

Last but not least, the Harvest Plus program is a promising initiative in which the international agricultural and research centers have begun to develop new breeds of staple foods that are rich in key vitamins and minerals using a new approach to fortification termed biofortification (see www.harvestplus.org for details).

Where we need to know more

Key questions remain:

- Under what circumstances is micronutrient supplementation more cost-effective than fortification? How can the two strategies best be combined to complement each other?
- What is the scope for alleviating micronutrient malnutrition through breeding and consuming micronutrient-rich crop varieties and emerging strategies such as biofortification?
- How best can we maximize the opportunities for developing effective multisectoral partnerships (or National Fortification Alliances) with clear financial and operational commitments from all partners?

Food and Social Protection Programs

Program experience

Food assistance and social protection programs can be either long or short routes to improving nutrition. There are lessons about what does and what does not work.

Two types of food assistance seldom work as nutrition interventions. General food subsidies can increase the food consumption of the poor, but they are a prohibitively expensive way to reduce malnutrition (box 3.4). School feeding programs can sometimes be justified in terms of providing an incentive for children to go to school and to perform better, but they are seldom a cost-effective nutrition intervention simply because undernutrition does its principal damage to preschoolers. Yet many governments try to justify school feeding for its nutritional benefits; if this means that school feeding comes out of the health and nutrition budget rather than the education budget, it can have big opportunity costs for programs that improve the nutrition of preschoolers. Nutrition education, iron supplements, and deworming are usually better school nutrition investments than school feeding. Iron supplements and deworming have been shown to improve schooling outcomes as well.[32]

Box 3.4 Food subsidies versus targeted social safety net programs

Countries often resort to general food subsidies as a nutritional safety net program. Unfortunately, these programs are usually expensive and poorly targeted, and sometimes have perverse effects. Subsidies in the Republic of Yemen in the 1990s consumed more than 16 percent of the government budget and almost 5 percent of GDP, and yet only 7 percent of the benefits reached the poorest quintile of the population.[33] In Morocco in the mid 1990s, the wheat flour "subsidy"—really a producer support program—was not only regressive and had a high opportunity cost (the 1.7 percent of GDP it cost could have been invested to generate substantial employment for the poor), but also had a negative environmental effect by encouraging farmers to expand wheat production onto more fragile lands.[34] The good news, at least in the Middle East and North Africa, is that significant policy reforms have since taken place to replace food subsidies with more targeted and effective social safety nets.

By contrast, food subsidies that are regular and significant, but tightly targeted to poor, malnourished populations, can be a cost-effective way to improve household food security—provided they are coupled with counseling services to help ensure that the additional food gets to the most vulnerable household members.[35] Targeting is often best achieved by subsidizing foods that are unattractive to nonpoor people. Furthermore, it has been found that subsidies in the form of food stamps do more to increase food consumption than the equivalent cash transfer. Yet improving household food security is usually a long route to better nutrition, for the reasons given in box 3.1. When can food or cash transfers be short routes to improving nutrition? Experience suggests this happens mainly in three situations:

- *When food assistance is made rapidly available to families who have suffered a serious food security shock, such as a crop failure.* In such circumstances, it can safeguard children's as well as mothers' nutrition.[36] But such aid needs to be well targeted and timely, so success depends on an effective early warning system, easily applicable targeting criteria, and a good storage and distribution network.
- *When food coupons or cash transfers to poor families are made conditional on beneficiaries using health and nutrition services.* Conditional transfers were first tried in Honduras to protect the poor from the shock of structural adjustment, and then adopted by other Latin American countries as human development programs.[37] Evaluations in Mexico,[38] Colombia,[39] and Nicaragua[40] show that conditional transfers, though costly, work when there is political commitment and when they target the right population with the right combination and quality of services (box 3.5). An important lesson is that these programs rapidly increase demand; hence, it is crucial to invest ahead of time in increasing service coverage for the poor, so supply can meet demand. In that context, conditional cash transfer programs can be an important component of both demand-side behavior change and supply-side interventions (see table 3.1).
- *When food supplements for children aged 6 to 24 months are used to educate mothers about the benefits of feeding small, affordable, additional amounts.* As India's experience with food supplementation shows (see technical annex 4.1A), such programs need to be carefully designed if they are to improve home feeding practices and families' self-reliance, rather than becoming welfare entitlements that increase dependence on government.

Conditional cash transfers may be an expensive option for effective nutrition interventions in poorer countries. An argument may be made that where governments may have decided for other reasons to make these transfers, adding a conditional element and linking it to enhanced supply

Box 3.5 Evidence that conditional transfer programs can work

One of the best known programs, Mexico's PROGRESA (now called Oportunidades), aims to break the intergenerational transfer of poverty by encouraging poor families to use education, health, and nutrition services. Between 1997 and 2000, PROGRESA provided cash transfers to nearly 2.6 million rural families (40 percent of the rural total) in return for families participating in services that build human capital, such as schools, immunization services, and health and nutrition education for behavior change. Since 2001, it has also covered 2 million urban families. PROGRESA provides nutrition education, growth monitoring, and micronutrient-fortified foods to children aged 4 to 23 months, malnourished children aged 2 to 4 years, and pregnant and lactating women. Children who benefited from PROGRESA, compared with the control group that benefited one to two years later:

- Had higher median food expenditure and higher intake of energy (7.1 percent).
- Had a better quality diet because they ate more vegetables, fruits, and meat.
- Were about 1 centimeter taller each year.
- Had a more than 10 percent lower incidence of anemia.

PROGRESA's effect was higher among younger children, girls, and children from poorer households. PROGRESA was also seen to have high distributional efficiency among the poorer populations for two reasons: more rural areas were targeted and larger families with more girls got larger transfers.

Source: Gertler (2000); Behrman and Hoddinott (2001); Hoddinott and Skoufias (2003); Handa and Huerta (2004); Rivera and others (2004); Coady (2003).

of services may make supply-side interventions more effective. Yet another variant of conditional cash transfers, a strategy that has not been tried at any large scale, is conditional transfers of food.

Where we need to know more

Most experience with conditional transfers has been in Latin American countries where relatively well-developed service delivery systems mean that supply was able to respond to increased demand. Key questions that remain:

- What scope is there for conditional transfers to work in Africa or Asia, where budgets for transfers are often very limited and health and nutrition services and the capacity to strengthen them are often weak?
- Where governments may have decided for other reasons to make transfers of food or other commodities, such as insecticide-treated bednets, would it be strategic to link these transfers with improved behaviors? Are conditional food transfers an option for improving nutrition?

Malnutrition and HIV/AIDS Programs

In the past several years, an increasing body of evidence has accumulated on the links between malnutrition and HIV/AIDS, and the effect of the two together on economic growth. There is little debate that nutrition plays an integral role in preventing, treating, mitigating, and caring for HIV-positive individuals and affected households and communities (figure 3.1). Yet the strong and devastating interaction between malnutrition and HIV/AIDS—especially in Sub-Saharan Africa, where more than 60 percent of people with HIV/AIDS live and where malnutrition rates are increasing—has only recently been appreciated by policy makers. In a recent consultation on nutrition and HIV/AIDS in Sub-Saharan Africa, WHO and its partners[41] emphasized two points:

- Adequate nutrition cannot cure HIV infection, but is essential to maintain a person's immune system, to sustain healthy levels of physical activity, and to support optimal quality of life.
- Adequate nutrition is also necessary to ensure optimal benefits from the use of antiretroviral treatment, which is essential to prolong the lives of HIV-infected people and prevent transmission of HIV from mother to child.

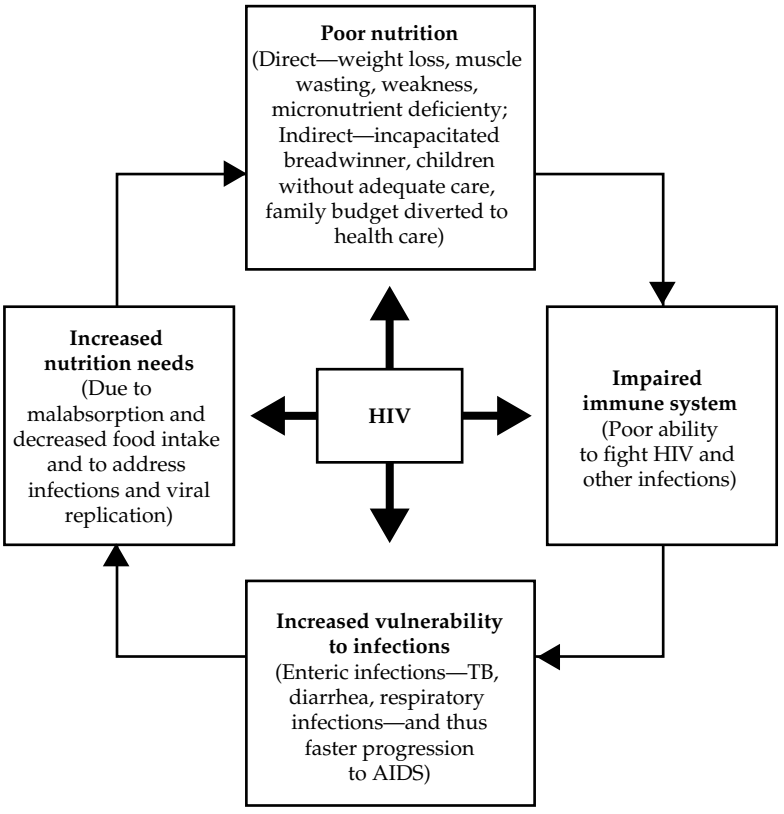
Two further points:

- Exceptional measures are needed to ensure the health and well-being of all children affected and made vulnerable by HIV/AIDS, with young girls especially at risk.
- Knowledge of HIV status is important to inform choices for reproductive health and child feeding.

Such measures will clearly need to include an increased focus on nutrition.

An issue needing special attention is how to balance the well-known benefits of breastfeeding and the risk of HIV transmission through breastfeeding—a risk that is constant throughout the breastfeeding period.[42] The

Figure 3.1 How malnutrition and HIV/AIDS interact



Source: FANTA (2004); modified with information from Gillespie and Kadiyala (2005).

dilemma is that switching to replacement feeding means children miss out on the immunity transmitted through breast milk and so are more susceptible to death or malnutrition from other diseases. The situation is further complicated by the fact that most women in resource-poor settings do not know their HIV status, and there is still uncertainty about the risks associated with different feeding alternatives (such as increased diarrheal disease, stigma associated with not breastfeeding, and spillover effects of formula feeding to mothers who are not HIV-positive). Furthermore, even women who know their status and choose alternative feeding often fall into the trap of mixed feeding (breastfeeding mixed with alternative

milks), an option shown to carry the highest risk of transmission. This default to mixed feeding is usually driven by cultural factors, social stigma, or the unavailability of or infeasibility of using breast milk on a continuous daily basis in hot, humid, resource-poor environments. Recent

Box 3.6 Summary findings of scientific review on nutrition and HIV/AIDS

- For uninfected mothers and mothers who do not know their HIV status, exclusive breastfeeding for six months is the ideal practice because of its benefits for improved growth, development, and reduced childhood infections. Safe and appropriate complementary feeding and continued breastfeeding for 24 months and beyond is recommended.
- HIV-infected mothers should avoid breastfeeding when replacement feeding is acceptable, feasible, affordable, sustainable, and safe. However these conditions are not easily met for the majority of mothers in resource-poor settings. If not feasible, early breastfeeding cessation after exclusive breastfeeding (associated with less HIV transmission than mixed feeding) is recommended for HIV-infected mothers and their infants. The age at which to stop breastfeeding depends on the circumstances of mothers and their infants.
- Although there is no evidence to support a need for increased protein intake by people infected by HIV above that required in a balanced diet to satisfy energy need, energy needs do increase by 10 percent in asymptomatic HIV-infected adults and children and by 20 to 30 percent in adults with more advanced disease. For HIV-infected children experiencing weight loss, energy needs increase by 50 to 100 percent.
- WHO's recommendations on vitamin A, zinc, iron, folate, and multiple micronutrient supplements remain the same. Micronutrient supplements are not an alternative to comprehensive HIV treatment, including therapy with antiretroviral agents.
- Viral load, chronic diarrhea, and opportunistic infections impair growth in HIV-infected children, and poor growth is associated with increased risk of mortality. Improved dietary intake is essential to enable children to regain weight lost after opportunistic infection.
- The lifesaving benefits of antiretroviral therapy are clearly recognized. To achieve the full benefits of such treatment, adequate dietary intake is essential. Dietary and nutritional assessment should be an integral part of comprehensive HIV care, both before and during antiretroviral treatment.

Source: WHO (2005c).

findings on the lower risks of transmission through exclusive breastfeeding, compared with mixed feeding, warrant the promotion of exclusive breastfeeding until further evidence is available—especially in resource-poor environments.[43]

Program experience

Uganda has led the way in incorporating nutrition considerations into counseling for people living with HIV/AIDS with an excellent set of guidelines for service providers.[44] A wide range of other nutrition–HIV/AIDS policy options including social protection and rural livelihood interventions are reviewed by Gillespie and Kadiyala (2005), but there is little or no evidence about the cost-effectiveness of the options or experience with their implementation at scale. However, there are inherent programmatic efficiencies in combining services because the vulnerable groups are similar and a common infrastructure will strengthen coordination, reduce fragmentation of limited service delivery capacity, and increase the quality of program delivery. RENEWAL (Regional Network on HIV/AIDS, Rural Livelihoods, and Food Security), a recently launched international partnership, aims to raise awareness, fill knowledge gaps, and help mainstream nutrition considerations into HIV/AIDS policy and HIV/AIDS considerations into nutrition policy (see www.ifpri.org/renewal). The U.S. Agency for International Development (USAID), through its Food and Nutrition Technical Assistance Project (FANTA) and Support for Analysis and Research in Africa (SARA) project, has been instrumental in keeping nutrition issues in the forefront of the development agenda for HIV research. The World Bank is starting an initiative to include nutrition interventions in Multicountry AIDS Projects (MAPs), starting with two countries, Mozambique and Kenya. The objective is to learn from this experience and to scale up to other countries in the region as well as to other non-MAP initiatives, such as President's Emergency Plan for AIDS Relief (PEPFAR).

Although we are still learning how to combine HIV/AIDS and nutrition interventions, neither the virus nor programs to combat it wait for the science. Large-scale HIV programs are being implemented in many countries, even as research is being carried out and policies developed. The challenges are to speed up research and to incorporate what we know about nutrition and HIV/AIDS as soon as possible into these large-scale programs.

Where we need to know more

Key questions:

- What is the role of improved nutrition in offsetting and mitigating the economic effect of HIV/AIDS in affected households or communities?
- WHO recommends early breastfeeding cessation after exclusive breastfeeding for HIV-positive mothers when alternative feeding is not acceptable, feasible, affordable, sustainable, and safe. What are the effects on growth and nutrition as well as HIV-free survival for children weaned early?
- Under what circumstances is it cost-effective, feasible, acceptable, safe, and affordable to finance replacement feeding for HIV-positive mothers wishing not to breastfeed, and food supplements for people with HIV/AIDS?
- What special nutrition and child care interventions may be needed for the children of parents with HIV/AIDS and single or double HIV/AIDS orphans?
- Daily multivitamin supplements given to HIV-positive adults in the early stage of infection were found, in some studies, to slow HIV disease progression and are therefore suggested to prolong the time before antiretroviral drugs are needed.[45] What is the most effective and efficient regimen for micronutrient supplementation for HIV-positive individuals?
- Could eating more and a better diet, rather than supplements, also delay the onset of AIDS in HIV-positive people and the point at which antiretroviral drugs are needed? What is the relative cost-effectiveness of nutrition interventions for potential cost savings on antiretroviral drug therapy?
- The target group for HIV/AIDS-related nutrition programs is not just mothers and children—the main clients of other undernutrition programs—but a broader population. What does this mean for the design, management, and cost of nutrition and health services?

Where the prevalence of HIV/AIDS is high, it affects not only individuals and families, but also the development prospects of communities and countries: for example, a labor force reduced by HIV/AIDS may compromise communities' capacity to produce food or to find volunteers for community programs. At the same time, lower productivity means governments have less tax revenue to fund development programs. A corresponding set of research questions at the national and global level includes these:

- When HIV/AIDS reduces financial and managerial capacity at the same time as it increases the need for government intervention, what does this mean for:
  - How governments should allocate investment between short routes to improving the nutrition of those with HIV/AIDS, and long routes such as livelihood creation?
  - How development partners allocate investment between development and social protection programs?
- Most work on the interaction between nutrition and HIV/AIDS has been performed in Sub-Saharan Africa. In Asia, where the next phase of the HIV/AIDS pandemic will be concentrated, how will the interaction differ and how should interventions differ?
- What are the opportunities for scaling up nutrition interventions through large scale AIDS programs/projects such as MAPs and PEPFAR?

Programs to Tackle Overweight and Diet-Related Noncommunicable Diseases

The problems of overweight and diet-related NCDs and ways to tackle them are much less well understood than the interventions for undernutrition and micronutrient malnutrition (see technical annex 3.1 for what is known about the problem and potential solutions). Recent research suggests that obesity in school children and adults often has much earlier roots. Malnourished children are more likely to become obese later in life, and there is a growing body of evidence that suggests that maternal food deprivation or low birthweight may program a child to be more prone to adulthood obesity and NCDs.[46] This—along with changes in eating habits and more sedentary lifestyles—helps explain why many developing countries that had high levels of low birthweight and early undernutrition are now experiencing an epidemic of NCDs.

Program experience

Because obesity is largely the result of changing eating habits, physical activity levels, and life styles, it is in principle largely preventable; and in practice, the high cost of treating obesity-related NCDs means that preventing excessive weight gain or promoting weight loss through a combination of nutrition and health education and food policy actions, which promote a healthier diet and lifestyle changes,[47] are the only feasible way forward. However, if maternal deprivation, low birthweight, and early undernutrition predispose children to later obesity, then incorporating obesity prevention interventions into existing nutrition programs is not

entirely incompatible, because undernutrition and micronutrient malnutrition programs mainly focusing on children under age two and pregnant and lactating women will also have a positive effect on obesity. Other important entry points for tackling obesity are ages 4 to 7 years, adolescence, and early adulthood (see technical annex 3.1), so obesity programs inevitably involve a broader target group and hence higher cost and managerial complexity than traditional programs focused on undernutrition.

There is a wide range of potential obesity interventions, ranging from education at the individual level to policy change at the national level (table 3.2). If obesity programs involve health, education, industry, the media, urban planning, transportation, and food and agriculture policy, they will require additional managerial capacity. Yet experience so far is that the seemingly more successful intervention programs, such as Finland's North Karelia project[48] and Brazil's large-scale Agita program,[49] have followed multiple approaches simultaneously. For example, the North Karelia project, launched in the early 1970s to prevent cardiovascular disease through lifestyle and risk factor changes, not only promotes healthy diets (that is, increased consumption of vegetables and fruits and reduced intake of salt), but also generates consumer market pressure for healthier food. Brazil's Agita program targeted school children, older adults, and workers with a combination of special events, informational materials, mass media, training for physical educators and physicians, worksite health promotion, and cooperative ventures with public agencies from several sectors.

One lesson is that health services are not necessarily the main or the best vehicle for achieving behavioral change. Another lesson is that while demand-side interventions (nutrition education) seem the obvious strategy, supply-side interventions such as food policy and pricing of calorie-dense "junk foods" and fruits and vegetables may be equally important. Achieving an appropriate balance between the two may be complicated by conflicts of interest between public health goals (say, eating less energy-dense food) and commercial goals (say, selling more, often energy-dense, products).

A key barrier to scaling up obesity programs is that very few have been well evaluated, partly because different outcome measures have been used and partly because many evaluations focus on changes in clients' awareness, rather than changes in behavior that actually affect obesity. Brazil's program, though better evaluated than most, illustrates this problem; it is clear that the program has led to behavioral change in terms of increased rates of physical activity, but it is not clear what the effects on obesity have been or which components have contributed to the effects.

Table 3.2 The range of interventions for obesity programs

	Intervention types	*Where implemented*
Communication about diet, exercise, and life style changes	Interpersonal	Local clinic,[50] school,[51] workplace,[52] community[53]
	Mass media[54]	Citywide, regionally, nationally
Policy change[55]	Provide parks, bike paths[56]	Locally
	Promote fruit and vegetable growing and perishable food distribution systems[57]	Nationally
	Lower subsidies on sugar and dairy products[58]	Nationally
	Promote better-quality diet (low fat, low sugar) and market regulation[59]	Nationally

Where we need to know more

- Multitarget, multiagency programs such as Brazil's are relatively expensive as well as institutionally demanding. What is the relative cost-effectiveness of different approaches to controlling obesity and diet-related NCDs in different country circumstances? And, what is the appropriate balance between demand- and supply-side interventions?
- In different country circumstances, how should obesity programs be targeted—on those with existing weight problems, on those at risk of obesity, or on the whole community? When in the life cycle are the best windows of opportunity for targeting programs to prevent obesity and diet-related NCDs?
- There seems a clear link between agriculture and food policies and nutrition and health outcomes. What are the intentional or unintentional effects of policies in other sectors on nutrition?
- Other barriers to progress include lack of awareness among politicians of the seriousness of the obesity problem; lack of awareness among economists and financial planners of its costs; and cultural norms among the obese in some societies that weight is not a concern (there is some

evidence that preference for smaller body sizes rises as countries modernize). In such circumstances, how best can we increase commitment to obesity and diet-related NCD prevention programs, among both policy makers and the public, without crowding out the undernutrition agenda?
- What combinations of integrated interventions can cost-effectively address both undernutrition and overweight in nutrition transition countries? What effective policies that promote healthier foods and diets can also target undernutrition and overweight simultaneously?

The Role of Policy

Nutrition policy—the laws, regulations, and rules that govern public budget allocation and action to improve nutrition—is important, as are programs. For example, an appropriate policy framework is important for the success of programs to reduce obesity (box 3.7). In an ideal world, each country would be committed to a nutrition policy outlining quantitative, time-bound nutrition goals; establishing an overarching strategy; prioritizing specific practical and effective policy reforms and programs; and systematizing progress monitoring and reporting.

The policy process

However, experience with nutrition policy making and implementation has by and large been discouraging. Some countries lack explicit nutrition policies altogether. Others have policies that have not been implemented because they suffer from some or all of the following weaknesses:

- They embrace broad goals without setting specific targets, what interventions will be used to achieve them, and who will be responsible.
- They are not based on analysis of what the different interventions will cost and how they will be financed and implemented.
- They are not linked to investment plans and budgets, or to a monitoring and evaluation process that will inform policy makers on their progress.

Beginning in 2000, the United Nations Children's Fund (UNICEF) and the World Bank jointly reviewed their work in nutrition over the preceding 20 years, with particular emphasis on what they had learned about the policy process.[60] Key conclusions were that policy should be based on a more careful review of country commitment and capacity (both financial and managerial) and that strategies should focus on how they will be implemented[61]—unlike several National Plans of Action for Nutrition developed after the 1992 International Conference on Nutrition, which contained no discussion of implementation. Policies and strategies work only if they

are the product of discussion and agreement among stakeholder institutions regarding what they are able and willing to do, and what will be financed and how.

The central importance of the commitment to implement policy can be illustrated by some contrasting country experiences. India developed a national nutrition policy in 1993, a national plan of action for nutrition in 1995, and set up a national nutrition council to oversee implementation. But seven years later the council had not yet met.[62] Thailand paid less attention to formal nutrition policy but based its multisectoral nutrition program on an implementation-oriented investment plan and budget, to which sectoral ministries were committed.[63] Vietnam iodized a substantial proportion of its salt by 1998, even before it formulated policy or legislation for salt iodization—in contrast to the Philippines, which enacted legisla-

Box 3.7 The role of public policy

Policy has a potential role in diminishing the poor health and negative economic outcomes associated with the increase in overweight and obesity in developing countries through both demand-side and supply-side interventions.

Demand-side

- Change the relative prices of healthy and unhealthy foods.
- Provide national diet guidelines and food labels to give clearer information about healthy diet and product contents.
- Provide information campaigns to raise awareness of the consequences of poor diet and obesity.
- Develop appropriate multisectoral approaches to address the marketing of unhealthy food to children.

Supply-side

- Increase investment in agriculture to raise productivity and lower the price of fruits and vegetables.
- Eliminate price incentives for high-fat foods and relax quantity restrictions on healthier foods.
- Regulate trade policies to reduce import tariffs on fruits and vegetables.
- Enforce tougher standards on the fat content of processed foods or food consumed away from home.

Source: Excerpt from Haddad (2003); modified with information from WHO (2004).

tion in 1994, but by 1998 had iodized less than 14 percent of its salt. As the UNICEF-Bank review concluded, "policy is what policy does."[64]

Policy choices

Nutrition policy therefore needs to realistically reflect country commitment and capacity and be part of a process to turn policy statements into action. It also needs to address specific policy choices. Thailand was able to mount a successful multisectoral nutrition program because it was strongly committed to nutrition; because it had the necessary management capacity; and because a cultural tradition of community self-help enabled it to expand its national growth promotion program cheaply, using village volunteers.[65] Other countries may not be in this fortunate position: where commitment or financial and managerial capacity are limited, it may make sense to focus in the short run on limited, achievable nutrition goals within one or two sectors. This prioritization will need careful consideration of the trade-offs among the many actions necessary when malnutrition is widespread and holding back development, and the country's capacity to manage these events is limited. Some key priorities, trade-offs, and mismatches are discussed in the next sections.

Short routes versus long routes. One key policy choice is how much to invest in long route investments, as opposed to short route ones. Where finances are tight, short route interventions often offer more bang for the buck. They affect nutrition more directly, and most countries have invested less in micronutrient and growth promotion programs than they have in food and agriculture—despite the evidence from many countries showing that malnutrition exists even in food-surplus areas and among the nonpoor (chapter 2). If this is the case, the most cost-effective course of action in the short run may be to concentrate additional funds for nutrition on short route interventions, while complementing these by reallocating existing long route expenditures to have more effect on nutrition. For example, this could be accomplished by:

- Focusing agricultural research and extension on crops grown by women because women's income is more likely to be spent on food-related expenditures for women and children.
- Targeting water and sanitation programs to areas where diarrhea is a major contributor to malnutrition.
- Using nutritional status as a criterion for targeting existing social protection programs.
- Optimizing the availability of certain kinds of foods (fruits and vegetables, sugars and fats and oils, junk foods) and influencing the demand for these foods.

Food supplementation versus health care and micronutrient interventions. There are also important policy choices in striking a balance between short route interventions. Many nutrition programs focus on food supplementation in situations where poor access to health services, poor child-care practices, or micronutrient deficiencies are the main causes of malnutrition. For example, a recent review of nutrition priorities in the Poverty Reduction Strategy Papers (PRSPs) of 40 countries where malnutrition is serious showed that whereas vitamin A deficiency and anemia are public health problems in 35 and 34 countries, respectively, only 13 included activities to address these deficiencies.

Micronutrient programs are an attractive policy choice because of their low cost per head. Where both micronutrient malnutrition and undernutrition are problems, and where countries lack the commitment or the funds to go to scale with multiple short route nutrition programs at once, it can sometimes make sense to scale micronutrient interventions up first, while experimenting with how best to organize growth promotion. Although success with micronutrients is no substitute for investing in large-scale growth promotion programs, it can build the commitment to invest more in growth promotion.

Putting more government money into micronutrient supplementation and budgeting for it within the governments' medium-term expenditure frameworks is particularly important if it is to be sustained: many countries are now dangerously dependent on external grants for these efforts, just as they were dependent on grant finance in the early stages of the universal immunization program. Nevertheless, investment in micronutrient programs must not crowd out attention to general undernutrition, as has been the case over the past decade in some countries. Instead, the capacity and confidence built in the process of implementing micronutrient programs could be used as a building block to implement large-scale community-based nutrition programs that require more complex management skills.

Coverage versus intensity. Experience from programs such as those in Bangladesh, Madagascar, and Mexico shows that the tensions between consolidating the quality of program implementation and the political impetus to expand (or to close down) programs need to be managed very carefully. When political commitment is high, too rushed expansion can compromise program quality. Yet the opportunity and political commitment for expansion does not present too often. Balance is the key.

Some countries have tried to increase the coverage of growth promotion programs—as is often politically expedient—at the expense of quality and the intensity of resource use, whether in the ratio of field workers to clients or the ratio of trainers and supervisors to field workers. This trade-off usually

has big costs in terms of quality and effect. A recent review of community growth promotion programs suggests the need for worker-household ratios in the range of 1 to 10 or 20 for part-time volunteers and 1 to 500 for full-time paid workers, and supervisor-worker ratios of about 1 to 20.[66]

Younger children versus older children. Although most undernutrition happens during pregnancy and the first two years of life, and most of this early damage cannot be reversed, many programs.

The poor versus the better off. Though data consistently show that malnutrition is concentrated among the poor, many programs (by design or through faulty implementation) fail to target either the poorest geographic areas, or the poorest people in mixed-income communities. Benefit-incidence analyses should therefore be part of program evaluations and feed into the design of policies and strategies.

Mismatches between the malnutrition problem and the proposed solutions. While most countries do not scale up nutrition programs to any reasonable level (see table 1.8), many do scale up the wrong kinds of programs or interventions. Three mismatches between the need or the cause of malnutrition and the design of programs were identified in India[67] and are common across many other programs:

- *The "food first" mismatch:* Many nutrition programs focus on food security and food supplementation in situations where poor access to health services or poor child-care practices are the main causes of malnutrition.
- *The age-targeting mismatch:* Most undernutrition happens during pregnancy and the first two years of life, and most of this early damage cannot be reversed (chapter 2). Yet many programs continue to expend large resources (especially food) on other age groups (for example, children aged 3 to 6 years, school children). The recent push in Africa for school feeding programs is yet another example of mistargeted resources and is particularly ironic in resource-scarce settings, where it has high opportunity costs.
- *The poverty-targeting mismatch:* Though data consistently show that malnutrition is concentrated among the poor, many programs (whether by design or through faulty implementation) fail to target either the poorest geographic areas or the poorest people in mixed-income communities. Benefit-incidence analyses should be part of all program evaluations.

As mentioned earlier, a recent review of nutrition in the context of PRSPs shows that among 40 countries that have PRSPs, 38 had a micronutrient problem, yet only 23 had specific activities to address micronutrient malnutrition. However, more than 90 percent mentioned food security interventions, even when food security may not have been the major problem.

Intentional and Unintentional Nutrition Policies

Some intentional nutrition policy choices in certain sectors clearly relate to nutrition (box 3.8). In addition, policies in seemingly unrelated sectors can have a strong positive or negative effect on nutrition, in large part through price effects on food and other inputs to good nutrition. For instance, in the mid 1990s, the devaluation of the CFA franc had a large and immediate effect on the Sahelian countries: the urban poor were particularly hard hit, as food prices rose sharply.[68] Another dimension of nutrition policy making is therefore the analysis of the nutrition implications of macroeconomic and sectoral policies, and the development of ways to enhance their positive effects and mitigate their negative ones, for example, by developing compensatory nutrition programs, as Senegal did when the CFA franc was devalued, to cushion the impact on the poor. A wide range of policies can have unintended effects on nutrition (table 3.3).

Box 3.8 Impact of agricultural and food policies on nutrition and health

Agricultural and food policies can affect nutrition and health outcomes both positively and negatively. For example, many Organisation for Economic Co-operation and Development (OECD) countries tend to subsidize grains (such as wheat and maize) more than fruits and vegetables, thereby directly increasing consumption of grains (and indirectly meats), while reducing consumption of fruit and vegetables. A recent review of the European Union (EU) Common Agricultural Policy noted that its support for the cattle sector produced excess dairy products and aided consumption of saturated fats. As a result, diet-related disease, particularly cardiovascular disease, claims more than 7 million years of life annually and obesity-related costs are 7 percent of the EU health care budget.

In Poland, the withdrawal of large consumer subsidies (especially for foods of animal origin) and subsequent substitution of unsaturated for saturated fats and an increased consumption of fresh fruits and vegetables are believed to have decreased the prevalence of ischemic heart disease and mortality from circulatory diseases since 1991.

Source: Gastein Opinion Group (2002); Zilberman (2005); Zatonski, McMichael, and Powles (1998).

Table 3.3 Examples of unintentional nutrition policies

Policy	*Potential nutrition effects*
Foreign exchange	• Overvalued rates favor urban consumers of imported food at the expense of rural food producers, who are at greater nutritional risk.
Trade	• Protecting local food producers by restricting imports raises consumer prices and net food purchasers (including most poor farmers) are taxed. • Customs and border controls on import of unfortified food where food fortification is mandatory (as with flour in Bolivia and salt in several countries) promotes nutrition.
Environment	• Preserving forests and parks promotes recreational exercise as part of reducing overweight; forests are a major source of foraged food.
Energy	• Taxation or subsidies on domestic fuels affect the type and amount of fuel used for cooking, which affects diet (for example, choosing to cook refined rice instead of sorghum or millet in the urban Sahel).
Employment	• Policies that require firms to offer breaks to lactating women during which they breastfeed their infants.
Roads and public safety	• Safe bike paths and sidewalks in urban areas help promote recreational exercise (as in the "healthy city" program in Bogotá, Colombia).
Agriculture	• Producer subsidies, publicly financed research, and public investments in infrastructure and markets can implicitly subsidize sugar, large animal livestock, oilseeds, and male-controlled cash crops instead of fruits and vegetables, coarse grains, or women-controlled crops, which affect the availability and price of foods and shift household decision-making power away from women. • Regulations or standards of identity of foods, permitted ingredients, purity, safety, nutritional content, labeling, and marketing can promote or inhibit food fortification (as with salt iodization in India), healthy consumer choices (as in Korea), and nutrition knowledge (as in Europe and the United States).
Health	• National health insurance and guaranteed basic health service packages that include (or exclude) growth promotion, micronutrients, and nutrition counseling can affect nutrition (as in Bolivia). • Regulations restricting marketing and distribution of breast milk substitutes, including through hospitals, can encourage breastfeeding.
Education	• Curricula requiring physical education, nutrition, and consumer education (as in Singapore).

continued

Table 3.3 ***(continued)***

Policy	*Potential nutrition effects*
Social welfare	• Social safety nets targeted to the poor ensure access to a minimum diet (income transfers, food stamps, institutional feeding). • Efforts to ensure the quality, availability, and affordability of early childhood development and parent education programs that include nutrition.

Program experience

Food policy analysis attempts to systematically analyze the effects of such disparate policies on the food consumption and nutrition of the poor.[69] Macroeconomic and sectoral food policy analysis has been conducted in India,[70] Tunisia,[71] Mozambique,[72] and Indonesia,[73] to name a few, and valuable lessons have been learned about how to effect policy transition in this highly politicized subject.[74] Poverty and Social Impact Analyses (PSIAs) take food policy analysis further, by embedding it in poverty strategies, sectoral reform, and structural adjustment. Within countries, it is important to create the capacity to advise policy makers about the nutrition effects of policies in a focal institution, such as a ministry of finance or a poverty monitoring office.

Where we need to know more

Some basic data gaps make it hard to allocate resources sensibly:

- More than 20 African countries lack adequate nutrition status or trend data.[75]
- Many more countries in all regions lack reliable data on the coverage and quality of existing nutrition projects and programs.

Better cost, affordability, and financing analysis are needed almost everywhere, on several subjects:

- What national interventions cost in different country circumstances.[76]
- What financing can be raised by reallocating expenditures on ineffective programs and which programs can be better redesigned and retargeted.

- What additional public spending will be required, and how it can be financed and incorporated into regular government budgets.
- How benefit-incidence analyses can be made a regular part of program evaluations.

Notes

1. World Bank (1994a).
2. Berg (1987).
3. Tontsirin and Winichagoon (1999).
4. World Bank (2002b); Pelletier, Shekar, and Du (forthcoming).
5. Van Roekel and others (2002); Griffiths and McGuire (2005).
6. World Bank (1999b).
7. World Bank (2001b).
8. Mason and others (forthcoming).
9. Jones and others (2003).
10. ACC/SCN (2000).
11. ACC/SCN (2000).
12. Pelletier, Shekar, and Du (forthcoming).
13. Christian and others (2003); Orsin and others (2005).
14. ACC/SCN (2000).
15. World Bank (1994a).
16. Barros and Robinson (2000).
17. OED (2005c).
18. World Bank (1994b).
19. UNICEF and MI (2004a).
20. Mannar and Shankar (2004).
21. Serlemitsos and Fusco (2001).
22. Beaton and others (1993).
23. Mora and Bonilla (2002).
24. Aguayo and others (2005).
25. Fiedler (2000).
26. Masanja and others (forthcoming).
27. Mannar and Shankar (2004).
28. Mannar and Gallego (2002).
29. Chen and others (2005).
30. Zlotkin and others (2005); Sari and others (2001).
31. Galloway (2003).
32. World Bank (2002c).
33. World Bank (1999a).
34. World Bank (1999a).
35. Alderman (2002).
36. Quisumbing (2003); Yamano, Alderman, and Christiaensen (2005).

37. Coady (2003); Rawlings (2004).

38. Behrman and Hoddinott (2000); Gertler (2000); Hoddinott and Skoufias (2003); Handa and Huerta (2004); Rivera and others (2004).

39. Attanasio and others (2005).

40. Maluccio and Flores (2004).

41. WHO (2005c).

42. Coutsoudis and others (2004); Iliff and others (2005).

43. Coutsoudis and others (1999); Iliff and others (2005); Ross and Labbok (2004).

44. Republic of Uganda (2004).

45. Fawzi and others (2004, 2005).

46. Barker and others (1992); Ravelli and others (1998); Barker and others (2002); Barker (2002); Prentice (2003); Barker (2004).

47. Zatonski, McMichael, and Powles (1998).

48. Puska and others (1998); Puska, Pietinen, and Uusitalo (2002).

49. Matsudo and others (2002); Ramsey and others (2002).

50. NICHM (2003); Sothern and others (2000); Sothern and others (2002).

51. NICHM (2003); Coleman and others (2005); Dowda and others (2005).

52. Coleman and Gonzalez (2001); Doak (2002).

53. Matsudo and others (2002); Kahn and others (2002); Puska and others (1998, 2002); Toh and others (2002); WHO (2000a).

54. Lee, Popkin, and Kim (2002); Doak (2002); Carroll, Craypo, and Samuels (2000).

55. Haddad (2003); Hawkes and others (2005).

56. Neiman and Jacoby (2003).

57. Nugent (2004); Lee, Popkin, and Kim (2002).

58. Nugent (2004).

59. Nugent (2004).

60. Gillespie, McLachlan, and Shrimpton (2003).

61. See especially Pelletier, D., "A Framework for Improved Strategies" in Gillespie, McLachlan, and Shrimpton (2003).

62. Gillespie, McLachlan, and Shrimpton (2003).

63. Heaver and Kachondam (2002).

64. Gillespie, McLachlan, and Shrimpton (2003).

65. Heaver and Kachondam (2002).

66. Mason and others (forthcoming).

67. Gragnolati and others (forthcoming).

68. Diagana and others (1999).

69. Timmer, Falcon, and Pearson (1983).

70. World Bank (2001c).

71. Tuck and Lindert (1996).

72. World Bank (1989).

73. Leith and others (2003).

74. World Bank (1999c).

75. Chhabra and Rokx (2004).

76. For a useful guide to nutrition program cost analysis, see Fiedler (2003).