1
Why Invest in Nutrition?

Improving nutrition contributes to productivity, economic development, and poverty reduction by improving physical work capacity, cognitive development, school performance, and health by reducing disease and mortality. Poor nutrition perpetuates the cycle of poverty and malnutrition through three main routes—direct losses in productivity from poor physical status and losses caused by disease linked with malnutrition; indirect losses from poor cognitive development and losses in schooling; and losses caused by increased health care costs. The economic costs of malnutrition are very high—several billion dollars a year in terms of lost gross domestic product (GDP). Relying on markets and economic growth alone means it will take more than a generation to solve the problem. But specific investments can accelerate improvement, especially programs for micronutrient fortification and supplementation and community-based growth promotion. The economic returns to investing in such programs are very high.

Nutrition and Economics

For many people, the ethical, human rights, and national security arguments for improving nutrition or the tenets of their religious faith are reason enough for action. But there are also strong economic arguments for investing in nutrition:

- Improving nutrition increases productivity and economic growth.
- Not addressing malnutrition has high costs in terms of higher budget outlays as well as lost GDP.
- Returns from programs for improving nutrition far outweigh their costs.

Improved nutrition increases productivity and economic growth

Good nutrition is a basic building block of human capital and, as such, contributes to economic development. In turn, sustainable and equitable growth in developing countries will convert these countries to "developed" states.[1] There is much evidence that nutrition and economic development have a two-way relationship. Improved economic development contributes to improved nutrition (albeit at a very modest pace), but more importantly, improved nutrition drives stronger economic growth. Furthermore, as quantified in the Copenhagen Consensus,[2] productivity losses caused by malnutrition are linked to three kinds of losses—those due to:

- Direct losses in physical productivity.
- Indirect losses from poor cognitive losses and loss in schooling.
- Losses in resources from increased health care costs (figure 1.1).

Therefore, malnutrition hampers both the physical capacity to perform work as well as earning ability.[3]

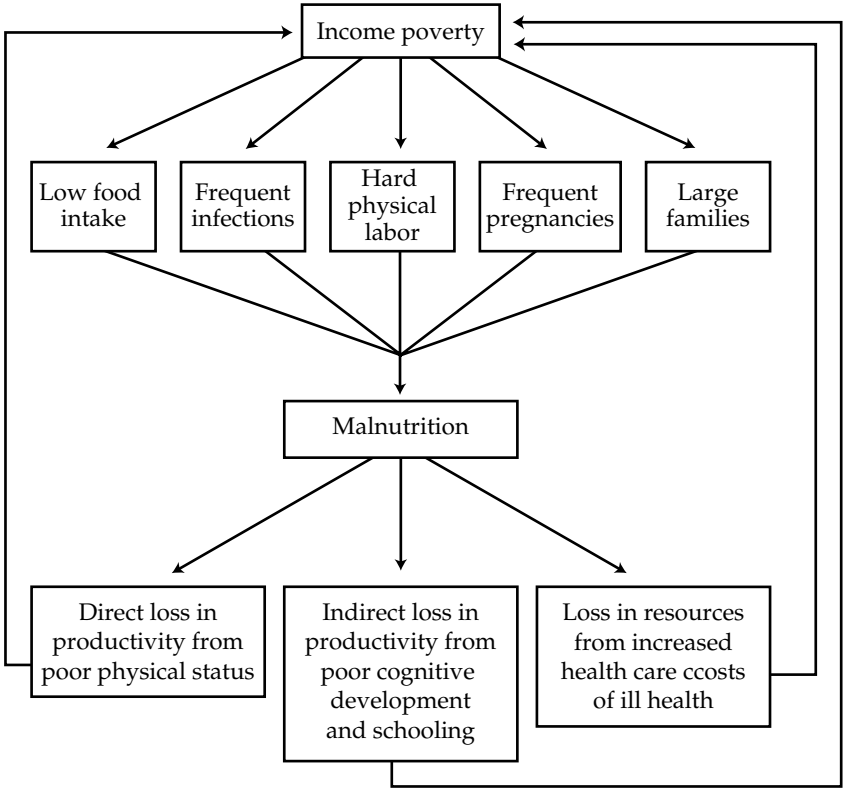
Malnutrition leads to direct losses in physical productivity

Malnutrition leads to death or disease that in turn reduces productivity. For example:

- According to the World Health Organization (WHO), underweight is the single largest risk factor contributing to the global burden of disease in the developing world. It leads to nearly 15 percent of the total DALY (disability-adjusted life years) losses in countries with high child mortality. In the developed world, overweight is the seventh highest risk factor and it contributes 7.4 percent of DALY losses (technical annex 1.1).[4]
- Malnutrition is directly or indirectly associated with nearly 60 percent of all child mortality[5] and even mildly underweight children have nearly double the risk of death of their well-nourished counterparts.
- Infants with low birthweight (less than 2.5 kilograms)—reflecting, in part, malnutrition in the womb—are at 2 to 10 times the risk of death compared with normal-birthweight infants.[6] These same low-birthweight infants are at a higher risk of noncommunicable diseases (NCDs) such as diabetes and cardiovascular disease in adulthood.
- Vitamin A deficiency compromises the immune systems of approximately 40 percent of the developing world's children under age five, leading to the deaths of approximately 1 million young children each year.

- Severe iron deficiency anemia causes the deaths in pregnancy and childbirth of more than 60,000 young women a year.
- Iodine deficiency in pregnancy causes almost 18 million babies a year to be born mentally impaired; even mildly or moderately iodine-deficient children have IQs that are 10 to 15 points lower than those not deficient.
- Maternal folate deficiency leads to a quarter of a million severe birth defects every year.[7]

Figure 1.1 The vicious cycle of poverty and malnutrition



Source: Modified from World Bank (2002a); Bhagwati and others (2004).

The strongest and best documented productivity-nutrition relationships are those related to human capital development in early life. Height has unequivocally been shown to be related to productivity,[8] and final height is determined in large part by nutrition from conception to age two. A 1% loss in adult height as a result of childhood stunting is associated with a 1.4 percent loss in productivity.[9] In addition, severe vitamin and mineral deficiencies in the womb and in early childhood can cause blindness, dwarfism, mental retardation, and neural tube defects—all severe handicaps in any society, but particularly limiting in developing countries.

Anemia has a direct and immediate effect on productivity in adults, especially those in physically demanding occupations. Eliminating anemia results in a 5 to 17 percent increase in adult productivity, which adds up to 2 percent of GDP in the worst affected countries.[10] Malnourished adults are also likely to have higher absenteeism because of illness.

In addition to its effect on immune function, poor nutrition also increases susceptibility to chronic diseases in adulthood (see chapter 2). Diet-related NCDs include cardiovascular disease, high blood cholesterol, obesity, adult-onset diabetes, osteoporosis, high blood pressure, and some cancers. About 60 percent of all deaths around the world and 47 percent of the burden of disease can be attributed to diet-related chronic diseases. About two-thirds of deaths linked to these diseases occur in the developing world, where the major risk factors are poor diet, physical inactivity, and obesity.[11] These diseases are increasing at such a rapid rate, even in poor countries, that the phenomenon has been dubbed "the nutrition transition."[12] Like other types of malnutrition, diet-related chronic diseases have their origins in early childhood, often in the womb. They are strongly associated with both low birthweight and stunting in low-income countries.

Strauss and Thomas (1998) have argued through the efficiency wage hypothesis that there is a relationship between calorie intake and work output. Although the hypothesis has yet to be proven, they have shown that calorie intake has an effect on farm output and piece rates of agricultural laborers. They have also shown that in Brazil and in the United States, height and weight of adults (measured as body mass index, or BMI) both affect wages, even after controlling for education. Among low-income men in Brazil, a 1 percent increase in height was associated with a 4 percent increase in wages. The relationship between BMI and productivity decreases as BMI drops below 18.5, showing that adults with extremely low weights (for their heights) have lower productivity. Adults with a high BMI of 24–26 (an indicator of overweight), also have lower productivity. Although the nutrition and productivity relationship is

strongest for manual labor, it has also been found in the manufacturing sector and among white collar workers.[13]

Malnutrition leads to indirect losses in productivity from poor cognitive development and schooling. Low birthweight may reduce a person's IQ by 5 percentage points, stunting may reduce it by 5 to 11 points, and iodine deficiency by as much as 10 to 15 points.[14] Iron deficiency anemia consistently reduces performance on tests of mental abilities (including IQ) by 8 points or 0.5 to 1.5 standard deviations in children.[15]

Growth failure before the age of two, anemia during the first two years of life, and iodine deficiency in the womb can have profound and irreversible effects on a child's ability to learn.[16] Malnutrition in Zimbabwe has been calculated to reduce lifetime earnings by 12 percent because of its effect on schooling.[17]

Height and weight affect the likelihood that children will be enrolled at the right time in school. Small and sickly children are often enrolled too late (or never), and they tend to stay in school for less time.[18] Malnutrition also affects the ability to learn. Common sense tells us that a hungry child cannot learn properly. Although this is true and short-term hunger does affect cognitive function (particularly attention span),[19] the effects of immediate hunger pale in comparison with the effects on school performance of malnutrition in early life, long before the child ever reaches the classroom. Children who were malnourished early in life score worse on tests of cognitive function, psychomotor function, and fine motor skills and they have reduced attention spans and lower activity levels.[20] These cognitive skill deficits persist into adulthood and have a direct effect on earnings.[21]

Recent studies have shown that that the positive correlation between nutritional status and both cognitive development and educational attainment also applies to children in normal birthweight and height ranges.[22] For example, as birthweight increased by 100 grams among sibling pairs, the mean IQ at age 7 increased 0.5 point for boys and 0.1 point for girls. Educational attainment at age 26 among cohorts with birthweights between 3 and 3.5 kilograms was 1.4 times higher compared with those with birthweights between 2.5 and 3 kilograms. The odds of having attained higher education (beyond compulsory schooling) at age 26 were also 2.6 times higher among the tallest cohort compared with the shortest cohort.

It is also worth noting here that the effect of improved nutrition often extends into the range of what is considered normal—so that improving birthweights has a positive effect even for children above the 2,500-gram cutoff for low-birthweight babies, reducing anemia has similar benefits beyond those for people afflicted with "severe or moderate" anemia, and levels of mortality are higher even among mildly underweight children.

Not addressing malnutrition has high costs in lost GDP and higher budget outlays

Malnutrition costs low-income countries billions of dollars a year. A recent study, for example, showed that preventing one child from being born with a low birthweight is worth $580.[23, 24] At the country level, it has been estimated that obesity and related NCDs cost China about 2 percent of GDP and in India productivity losses (manual work only) from stunting, iodine deficiency, and iron deficiency together are responsible for a loss of 2.95 percent of GDP.[25, 26]

Preventing micronutrient deficiencies alone in China will be worth between $2.5 and $5 billion annually in increased GDP, which represents 0.2 to 0.4 percent of annual GDP in China. Other studies have suggested that micronutrient deficiencies alone may cost India $2.5 billion annually, about 0.4 percent of India's annual GDP.[27] One estimate suggests that the productivity losses in India associated with undernutrition, iron deficiency anemia, and iodine deficiency disorders (IDD), in the absence of appropriate interventions, will amount to about $114 billion between 2003 and 2012 (India's annual GDP is about $601 billion).[28] Another study, examining only the productivity losses associated with forgone wage employment resulting from child malnutrition, estimates the loss at $2.3 billion in India (0.4 percent of annual GDP). In Sierra Leone, lack of adequate policies and programs to address anemia among women will result in agricultural productivity losses among the female labor force exceeding $94.5 million over the next five years.[29]

Malnourished children require more health services and more expensive types of care than other children. Malnourished children have poorer schooling outcomes and may repeat years more often,[30] thus increasing education costs. Developing countries are also spending an average of 2 to 7 percent of their health care budgets on direct costs for treatment of obesity and associated chronic diseases—and the obesity problem is rapidly worsening (see chapter 2). All of these costs fall largely on governments, which provide extensive public sector financing for health and education for the poor.

Returns from programs for improving nutrition far outweigh their costs

Taking into account the reduced mortality, reduced medical costs, intergenerational benefits (reduced likelihood of giving birth to a low-birthweight infant in the next generation), and increased productivity, Behrman, Alderman, and Hoddinott (2004) calculate that the returns from investing in nutrition are high (table 1.1).

Table 1.1 The benefit-cost ratios for nutrition programs

Intervention programs	*Benefit-cost*
Breastfeeding promotion in hospitals	5–67
Integrated child care programs	9–16
Iodine supplementation (women)	15–520
Vitamin A supplementation (children < 6 years)	4–43
Iron fortification (per capita)	176–200
Iron supplementation (per pregnant woman)	6–14

Source: Behrman, Alderman, and Hoddinott (2004).

Costs are rarely evaluated rigorously in development programs, and nutrition programs are no exception. Where data have been collected (table 1.2 and annex 1), many nutrition programs are found to be not only effective, but also efficient. For example, eliminating Vitamin A deficiency alone will save 16 percent of the global burden of disease in children.[31]

Comparable estimates are available from other sources (table 1.3).

Nutrition, economic growth, and markets

The past 20 years have shown that in many developing countries where incomes have increased substantially, malnutrition has not declined correspondingly. This indicates that economic growth and markets alone are not enough to address malnutrition.

How far can economic growth take us?

The income–malnutrition relationship is modest. When gross national product (GNP) per capita in developing countries doubles, nutrition does improve but the changes in underweight rates are much more modest—from 32 to 23 percent (figure 1.2).

Nutrition has steadily improved in most regions of the developing world—for example, worldwide, stunting fell from 49 to 27 percent of children under age five between 1980 and 2005, and underweight rates declined from 38 to 23 percent between 1980 and 2005 (see chapter 2 and technical annex 1.2). Economic growth has played an important part in this improvement. But economic growth reduces malnutrition very slowly. On the basis of the past correlation between growth and nutrition, it is estimated that sustained per capita economic growth of 2.5 percent between the 1990s and 2015 would reduce malnutrition by 27 percent—only half of the MDG

target.[32] Technical annex 1.3 outlines the number of years it would take for different countries to halve their underweight rates at different rates of economic growth. These estimations show that countries cannot depend on economic growth alone to reduce malnutrition within an acceptable timeframe, especially given the human and economic costs and the international community's commitments to achieving the MDGs.

Table 1.2 Annual unit costs of nutrition programs

Intervention	*Unit cost per participant ($)*
Community-based growth promotion[a]	1.60–10.00 without supplementary food 11.00–18.00 with targeted supplementary feeding
Food supplementation[b]	36.00–172.00 to provide 1,000 Kcal/day
Early child development/child care[c]	250.00–412.00 with food (Bolivia) 2.00–3.00 without food (Uganda)
Nutrition education[d]	2.50
Breastfeeding promotion in hospitals[e]	0.30–0.40 if infant formula removed from maternity 2.00–3.00 if not
Microcredit cum nutrition education[f]	0.90–3.50 (cost of nutrition education only)
Conditional cash transfers[g]	70.00–77.00
Vitamin A supplements to preschool children[h]	1.01–2.55
Vitamin A fortification of sugar[i]	0.69–0.98
Iron supplementation[j]	0.55–3.17
Salt iodization[k]	0.20–0.50

Sources:
a. Fiedler (2003); Iannotti and Gillespie (2002); Gillespie, Mason, and Martorell (1996); Mason and others (2001).
b. Horton (1993, 1999).
c. World Bank (2002a); Alderman (personal communication).
d. Ho (1985).
e. Horton and others (1996).
f. Vor der Bruegge, Dickey, and Dunford (1997; updated 1999).
g. Caldes, Coady, and Maluccio (2004).
h. Fiedler and others (2000); Hendricks, Saitowitz, and Fiedler (1998); Fiedler (2000); Gillespie, Mason, and Martorell (1996).
i. Fiedler (2000); Horton (1999).
j. Horton (1992); Mason and others (2001).
k. Horton (1999); Mason and others (2001).

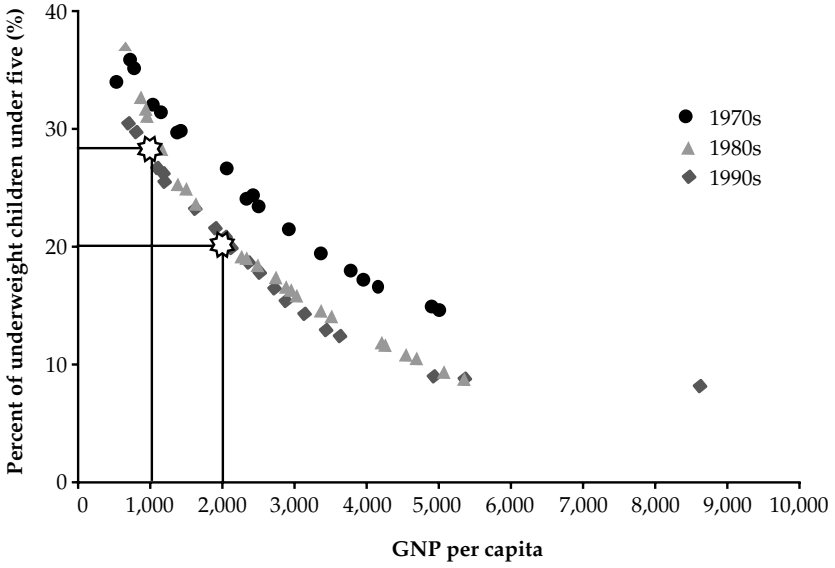
In Tanzania and India, at realistic levels of sustained per capita GDP (2.1 percent and 3 percent, respectively) and using an elasticity figure (change in malnutrition rates relative to per capita income growth) of -0.5, economic growth alone would take until 2065 and 2035, respectively, to achieve the nutrition MDG (figure 1.3). Depending on income alone, both

Table 1.3 Cost of nutrition interventions ($)

Intervention	*Delivery method* *Fortification*	*Supplementation*
Iodine	0.02–0.05	0.8–2.75[a]
Vitamin A	0.17	0.9–1.25
Iron	0.09–1.00	3.17–5.30
Community-based growth promotion	Less intensive	More intensive
	2.00–5.00	5.00–10.00[b]

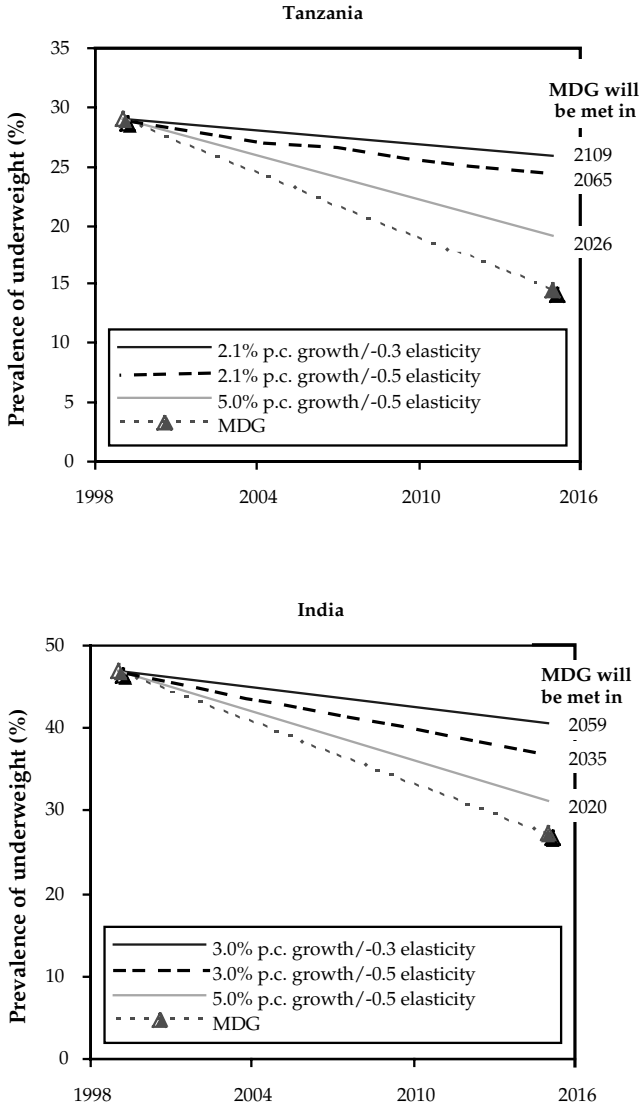
Source: Caulfield and others (2004b).
a. For iodized oil injections.
b. For example, with paid workers or food supplements.

Figure 1.2 The income–malnutrition relationship



Source: Haddad and others (2002).

Figure 1.3 Estimated reduction of underweight prevalence at different economic growth and income-nutrition elasticity scenarios



Source: Underweight prevalence in 1999 from www.measuredhs.com. The projections are authors' calculations using different assumptions.

Table 1.4 Reduction of the fraction of children underweight in Tanzania under different income growth and nutrition intervention coverage scenarios (%)

		Reduction in underweight (%)						
Per capita income growth (%) since 1993	*Reduction in income poverty (%)*	*No more interventions*	*Interventions in 10% more communities*	*Interventions in 50% more communities*	*Interventions in all communities*	*Farm income maximum of 75% of total household income*	*Additional year of education for the father*	*Ratio of children vaccinated increased to 95%*
0.0	0.0	0.0	11.0	31.7	**53.4**	1.8	3.6	9.9
0.5	24.7	3.4	14.1	34.4	**55.5**	5.2	7.0	12.9
1.0	44.1	6.8	17.2	37.0	**57.6**	8.5	10.3	15.9
1.5	**55.7**	10.1	20.2	39.5	**59.6**	11.8	13.5	18.8
2.0	**66.6**	13.3	23.2	42.0	**61.5**	15.0	16.7	21.7
2.5	**79.0**	16.5	26.0	44.4	**63.4**	18.1	19.7	24.5
3.0	**84.1**	19.5	28.8	46.7	**65.1**	21.1	22.7	27.2

Source: Alderman, Hoogeveen, and Rossi (2005).
Note: Based on data from Kagera district. Simulations are based on the random effect regression model, which is the preferred estimation strategy. Base year is 1993. Because the per capita income growth rate between 1993 and 2003 in Tanzania is known (0.7 percent per year), the effective growth rates required to attain the 1993–2015 mean growth rates of 0, 1, 2, and 3 percent for the 2003–15 period are respectively: –0.5, 1.3, 3.1, and 5.0 percent. Figures in bold show attainment of the MDG.

countries would need an unrealistic sustained rate of per capita income growth of 5.5 percent to achieve the MDG by 2015—unachievable under any circumstances (see technical annex 1.3).

One small study applying data from the Kagera district in Tanzania shows that the income poverty target could be reached with a potentially achievable rate of per capita income growth of 1.5 percent. However, without any nutrition interventions, the corresponding improvement in the nonincome poverty target (nutrition) will be only 10 percent. Even with a per capita income growth of 3 percent, without nutrition interventions, the nutrition MDG cannot be achieved (table 1.4). Near-complete nutrition program coverage is required to achieve the nutrition MDG.

Market forces do not suffice to improve nutrition; public investment is necessary

Although the private returns of improved nutrition are considerable, malnutrition persists. In part this is due to simple resource constraints that inhibit poor families from investing more resources (which they often do not have and cannot borrow) in children—investments that will not pay off for 10 or 20 years.

A critical reason for market failure in addressing malnutrition has to do with informational asymmetries of two kinds:

- People cannot tell when their children are becoming malnourished because healthy growth rates, arguably the best indicator of good nutrition, cannot be detected with the naked eye. And until micronutrient deficiencies are severe, they are impossible to detect without clinical tests. Thus families do not know there is a nutrition problem until it is too late.
- Good nutrition is not intuitive: people do not always know what food or what feeding practices are best for their children or for themselves. Sometimes, too, food marketing and advertising change preferences in unhealthy ways, as is especially evident in the emerging epidemic of obesity and diet-related NCDs in developing countries, driven by the increased availability of inexpensive, calorie-dense foods.

Because of such information gaps, even when families gain additional cash resources—for example through cash cropping[33] or conditional cash transfers[34]—children's nutrition does not automatically improve. Given the productive and redistributive benefits of investing in nutrition, there is thus an argument for public intervention to ensure that parents get the information they need and to institute policies and programs (such as mandatory salt iodization) that bridge the information gaps.

Yet another reason for justifying public investment is that improved nutrition is often a public good (as opposed to a private good), yielding benefits for everybody in society—for example, better nutrition can reduce the spread of contagious diseases and it increases national economic productivity. Furthermore, the infrastructure and institutions for delivering nutrition services as well as the authority to implement public interventions lie primarily in the public sector, though some interventions (such as food fortification) require much stronger private sector intervention.

Table 1.5 Prevalence of underweight and anemia in Indian children by income quintiles

	Percentage of children with weight-for-age lower than 2 standard deviations below the mean			*Percentage of children age 6–59 months with iron levels less than g/dl*
Income quintiles	*Male*	*Female*	*Both*	*Both*
1992–93 National Family and Health Survey (children 0–3 years)				
Lowest	61.5	60.3	61.0	—
Second	62.5	58.9	60.6	—
Middle	57.1	56.9	57.0	—
Fourth	47.5	49.6	48.5	—
Highest	36.0	35.1	35.6	—
1998–99 National Family and Health Survey (children 0–2 years)				
Lowest	59.7	61.5	60.7	78.8
Second	51.7	56.5	54.0	79.0
Middle	47.2	51.3	49.2	75.1
Fourth	37.6	40.3	38.9	72.3
Highest	25.2	27.6	26.4	63.9

Source: Gwatkin and others (2003).
— = not available.

Nutrition and income poverty

Undernutrition and micronutrient malnutrition are themselves direct indicators of poverty, in the broader definition of the term that includes human development. But undernutrition is also strongly linked to income poverty, although by no means synonymous with it. The prevalence of malnutrition is often two or three times—and sometimes many times—higher among the poorest income quintile than among the highest quintile.[35] (Table 1.5 illustrates the situation in India, which has almost 40 percent of the world's malnourished children.[36]) This means that improving nutrition is pro-poor and increases the income-earning potential of the poor. In countries where girls' nutrition lags behind, improving the nutrition of young girls adds an extra equity-enhancing dimension to any such investment.

Poverty and malnutrition reinforce each other through a vicious cycle (see figure 1.1). Poverty is associated with poor diets, unhealthy environments, physically demanding labor, and high fertility, which increase malnutrition (chapter 2). Malnutrition in turn reduces health, education, and immediate and future income, thus perpetuating poverty. Even worse, poor

malnourished women are likely to give birth to low-birthweight babies, thus perpetuating poverty in the subsequent generation. Addressing malnutrition helps break this vicious cycle and stop the intergenerational transmission of poverty and malnutrition.

Nutrition and the Millenium Development Goals

Malnutrition is one of the most important constraints to achieving the MDGs. Improving nutrition is essential to reduce extreme poverty. Recognition of this requirement is evident in the definition of the first MDG, which aims to eradicate extreme poverty and hunger. The two targets are to be halved between 1990 and 2015:

- The proportion of people whose income is less than $1 a day.
- The proportion of people who suffer from hunger (as measured by the percentage of children under age five who are underweight).

The first target refers to income poverty; the second addresses nonincome poverty. The two indicators used for measuring progress on the nonincome poverty goal are:

Box 1.1 Off track on the Millennium Development Goals

Recently the World Bank issued a Global Monitoring Report painting a pessimistic picture for achieving the MDGs on hunger: five years after the global commitment was made, progress has been inadequate to ensure their attainment. Sub-Saharan Africa is not on track to achieve a single MDG. In addition to other goals, it is off track on the hunger goal—and it is the only region where child malnutrition is not declining. South Asia is off track on six goals: gender equity, universal primary school completion, child mortality, maternal mortality, communicable diseases, and sanitation. And while malnutrition in that region is dropping sufficiently to achieve the MDG target, it remains at very high absolute levels: almost half of children under age five are underweight. The Middle East and North Africa is also off track on six goals: gender equity, universal primary completion, child mortality, communicable diseases, water, and sanitation. Europe and Central Asia is off track on child mortality, maternal mortality, communicable diseases, and sanitation. And both Latin America and the Caribbean and East Asia and the Pacific are off track on child mortality, maternal mortality, and communicable diseases.

Source: Excerpted from World Bank (2005b).

Figure 1.4 Progress toward the nonincome poverty target

On track (24%)

AFR (7)
Angola
Benin
Botswana
Chad
Gambia, The
Mauritania
Zimbabwe

EAP (5)
China
Indonesia
Malaysia
Thailand
Vietnam

ECA (6)
Armenia
Croatia
Kazakhstan
Kyrgyz Rep.
Romania
Turkey

LAC (10)
Bolivia
Chile
Colombia
Dominican Rep.
Guyana
Haiti
Jamaica
Mexico
Peru
Venezuela, R.B. de

MENA (6)
Algeria
Egypt, Arab Rep. of
Iran, Islamic Rep. of
Jordan
Syrian Arab Rep.
Tunisia

SAR (0)

Some improvement, but not on track

AFR (14)
Central African Rep.
Congo, DR
Côte d'Ivoire
Eritrea
Gabon
Ghana
Kenya
Madagascar
Malawi
Mozambique
Nigeria
Rwanda
Sierra Leone
Uganda

EAP (5)
Cambodia
Lao PDR
Phillippines

ECA (0)

LAC (4)
El Salvador
Guatemala
Honduras
Nicaragua

MENA (1)
Morocco

SAR (4)
Bangladesh*
India
Pakistan
Sri Lanka

Deteriorating status (18%)

AFR (13)
Niger
Burkina Faso
Cameroon
Comoros
Ethiopia
Guinea
Lesotho
Mali
Senegal*
Sudan
Tanzania*
Togo
Zambia

EAP (2)
Mongolia
Myanmar

ECA (4)
Albania
Azerbaijan
Russian Federation
Serbia and Montenegro

LAC (3)
Argentina
Costa Rica
Panama

MENA (2)
Iraq
Yemen, Rep. of

SAR (2)
Maldives
Nepal

No trend data available (40%)

AFR (13)
Burundi
Cape Verde
Congo, Rep. of
Equatorial Guinea
Guinea
Guinea-Bissau
Liberia
Mauritius
Namibia
Sâo Tomé and Principe
Seychelles
Somalia
South Africa
Swaziland

EAP (11)
Fiji
Kiribati
Marshall Is.
Micronesia, Federated States of
Palau
Papua New Guinea
Samoa
Solomon Islands
Timor-Leste
Tonga
Vanuatu

ECA (17)
Belarus
Bosnia and Herzegovina
Bulgaria
Czech Republic
Estonia
Georgia
Hungary
Latvia
Lithuania
Macedonia, FYR
Moldova
Poland
Slovak Republic
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

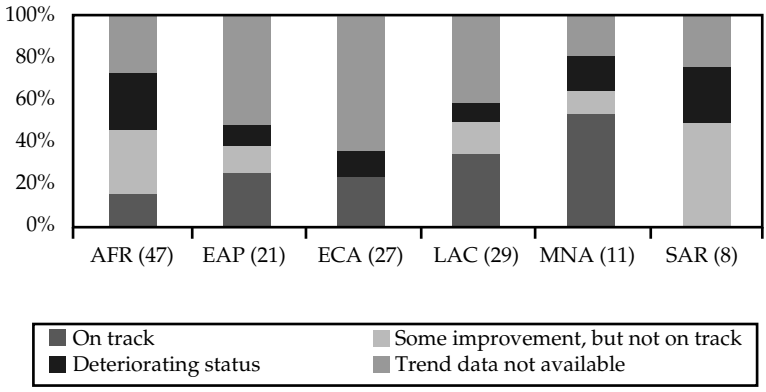
LAC (12)
Belize
Brazil
Dominica
Ecuador
Grenada
Paraguay
St. Kitts and Nevis
St. Lucia
St. Vincent
Suriname
Trinidad and Tobago
Uruguay

MENA (2)
Djibouti
Lebanon

SAR (2)
Afghanistan
Bhutan

Source: Author's calculations. See also technical annex 5.6.
Note: All calculations are based on 1990–2002 trend data from the WHO Global Database on Child Growth and Malnutrition (as of April 2005). Countries indicated by an asterisk subsequently released preliminary DHS data that suggest improvement and therefore may be reclassified when their data are officially released.

Figure 1.5 Progress toward the nonincome poverty target (nutrition MDG)



Source: Author's calculations. See also technical annex 5.6.

- The prevalence of underweight children (under age five)
- The proportion of the population consuming less than the minimum level of dietary energy.

Therefore, improving nutrition is in itself an MDG target. Yet most assessments of progress toward the MDGs have focused primarily on the income poverty target, and the prognosis in general is that most countries are on track for achieving the poverty goal. Yet many regions are off track for achieving the nonincome poverty target (box 1.1).

Of 143 countries, only 34 (24 percent) are on track to achieve the nonincome target (nutrition MDG) (figures 1.4 and 1.5). It is particularly notable that no country in South Asia, where undernutrition is the highest, will achieve the MDG—though Bangladesh will come close to achieving it, and Asia as a whole will achieve it. Another alarming note is struck by the many countries where the nutrition status is deteriorating. Many are in Africa, where the nexus between HIV and undernutrition is particularly strong and mutually reinforcing. And in 57 countries, no data are available to tell whether progress is being made.

Improving nutrition is not only intrinsic to achieving the first MDG, but also fundamental to progress toward five other goals (table 1.6).

Nutrition and Human Rights

The 1948 Universal Declaration of Human Rights established adequate health, including adequate food, as a basic human right. The right to health and nutrition was reiterated in the 1989 Convention on the Rights of the Child, adopted by all but two United Nations (UN) member countries. The right to adequate nutrition is also enshrined in the constitutions of many countries—for example, those of Ethiopia, Guatemala, India, Peru, and South Africa. Governments are entrusted to ensure that these rights are fulfilled, especially among children, the elderly, the vulnerable, and the infirm. The rights-based approach to development has also been firmly endorsed by the development community in recent years.

Nutrition interventions also often act as social safety nets against shocks (see box 3.2). This is also true in countries undergoing reforms; access to safety nets such as nutrition interventions can increase the tolerance for shocks from public sector reforms, thereby increasing the potential for the success of reforms while also protecting basic human rights.

The Know-How for Improving Nutrition

As documented by the Copenhagen Consensus, we know what to do to improve nutrition and the expected rates of returns from investing in nutrition are high. Compared with many possible development investments, including trade reform and private sector deregulation, malaria eradication, and water and sanitation, the provision of micronutrients was identified as the second best opportunity for meeting the world's development challenges. Other nutrition investments also ranked high (table 1.7). Direct actions to improve nutrition are therefore desirable and have high potential for returns.

The final argument for investing in nutrition is that there are tried and tested models and experiences for reducing most forms of malnutrition—models and experience that have not been adequately exploited and scaled up (see chapter 4). In some exceptional countries, nutrition programs have virtually universal coverage (Chile, Costa Rica, Cuba, and Thailand) and malnutrition has declined rapidly (see figure 2.12). But other countries with large nutrition programs still have significant gaps in coverage and quality. The reason undernutrition and micronutrient malnutrition persist at high levels is not that we do not know how to reduce them, nor that countries have applied best practice, yet failed to succeed. It is that most

countries have not invested at a scale large enough to get these tested technologies to those who will benefit from them most. In addition, many countries that have invested have either used less effective and less strategic interventions (such as school feeding), or have not paid attention to implementation quality.

Table 1.6 How investing in nutrition is critical to achieving the MDGs

Goal	*Nutrition effect*
Goal 1: Eradicate extreme poverty and hunger.	Malnutrition erodes human capital through irreversible and intergenerational effects on cognitive and physical development.
Goal 2: Achieve universal primary education.	Malnutrition affects the chances that a child will go to school, stay in school, and perform well.
Goal 3: Promote gender equality and empower women.	Antifemale biases in access to food, health, and care resources may result in malnutrition, possibly reducing women's access to assets. Addressing malnutrition empowers women more than men.
Goal 4: Reduce child mortality.	Malnutrition is directly or indirectly associated with most child deaths, and it is the main contributor to the burden of disease in the developing world.
Goal 5: Improve maternal health.	Maternal health is compromised by malnutrition, which is associated with most major risk factors for maternal mortality. Maternal stunting and iron and iodine deficiencies particularly pose serious problems.
Goal 6: Combat HIV/AIDS, malaria, and other diseases.	Malnutrition may increase risk of HIV transmission, compromise antiretroviral therapy, and hasten the onset of full-blown AIDS and premature death. It increases the chances of tuberculosis infection, resulting in disease, and it also reduces malarial survival rates.

Source: Adapted from Gillespie and Haddad (2003).

Table 1.7 The Copenhagen Consensus ranks the provision of micronutrients as a top investment

Rating	*Challenge*	*Opportunity*
Very good	1. Diseases	Controlling HIV/AIDS
	2. Malnutrition and hunger	Providing micronutrients
	3. Subsidies and trade	Liberalizing trade
	4. Diseases	Controlling malaria
Good	5. Malnutrition and hunger	Developing new agricultural technologies
	6. Sanitation and water	Developing small-scale water technologies
	7. Sanitation and water	Implementing community-managed systems
	8. Sanitation and water	Conducting research on water in agriculture
	9. Government	Lowering costs of new business
Fair	10. Migration	Lowering barriers to migration
	11. Malnutrition and hunger	Improving infant and child malutrition
	12. Diseases	Scaling up basic health services
	13. Malnutrition and hunger	Reducing the prevalence of low birthweight
Poor	14–17. Climate/migration	Various

Source: Bhagwati and others (2004).

Table 1.8 Coverage of nutrition interventions in some large-scale programs

Program/country	*Coverage rates*
ICDS/India	Purported to cover 90% of development blocks, but only half the villages from the lowest two wealth deciles have access to the program, and the individuals not reached seem to be the poorer and younger children[a]
NNP/Bangladesh	Aims to cover 105 of the 464 *upazilas* (< 25% coverage)
AIN/Honduras	Reaches only 24 of 47 health areas
SEECALINE/Madagascar	Reaches only 62 of 111 districts

Source: Various unpublished World Bank reports.
a. Gragnolati and others (forthcoming).

Some program coverage data can be illustrative as a proxy measure of underinvestment compared with the severity of undernutrition (table 1.8 and maps 1.1 and 1.2). While coverage for micronutrients is somewhat higher, similar discrepancies between needs and investments exist (vitamin A and iodine, maps 1.3 and 1.4).

The conclusion: there is a significant gap between the size of the nutrition problem (chapter 2) and the coverage of current investments. Coverage of micronutrient programs is wider than for underweight programs. Nonetheless, investments in both are much smaller than warranted, although many models for and successful experiences in addressing malnutrition exist (chapters 3 and 4).

Notes

1. Hunt (2005).
2. Behrman, Alderman, and Hoddinott (2004).
3. Hunt (2005).
4. Ezzati and others (2002).
5. Pelletier, Frongillo, and Habicht (1994); Caulfield and others (2004a); Caulfield, Richard, and Black (2004); Bryce and others (2005).
6. Behrman, Alderman, and Hoddinott (2004).
7. UNICEF and MI (2004a).
8. Behrman and Rosenzweig (2001).
9. Hunt (2005)
10. Strauss and Thomas (1998); Horton and Ross (2003).
11. IASO (2004).
12. Popkin, Horton, and Kim (2001).
13. Strauss and Thomas (1998).
14. Grantham-McGregor, Fernald, and Sethurahman (1999)
15. Horton and Ross (2003).
16. Behrman, Alderman, and Hoddinott (2004).
17. Behrman, Alderman, and Hoddinott (2004).
18. Behrman, Alderman, and Hoddinott (2004).
19. Pollitt (1990).
20. Behrman, Alderman, and Hoddinott (2004); Pollitt (1990).
21. Behrman, Alderman, and Hoddinott (2004).
22. Richards and others (2001); Richards and others (2002), Matte and others (2001).
23. It was calculated under the assumption that all non-low-birthweight children would survive to adulthood and become laborers. When corrected for age-specific mortality, the benefit becomes $510 (personal communication, Alderman).
24. Alderman and Behrman (2004).
25. IFPRI (2003).

26. Horton (1999).
27. Gragnolati (forthcoming).
28. AED (2003).
29. Darnton-Hill (2005).
30. Behrman, Alderman, and Hoddinott (2004).
31. Darnton-Hill (2005)
32. Haddad (2003).
33. Von Braun (1995).
34. Behrman and Hoddinott (2001); Morris and others (2004).
35. Wagstaff and Watanabe (2001); Gwatkin and others (2003).
36. See Gwatkin and others (2003) for other countries.