Stunted lives: the disaster of undernutrition

Every year some 9 million children across the world die before they reach their fifth birthday, and about one-third of these untimely deaths is attributed to undernutrition (Black et al., 2008). However, contrary to popular perception, the great majority of malnutrition-related deaths (up to 90 per cent) do not occur during sudden food crises and famines, but as a result of long-term, chronic hunger that gradually depresses or destroys the immune system and leaves children especially vulnerable to diseases that they have difficulty staving off. A child suffering from mild undernutrition, for example, is twice as likely to die from malaria as a well-nourished child – and the risk of death is ninefold for a child who is severely undernourished (WHO and UNICEF, 2007).

For every child who dies as a result of undernutrition, there are many millions more who suffer permanent damage to their health; this blights the rest of their lives. Today, some 178 million children under the age of 5 suffer from stunted growth as a result of undernutrition. About 55 million under 5 years of age are acutely undernourished, which means that their bodies are wasted – they are underweight for their height – and 19 million of these children are severely wasted. “This is a human disaster on a vast scale,” says a 2010 report from the United Kingdom’s Department for International Development (DFID, 2010; see Figure 2.1).

The impact of undernutrition

The critical period of growth and development is the 1,000 days from conception to a child’s second birthday. The problem of stunting has its roots in poor nutrition during this time: undernourishment during the foetal period contributes up to half of a child’s failure to grow by the age of 2 (UNSCN, 2010a).

“Young children up to the age of 2 are at a very critical stage of development. They’re growing very fast; they have huge needs for various nutrients in relation to their own body weight, which is quite small, and if these nutrients are not provided to them they risk missing several opportunities for mental and physical development which cannot be corrected later in life,” says Venkatesh Maniar, president of The Micronutrient Initiative (Sight and Life, undated). A report from the United Nations Standing Committee on Nutrition (UNSCN) reiterates the point, stating: “Damage suffered in early life, associated with the process of stunting, leads to permanent impairments that lower attained schooling and reduce adult income” (UNSCN, 2010a).
From one generation to the next

As the nine months in the womb is part of this critical 1,000 days, the mother’s own nutritional status has a strong influence on the life prospects of the baby. If the mother is stunted and anaemic and has a poor diet during pregnancy, she is likely to give birth to a small and undernourished baby. Every year around 13 million babies are born with low birth weight – defined by WHO as below 2,500 grams – and are at increased risk of dying at or soon after birth. About half of these babies are born in south-central Asia (UNSCN, 2010a). If they survive, low birth weight babies are more likely to suffer from stunted growth; this can become a recurring pattern from one generation to the next, as a stunted child becomes a small adult woman who is likely to produce babies of low birth weight. Scientists are now discovering that this pattern has implications for the individual and for the health services that no one could have imagined.

In the early 1990s David Barker, professor of clinical epidemiology at the University of Southampton in the UK, showed for the first time that low birth weight babies are at increased risk of developing coronary heart disease as adults. In 1995 the British Medical Journal named this observation – highly controversial at that time – as the Barker hypothesis. Today it is also known as ‘the developmental origins of health and disease hypothesis’ and is widely accepted. Research has now attributed a number of other conditions – including stroke, hypertension, type 2 diabetes and osteoporosis – to the effects of poor foetal growth and low birth weight, which are thought to change the activity of genes in our bodies via what are called epigenetic mechanisms (see Box 2.2).

These conditions are measured using ‘Z scores’, which reflect how much a child’s weight or height deviates from the standard for healthy child growth set by the World Health Organization (WHO). The closer a child’s Z score is to zero, the closer he or she is to the median of the international growth reference standard. This standard is based on the fact that children of all races and ethnicities have the capacity to reach a healthy weight and height. For all three indicators, undernutrition (as represented by stunting, wasting or underweight) is defined as a Z score below -2 and severe undernutrition as a Z score below -3.

Source: Global Hunger Index (IFPRI, 2010)
Box 2.2 The ‘double burden’ of malnutrition

The primary preoccupation of nutritionists in low- and middle-income countries is obviously hunger and undernourishment. However, many countries are today facing another serious malnutrition problem – an epidemic of obesity and the chronic diseases associated with overweight such as diabetes, hypertension, cardiovascular problems and cancers. "Traditionally," says Gina Kennedy, consultant nutritionist with the Food and Agriculture Organization of the United Nations (FAO), "overnutrition appears as undernutrition, and infectious and chronic diseases coexisting over long periods of time" (FAO, 2006a).

This has been dubbed the ‘double burden’ of malnutrition, and is particularly stark in countries like the Philippines, where 32 per cent of children under 5 are underweight and 27 per cent of adult women are overweight or obese (FAO, 2006a). In Egypt, nearly 20 per cent of people live on less than US$ 1 a day and struggle to feed themselves, yet children who are overweight outnumber those who are undernourished (FAO, 2006a) and more than 30 per cent of adults are obese (WHO Global BMI Database). India and China, too, although home to nearly half the world’s hungry people, are experiencing rapidly rising rates of obesity.

Worldwide, obesity has more than doubled since 1980. An estimated 1.5 billion adults and nearly 43 million children under 5 are classified as obese or overweight (WHO Fact Sheet 311). Excess nutrition kills more people each year – an estimated 2.4 million – than does hunger, and ironically the great majority of them live in the poorer countries of the world, where coronary heart disease, often related to obesity, is already the leading cause of death (WHO Fact Sheet 310).

Obesity is defined by the body mass index (BMI). This is a proxy measure of body fat reached by dividing an individual’s weight in kilograms by the square of his or her height (kg/m2). WHO defines overweight as a BMI of 25 or over, and obesity as a BMI over 30.

The reasons for this explosive rise in obesity in a world still struggling with hunger are many and complex. Rapid economic growth and urbanization in many countries have dramatically affected eating habits. Increasing numbers of people are shopping for food rather than producing it themselves and are coming under the influence of the fads, fashions and commercial pressures of the modern world. This is known as the ‘nutrition transition’ and in 2006, the FAO commissioned detailed case studies from six countries – China, Egypt, India, Mexico, Philippines and South Africa – to gain insights into the dynamics of the phenomenon (FAO, 2006b).

The researchers studied data on food availability and eating habits from the 1970s to the early 2000s. They found that the number of calories available per capita had increased dramatically in every country, with the steepest increase being in China, at 49 per cent. They also found that the energy density of people’s diets – that is, the proportion of calories supplied by fats – had increased everywhere. Again the trend was most marked in China, where the proportion of fat in the diet increased by 10 per cent in the last decade alone. However, Mexicans consumed the highest proportion of dietary fat at 30 per cent. The report found too that everywhere, except South Africa, consumption of sugar has risen over the decades, with Egyptians consuming an extra 27 kilograms per person per year by 2002 compared with 1972.

Typically the change in eating habits is part of a more general change in lifestyle that also includes reduced levels of physical activity. As people begin to prosper and/or leave the land for the city, they are relieved of the burdens of agricultural labour and collecting water and firewood, and are more likely to have sedentary jobs and spend leisure time in front of the television.

Globalization has had a huge impact on agricultural production and trade throughout the world, driven by a vision of integrated systems in which countries rely increasingly on the marketplace to meet their food needs. Between 1974 and 2004 the amount of food imported by developing countries as a proportion of gross domestic product (GDP) doubled – with the proportion of processed products rising much faster than that of primary products (Hawkes, 2006).

Globalization has also opened new markets and opportunities to the transnational food corporations and greatly increased the reach of their products, advertising and marketing activities. As the removal of barriers to investment in foreign countries has accelerated over recent decades, these corporations have poured money into food processing in the developing world and into retail outlets for their products. In Mexico, for example, the number of supermarkets and 24-hour convenience stores grew from fewer than 700 to 3,850 in just one year, 1997, and to 5,729 by 2004 (Hawkes, 2006).

Besides macro-level socio-economic forces, there are some extremely subtle biological forces at work behind the growing problem of obesity in low- and middle-income countries. During its time in the womb, a foetus receives signals from its mother about the environment into which it will be born, including whether or not food is likely to be abundant or scarce, and these signals influence how its metabolism is set, via epigenetic mechanisms. The epigenome is in effect the ‘instruction manual’ for our genes, turning them on and off, as appropriate, in the various sites in our bodies so that the cells can perform their specialist tasks. Using chemical ‘switches’, it is the epigenome that guides the differentiation of cells during the development of the foetus from a fertilized egg to a human being.

But the epigenome is also sensitive to environmental cues, enabling organisms to adapt to their environment. It is through this mechanism, explains paediatric biologists Peter Gluckman and Mark Hanson in their book Mismatch: why our world no longer fits our bodies (2006), that the developing baby of an undernourished mother “will adjust its biology to favour laying down fat whenever it can as a form of energy reserve, and set its appetite to favour eating high-fat foods when available”. This is called the ‘predictive adaptive response’, and is at the cutting edge of research into the roots of obesity, for it is becoming clear that this survival strategy can become a handicap when the person encounters an environment where calories are unexpectedly plentiful – as is the case for many millions of people in low- and middle-income countries experiencing the transition today.

“I think if we really want to change this epidemic of obesity, we’ve got to worry about the health before birth,” comments Gluckman (personal communication).

By 2020 diet-related chronic diseases are projected to account for almost three-quarters of all deaths worldwide, and 60 per cent of these will be in low- and middle-income countries.
countries (WHO, 2003). But as the threat posed by malnutrition takes on new forms, the challenge, says FAO’s Gina Kennedy, “is to develop effective programmes and policies aimed at preventing and controlling both aspects of the ‘double burden’. That is a task not only for nutritionists but for everyone working in food production, processing and marketing, as well as food safety and education” (FAO, 2006a).

**Hidden hunger: micronutrient deficiency**

“People think that as long as I have filled the stomach I have fed my child,” says Anna Lartey, a Ghanaian nutritionist and president-elect of the International Union of Nutritional Sciences. “But it’s not just food, but the quality of food that’s important to good nutrition.”

Besides the many millions who never get enough to fill their stomachs, there are perhaps 2 billion people worldwide whose diet does not provide the vitamins and minerals essential for physical and mental health (UNSCN, 2010a). Micronutrient deficiency is often impossible to detect without a clinical examination, so it is easily overlooked.

**Iron-deficiency anaemia**

Anaemia in children, for example, has only relatively recently been recognized as a widespread problem, and there are almost no data before 1995. Haemoglobin is now one of the elements measured in demographic and health surveys, and they show that in sub-Saharan Africa around 60 per cent of children are anaemic (UNSCN, 2010a), compared with a global average of nearly half of all preschool-age children (WHO website). Furthermore, some 40 per cent of women in low- and middle-income countries are believed to suffer from anaemia (UNSCN, 2010a), which affects a total of around 2 billion people worldwide (WHO website).

Iron-deficiency anaemia is “the most common and widespread nutritional disorder in the world”, according to WHO. It undermines health and leads to feelings of malaise and lethargy that make the tasks of everyday living more difficult. Anaemia can also be a killer, increasing the risk of haemorrhage in pregnant women particularly and contributing to one in five of all maternal deaths (WHO website).

**Vitamin A deficiency**

Vitamin A deficiency, which is the most common cause of blindness in low- and middle-income countries, affects around 30 per cent – some 163 million – of children in poor countries. Two-thirds of affected children are in South and central Asia, which along with West Africa have the highest prevalence of childhood vitamin A deficiency, at more than 40 per cent. Latin America and the Caribbean have the lowest prevalence, at 10 per cent (UNSCN, 2010a). Nearly 14 million children in the condition have some degree of visual loss, and 250,000 to 500,000 are blinded every year, half of them dying within 12 months of losing their sight (WHO website).

“Vitamin A deficiency is something the world absolutely has to pay attention to,” says Alfred Sommer, professor of ophthalmology at the Johns Hopkins University School of Medicine in the United States (Sight and Life, undated). “Our earlier work and that of others indicated that if we could get adequate vitamin A to all the children who need it in the world, we could prevent 1 to 2 million children from dying or going permanently blind every single year.”

“What we are seeing in Ghana,” says Lartey, “is no longer children going blind so much, but sub-clinical levels of vitamin A deficiency where you don’t see the symptoms but it is causing harm because it is affecting the immune system. The child is more susceptible to infections, and is getting more sickness.”

Worldwide, vitamin A deficiency is thought to contribute to the deaths of around 700,000 children under 5 every year from infections such as measles and diarrhoea (Black et al., 2008). In pregnant women, it contributes to low birth weight in their babies and may increase the risk of maternal death (WHO website).

**Iodine deficiency**

More than 1.7 billion of the world’s people (of whom 1.3 billion live in Asia) suffer from iodine deficiency (UNSCN, 2010a), which can lead to stunted growth and other developmental abnormalities and which is one of the commonest causes of mental impairment and retardation in children worldwide (WHO website). In Afghanistan, for instance, the World Bank estimates that more than half a million babies are born each year with iodine deficiency, which reduces their IQ by 10 to 15 points (World Bank, undated). In addition, more than 3 billion people, or 31 per cent of the world’s population, are deficient in zinc (Caulfield and Black, 2004), which increases the risk for children of diarrhoea, pneumonia and malaria (Black et al., 2008), and is thought to contribute to more than 450,000 child deaths annually worldwide (Black et al., 2008).

“The case for the elimination of vitamin and mineral deficiency is compelling beyond description. The return on investment is without equal,” said Rolf Carriere, former executive director of the Global Alliance for Improved Nutrition (UNICEF and The Micronutrient Initiative, 2007). According to Save the Children, deficiency in vitamin A and zinc could be prevented with supplements costing just 6 US cents and US$ 1.67 per child per year respectively (Save the Children, 2009).

**Handicapped for life**

“Malnutrition causes lifelong losses in cognitive capacity, workability, and increases adult health problems. And those are substantial burdens on a developing economy – if you turn a worker who [should be] a great plus to the economy into a burden,” says nutritionist Daniel McFadden of the University of California, Berkeley, USA.
Evidence from many low- and middle-income countries suggests that children stunted by malnutrition struggle in school. Research in Cebu in the Philippines, for example, showed that such children were more likely to enter school at a later age, repeat classes, attain poorer grades and drop out compared with their better-nourished peers (Victora et al., 2008). In Zimbabwe, a difference in height-for-age of 3.4 centimetres at 3 years of age was associated with the achievement of almost a full grade in school (Victora et al., 2008). And a multi-country study reported in The Lancet in 2007 found that for every 10 per cent increase in the prevalence of stunting in the population, the proportion of children reaching the final grade of school fell by 8 per cent (Granthan-McGregor et al., 2007).

In 2005 the World Bank estimated that malnutrition costs the global economy around US$ 80 billion a year (Sridhar, 2007). The loss to the Indian economy alone is at least US$ 10 billion a year, or 2 to 3 per cent of GDP (Sridhar, 2007). Figures also from the World Bank suggest a similar loss of 2 to 3 per cent of GDP a year for the economy of Afghanistan (World Bank, undated).

At the more basic level of the family, the spectre of hunger can also deepen and perpetuate poverty. People are forced to sell assets such as land and livestock and often withdraw their children from school, thus mortgaging the future in the interests of short-term survival. Karim Bux, one of nine brothers who, with their families, live near Manchar Lake in Pakistan, describes how they rely on remittances from a brother working abroad. "We took out a loan and sold our livestock to generate funds to send him to Saudi Arabia so that he can earn for us, because we were passing through a very bad phase of our life," Bux says. "He sends the money but there is a lot of unemployment in this area, so the money falls short of our expenses" (Panos website).

Sometimes the choices facing families are stark indeed. In her community, explains Basran, who comes from the same area of Pakistan as Bux, the custom is to marry among themselves and for girls to bring a dowry into the partnership. "But when we are starving we sell our girls… Amma! There is no work. That is why, to fill our stomachs, we sell our girls to others, for a few thousand rupees" (Panos website).

In Niger, hit by drought in 2009, families sold their livestock – including breeding female stock – but as conditions worsened, the exchange rate between goats and grain deteriorated. Some people sold milk to raise money, but the poor condition of their hungry animals affected the yield. Some mortgaged the coming harvest and many rural people migrated, sometimes with their whole families, to the towns, where competition for jobs was so fierce that wages were cut by up to half the normal rate (IFRC, 2010).

The causes of malnutrition

The causes of hunger and undernutrition are complex and include structural factors such as lack of investment in agriculture, climate change, volatile fuel prices, commodity speculation and the ebb and flow of global market forces (see also Figure 2.2). These
Box 2.3 Urban hunger and backyard agriculture

About one-fifth of the world’s 1.85 million undernourished people live in towns and cities (WIT website) and the root cause of their hunger is overwhelmingly poverty. Most urban dwellers do not produce their own food so they must buy it, and for tens of millions of people an adequate diet – let alone a healthy one – is beyond their means. The highest rates of urban malnutrition are in the slums and shanty towns of low- and middle-income countries, which in many places are growing at an alarming pace, outstripping the capacity of economies and urban planners to provide jobs, homes, healthcare, water and sanitation and other modern services.

According to the FAO, growth in the urban population of the developing world is equivalent to a new city the size of Lagos in Nigeria every two months (FAO, 2010). Today, about one in six of the world’s people lives in a slum or shanty town (UN-Habitat, 2007) and studies from a number of countries show rates of stunting and wasting among children at this level of urban society comparable with their counterparts in rural areas (Van de Poel et al., 2007). The vulnerability of the urban poor is well illustrated by a study from India which investigated food insecurity among slum dwellers in the city of Bhuj in Gujarat (EFSN and FAO, 2003). The team conducted focus group discussions with people from four different categories – households headed by single women, pregnant women and mothers of small children, migrants, and the general population. They found that 40 per cent of the migrants and many of the single women were casual labourers on wages typically below US$ 2 a day; they faced stiff competition and often could not find work for half the month. Women were paid less than men for similar work. Nearly half the people worked as street vendors or in small shops and garages. Only 4 per cent had regular office jobs and the rest were unemployed. All said they bought food daily from local vendors because they lived too far from the big markets where prices were lowest. Most lived on a diet of cheap grains, unable to afford pulses and vegetables on a regular basis, and almost all admitted they could not earn enough to fill their families’ stomachs. “Our normal times are always crisis times,” commented one woman.

When money for food ran out, Bhuj’s slum dwellers said they borrowed cash from relatives and neighbours, or bought on credit from vendors. In extreme circumstances they begged or sold their assets to buy food. One woman said, “My husband is a tuberculosis patient and cannot go for work. Even my child of 2 years has TB. “My husband is a tuberculosis patient and cannot go for work. Even my child of 2 years has TB. So I have entered into prostitution to look after our kitchen and child” (EFSN and FAO, 2003).

The growing crisis of urban hunger has given rise to a new agricultural revolution that started in the 1970s and is gathering momentum throughout the world today. Urban farms – established in tiny backyards, on patios, roofs and patches of wasteland, big and small – are producing food for city dwellers in ever-increasing quantities and variety. Global figures are hard to come by, but in the mid-1990s, 800 million people worldwide were reckoned to be involved in growing food in cities (Wikipedia).

They are people like Preeti Patil, catering officer with the Mumbai Port Trust (MbPT) in India, who has created a vegetable garden on a 1,000 square metre patch of ground outside the canteen. It produces over 120 different varieties of vegetables, fruits and herbs, all nourished on recycled garbage (Pendharkar, 2008). “There used to be a pile of kitchen waste rotting and raising a stink right next to our kitchen and that was most undesirable,” she says. “When you cook food for over 30,000 employees the waste generated could be immense.” Patil was inspired by a radio programme she heard with Ramesh Bhai Doshi, a Gandhian and pioneer of urban farming, who uses household waste and anything, from tin cans to plastic buckets and old tyres, as planters. A group of employees from the MbPT went for training with Doshi, and the project Patil started in 2002 with a few seeds sown in old laundry baskets has blossomed into a biodiversity hotspot of fruit trees, shrubs and vegetables buzzing with insects and birds among the cranes and warehouses. Today it sells organic produce to the local people.

In the Democratic Republic of the Congo (DRC), FAO is supporting a programme run by the Ministry of Rural Development in five cities – Kinshasa, Lubumbashi, Kisangani, Likasi and Mbanza-Ngungu – to improve and encourage urban farming for food production (FAO, 2010). The DRC’s urban population grows by about 4.6 per cent per year, and poverty and malnutrition are massive problems: GDP per capita in the DRC is just US$ 327 a year and 76 per cent of the people are undernourished. The country ranks 168 out of 189 in the United Nations Development Programme’s Human Development Index (UNDP, 2010). Launched in 2000 with core funding from Belgium, the urban gardening programme built on people’s own efforts to survive by growing food on whatever land they could find, from backyards to the verges of roads and streams, and an existing network of small-scale market gardens farming around 1,100 hectares in Kinshasa and Lubumbashi. The growers faced a myriad constraints: most operated without permits on other people’s lands, they often had to carry water in buckets from distant sources and they lacked access to finance, information and any support from government. Organizing leases and permits was a high priority for the new programme, as was improving access to water and setting up microfinance schemes with the help of non-governmental organizations (NGOs). It also established a system of farmers’ field schools involving regular group meetings of growers with agricultural extension workers.

By 2003 the average income of gardeners participating in the programme had increased nearly fourfold, to US$ 600 a year. An assessment of the programme in 2010 found that around 500 field schools had been organized, reaching more than 9,000 growers; more than US$ 1 million had been disbursed in loans averaging US$ 60 per grower for farm-related investments; some 16,100 vegetable growers were being assisted directly; and the programme had generated jobs and income for another 60,000 people in related fields. By 2010, the urban gardens were producing 150,000 tonnes of vegetables a year for the five cities’ residents. Similar projects exist in many other low- and middle-income countries, including China, Pakistan, Peru, Tanzania, Thailand and Viet Nam (RUAF website).
CHAPTER 2

The synergy between infection and malnutrition

Another key piece of the jigsaw is illness, which is both a direct cause of undernutrition and exerts an influence through increasing poverty. By affecting mostly young adults, HIV, for example, can have a devastating effect on households. Sick people cannot work or produce food, and they require people and resources to care for them (see Box 2.4). In poor communities in badly affected countries, many children have been left to fend for themselves or are cared for by elderly grandparents who expected to be supported by their own children in old age. Pervasive hunger was one of the toughest ‘indirect’ causes are the subject of other chapters; here we look at the more immediate reasons why individuals and families are unable to procure a healthy or sustainable diet.

Some of the starkest images of hunger are of people starving in places where food stalls are still laden with produce in the marketplace. Indeed, you can see undernourishment amid plenty every day in the big cities of Africa, Asia and Latin America. These underline the message that hunger and malnutrition are about so much more than simply shortage of food. Poverty, which puts available food beyond the reach of people, is the biggest single reason for undernutrition. Poverty and hunger are two sides of the same coin and, as it has pushed people to the edge and beyond, the crisis in the global economy has swelled the ranks of the hungry and malnourished.

“If you are up to your neck in water,” says a Chinese proverb, “it takes only a ripple to drown you.” Many millions of people who were just able to survive before the economic crisis have lost work and livelihoods and gone under. In Tajikistan, where nearly 54 per cent of the people live below the poverty line (World Bank country data) and very many families are dependent on dwindling remittances from abroad, the price of basic foods such as oil and bread rose by 200 per cent in 2008 (Save the Children, 2008). In Uganda flour went up by 50 per cent and in Egypt, too, bread increased by about the same amount (Save the Children, 2008). Moreover, even when the price of basic foodstuffs on the world market went down again (if only temporarily – they are higher today than ever before), it did not necessarily do so in local markets. At the end of 2008, the price of staple foods was still 17 per cent higher on average in real terms than before the crisis (FAO, 2009).

Besides economic turmoil, conflict and displacement have deepened poverty in many parts of the world. In one of the most war-torn countries on earth, the Democratic Republic of the Congo, 5.5 million people, including 2.7 million children, have died since a military coup deposed President Mobutu Sese Seko in 1997 and nearly 2 million people have been driven from their homes (War Child website). Well over half the population today lives in extreme poverty and, in a land of tropical abundance where food is easy to grow, half of all children are chronically malnourished and one in ten suffers from acute malnutrition. One in five children dies before his or her fifth birthday, with undernourishment being a major contributor to mortality. When Save the Children conducted research in 2009 into the nutritional situation in East Kasai province, a fertile agricultural region which produces a wide variety of food crops, it found that a diet of poor nutritious quality but that fills stomachs and provides the calories required by children for energy was “four times cheaper than a diet that provides the required nutrients for optimal growth and development” (Save the Children, 2010; see Figure 2.3).

In the early 1980s before HIV was identified, AIDS was known around the shores of Lake Victoria in East Africa – one of the first places on earth to be ravaged by the virus – as ‘slim disease’, because of the emaciated appearance of people who contracted the mysterious illness. Today we know that people living with HIV have special nutritional needs. Even before they start experiencing AIDS-related symptoms, for example, they require 10 per cent more food than normal. When they develop opportunistic infections such as tuberculosis and persistent diarrhoea, their food requirements increase by 25 to 30 per cent. The increase may be as high as 50 to 100 per cent in children with AIDS.

The region worst affected by HIV and AIDS today is southern Africa. In Lesotho, where HIV
grow field crops. Keyhole gardens were first ‘keyhole’ gardening, and ‘basin’ agriculture using low-tech innovative techniques including how to grow their own vegetables and fruit and Leribe districts, the project shows people villages scattered across the foothills of Berea things they can produce for themselves. “They thought this meant expensive foods from the shops, like fish and meat, that they can’t... afford, but I teach them there are lots of good... are overweight, caused flooding and battered fields. However, this project to help people to feed themselves well faces some serious challenges. Lesotho’s weather is unpredictable and often extreme. Rainfall is erratic and the soil thin and nutrient-poor from erosion and overuse. The average family produces around 25 per cent of its own food and must... buy the rest from shops. People are heavily affected by rising food prices and widespread unemployment. In January 2010, the LRCS began the Food Facility Support Project, funded by the European Union and the German Red Cross. This project built on the foundations of home-based care and livelihood projects for AIDS-affected households, which indicated that food insecurity was a big problem: people with HIV were not getting the varied diet they needed to build their immune systems or to enable their bodies to cope with anti-retroviral treatment. The local clinics did not have time to advise patients on nutrition beyond telling them to “eat well”, explains Alina Letsika, LRCS nutrition officer. “They thought this meant expensive foods from the shops, like fish and meat, that they can’t afford, but I teach them there are lots of good things they can produce for themselves.” Working with 1,500 beneficiaries in 84 villages scattered across the foothills of Berea and Leribe districts, the project shows people how to grow their own vegetables and fruit using low-tech innovative techniques including ‘keyhole’ gardening, and ‘basin’ agriculture for those who have the land and the energy to grow field crops. Keyhole gardens were first developed in Lesotho and have now spread throughout the region. They are raised beds for vegetables created by building a ring of stones to waist height and an arm’s length in radius, and filling it with layers of materials including old tin cans, animal bones, mulch and ash that provide rich nutrients for the soil. A hole is left in the centre into which household waste and water are poured. The gardens are easy to tend, requiring no bending down to weed or sow. They are especially good at retaining moisture and can provide vegetables such as carrots, spinach, mustard and tomatoes all year round.

The project has trained a lead farmer and lead gardener – volunteers selected by their communities, and the majority of whom are women – in almost every village. Their job is to develop demonstration gardens and fields and to pass on their knowledge to the local people. Each supports around 12 of her fellow villagers with regular visits to their homesteads. The training of these lead farmers and lead gardeners also included different nutritional aspects. They now are able to advise villagers in preparing healthy meals for people living with HIV and on preserving food. When they join the project, the villagers receive a voucher with which they can buy seeds and organic fertilizer at special seed fairs organized by the LRCS in locations convenient to remote villages. The plant varieties are self-seeding to enable local people to keep their gardens going with little further expense. “People are very keen to have more diverse gardens everywhere.”

And the stigma of AIDS – still strong, despite the fact that almost every family in Lesotho is affected – inhibits people from disclosing their infection and from making the most of opportunities offered them. Because of the floods, the project anticipates a disappointing yield from the first year’s field harvest. But everyone is optimistic about the vegetable gardens, which are much better protected from the weather and the goats, and have proved especially popular. “People are very keen to have more diverse meals,” explains Monika Mayer of the German Red Cross. “It’s just incredible – if you drive through the area now, you see keyhole gardens everywhere.”

People who lack clean drinking water and sanitation are vulnerable to all kinds of infections (see also Box 1.3). Diarrhoeal diseases caused by contaminated water and poor hygiene kill more than 2 million people every year (WaterAid website), mostly small children, and contribute to the stunting and wasting of many millions more. Poor hygiene is also a cause of infestation with parasites. Worldwide, 2 billion people have intestinal worms, and 300 million – at least half of them school-age children – are severely ill (WaterAid website).

Odds stacked against girls

One of the most pernicious causes of malnutrition is gender discrimination. An estimated 60 per cent of the world’s undernourished people are women (ECOSOC, 2007) and in some countries girls are twice as likely as boys to die from malnutrition and preventable childhood diseases (FAO and OHCHR, undated), simply because of their sex. The low status of women in many societies means that girls are disadvantaged from birth. Particularly where resources are scarce, they are likely to receive less food, healthcare and education than their brothers. In 2007, for example, two-thirds of the 75 million children worldwide denied the chance of schooling were girls (WFP website). “We know that illiteracy is closely related to malnutrition,” says Anna Larkey. “If you look at demographic and health survey data in relation to the educational status of women, you see that malnutrition is highest among children of women with little schooling.”

Families in many countries consider their girls an economic burden and marry them off young, occasionally even before puberty. The practice is most common in sub-Saharan Africa and South Asia. Girls who become pregnant in their teens stop developing physically themselves and are at increased risk of delivering low birth weight babies, thus setting in motion the cycle of deprivation described earlier. In India, where 40 per cent
of the world’s low birth weight babies are born, 8 per cent of women aged 20–24 years in 2006 had given birth to her first child before she was 16 years old (UNSCN, 2010a).

Tackling hunger and malnutrition

Hunger and malnutrition need to be tackled on multiple levels at the same time. Important macro-level interventions include investment in agriculture, water and sanitation, healthcare and social safety nets, and in efforts to mitigate the effects of climate change and to regulate world markets in the interests of low- and middle-income countries, all of which are discussed in other parts of this report. Here we focus on measures aimed at preventing or treating malnutrition at the level of the family and the individual.

Since the period from conception to birth has such a powerful influence on the physical and mental development of children, ensuring that pregnant women are adequately nourished is very important to the well-being of both mother and child. Evidence from a number of places shows what can be achieved by focusing attention on this period. In Gambia, for example, low birth weight rates were cut by a third within a few years by giving pregnant women balanced protein-energy supplementation. In New Delhi, India, a research project which gave thin and anaemic pregnant women a multiple micronutrient supplement in addition to their regular iron and folic acid, found a mean increase of 98 grams in the birth weight of their babies and a 50 per cent reduction in illness among the newborns compared to a placebo. And in Vietnam, a trial to compare a new micronutrient supplement with regular iron and folic acid supplementation in pregnancy found an increase of 120 grams in the mean birth weight of babies and a reduction in stunting of 30 per cent at the age of 2 years (UNSCN, 2010a).

Breastfeeding: the mainstay of infant feeding

Breastfeeding plays a critical role in the nutrition of babies and toddlers. But for a host of reasons, from fashion to lack of understanding, opportunity or support, the proportion of babies who are exclusively breastfed (i.e., receive no other food or drink, not even water) for the first six months, as recommended by health and nutrition professionals, WHO and the United Nations Children’s Fund (UNICEF), rarely reaches 50 per cent (see Figure 2.4) and is extremely low in some of the poorest countries, for example, Côte d’Ivoire at 4 per cent and Djibouti at 1 per cent (UNICEF, 2009). Even non-exclusive breastfeeding rates are very low in many places.

Because of its huge potential to save lives, breastfeeding advocacy for children up to 2 years is the very foundation of most nutritionists’ regular work with communities and families. But changing behaviour is an uphill struggle and is hard to measure, says Peter Hailey, senior nutritionist in UNICEF’s Somalia country office, which is based in Nairobi, Kenya. Breastfeeding advocacy has always been hard to sell to donors when more exciting issues such as HIV and vaccination are competing for attention.

In 2003, WHO and UNICEF introduced the Global Strategy on Infant and Young Child Feeding to help promote good practice in this area. Besides exclusive breastfeeding for the first six months, the strategy recommends that, for maximum benefit, even when complementary foods are introduced at six months, children should continue to be breastfed until they are 2 years old. During the period when children are making the transition from exclusive breastfeeding to sharing the family meals, they have special requirements; the strategy also gives advice on how to ensure that complementary feeding is timely, adequate, appropriate and safe. A 1-year-old, for example, needs two to four times the quantity of calories, fat and protein per kilogram of body weight as the average adult (Save the Children, 2009).
To be able to act on the recommendations, mothers need both personal support and an environment that encourages breastfeeding – that is, one in which, among other things, the advertising and promotion of infant formula and bottle feeding are strictly controlled (Save the Children, 2009). Ghana offers a good example of what can be achieved. In partnership with the United States Agency for International Development’s Linkages programme, the Ghanaian health ministry ran a nationwide campaign to promote breastfeeding. It has led to an increase in the rate of exclusive breastfeeding from 7 per cent to 54 per cent over the past decade (Save the Children, 2009) and is considered an important factor in Ghana having already achieved Millennium Development Goal number 1 (eradicating extreme poverty and hunger).

Breastfeeding support should be included in national emergency preparedness plans too, says Save the Children, since “women are often worried about their ability to breastfeed and therefore need reassurance at a time when their babies need breast milk most” (Save the Children, 2009). Such plans should include measures to deal with the challenge of unsolicited donations of tinned baby milk by humanitarian agencies, which can undermine confidence and commitment to breastfeeding.

### ‘Ready-to-use’ formula revolutionizes treatment

For the millions of children who fail to receive the nutrition they need and who become acutely ill, the tradition was to admit them to hospital where they would be treated with a mixture of milk powder, oil and sugar. Then a fortified dried-milk-based formula called F100 was developed, which greatly facilitated the treatment of severe acute malnutrition. In 1996 treatment was further revolutionized when a new formula, based on F100, was developed by paediatric nutritionist André Briend and colleagues working with the NGO Action Contre la Faim. Though very effective, F100 has to be prepared with clean water, which means it can only be used safely under medical supervision. Frustrated by this limitation, Briend was looking for a modified formula when the sight of a jar of chocolate spread on his kitchen table gave him a brainwave. The balance of nutrients in the spread was very similar to that of F100 and Briend decided to try using peanut butter to make a paste that a child could eat directly, without the addition of water. ‘Plumpy’nut’ was the result – a ready-to-use therapeutic food (RUTF), patented and produced by a French company, Nutriset.

The great advantage of Plumpy’nut is that it can be used to treat children with severe acute malnutrition at home, and the first person to run with the idea was Steve Collins, a nutrition specialist then working with Concern Worldwide. Working in Liberia during the 1996 famine, Collins had become acutely aware of the limitations of the conventional feeding centre approach when cholera broke out among the people. He recognized, too, that the necessity for mothers and children to stay at such centres for up to six weeks during treatment meant that very many children were never seen. In war-torn places especially, feeding centres were often sitting targets for attack.

The first opportunity to test his ideas for community-based therapeutic care of severe acute malnutrition came in 2000 with a food emergency in Ethiopia, where the government forbade the setting-up of feeding centres. “That programme ran for eight or nine months and was a success,” says Collins. “The mortality rate was about 4.5 per cent, whereas the standard you aim for in an emergency is 10 per cent, and the norm in
a developing country hospital is 20–30 per cent – that is, 20–30 per cent of all children admitted die” (RTE, 2009).

The story of what is known today as community management of acute malnutrition (CMAM) is told more fully in Chapter 5. Suffice it to say here that the idea met with strong resistance at first. Doctors and nurses staffing the malnutrition wards were not convinced it was safe to send very sick children back home and nutritionists were primarily concerned that the use of Plumpy’nut would undermine long-term breastfeeding. But as evidence of its effectiveness mounted, CMAM became universally accepted – and was endorsed by WHO, UNICEF and the World Food Programme (WFP) in 2005 – as the most appropriate model for 80 per cent of children with severe acute malnutrition.

Ready-to-use foods: a matter of debate

However, the debate about ready-to-use foods (RUF) continues to arouse passions, especially since CMAM, originally developed as a response to emergency feeding, is increasingly becoming part of regular activities to combat malnutrition and is being mainstreamed into the health services of more and more countries. This is welcomed by nutritionists in the field, who say that acute malnutrition is often an endemic problem that does not begin and end with emergencies. But some fear that using RUF outside the clinic fudges the line between a medicine and a food, and also risks undermining not just breastfeeding but traditional eating habits and reliance on local foods that are sustainable (Latham et al., 2011). Some even fear these tasty, sweet, high-energy foods – which now include a variety of products designed specifically for preventing malnutrition – are encouraging the ‘snacking habit’, opening potential new markets in low- and middle-income countries for the multinational food corporations and setting the scene for obesity problems in the future (World Nutrition, 2011; see also Box 2.2).

WFP is actively discussing the production of RUF with private sector companies. In February 2011, the Canadian branch of Campbell’s, the world’s leading soup maker, launched ‘Nourish’, its first not-for-profit product designed specifically to address the problems of malnutrition.

“If it was always very difficult to sit at a table and say we should be spending more money on breastfeeding promotion. Although there’s clear evidence that good breastfeeding saves far more lives than any other medical intervention, it wasn’t an easy sell, and we didn’t have easy ways of showing impact,” he says. “Now we have a product that shows that nutrition programmes can have a visible and immediate impact. And for every dollar we’re spending on Plumpy’nut, why aren’t we including 50 cents for breastfeeding and appropriate complementary feeding promotion, and connecting the two together?”

Funding mechanisms – out of step with reality?

In fact, the integration of programmes for the management of acute malnutrition and for the promotion of infant and young child feeding is gaining ground and offers huge potential for preventing malnutrition and related mortality. But just as the development of RUF has broken the mould of how malnutrition is managed and treated, opening the door for it to become a part of routine public health services for children, so there is now a need to stimulate a rethink about how such services are funded. The bulk of foreign assistance for feeding the hungry and malnourished still comes overwhelmingly from donors’ humanitarian budgets, which are quite separate from their development budgets. These are governed by their own assumptions, philosophies and rules, which are increasingly out of date.

For one thing, humanitarian funds are generally short term, focused on coping with an immediate crisis and goal-orientated. There is little incentive to build or strengthen the capacity of national health ministries to manage what is often an endemic problem that occasionally becomes a crisis. For another, they tend to be limited in scope, targeted at the most visible part of the problem while leaving a country’s routine activities to combat hunger and malnutrition with little or no support. Since it takes time to gear up a response when numbers exceed the threshold for an emergency, and to wind down again when numbers fall, the response can be out of step with people’s needs on the ground.
Hunger and malnutrition are certainly not confined to low-income countries. In the United States in 2010, 5.7 million people a week out of a population of 311 million received emergency food assistance through Feeding America, the country’s leading domestic hunger-relief charity. This figure represents a 27 per cent increase on the 4.5 million people given food weekly in 2006 through the organization’s network of food banks. Some 41 per cent of the client households are on the Supplemental Nutrition Assistance Program (SNAP) – or food stamps as it is still called in some states – a 64 per cent increase on the 2006 figure (Feeding America, 2010).

In the European Union (EU), one in every six citizens in the 27 member states, around 80 million people, live below the poverty line, defined as 60 per cent of the median income (Atkinson and Marlier, 2010). Inevitably this means that people on low incomes cannot always afford to buy nutritious food. It is not just a lack of food that can cause malnourishment, eating too much of the wrong types of foods, i.e., ‘junk food’, is equally harmful. Obesity (see Box 2.2) has assumed epidemic proportions in the rich world. The United States has the highest prevalence of obesity in the world with 26.7 per cent of the adult population unable to afford an adequate and nutritious diet (Atkinson and Marlier, 2010; CSO, 2006).

There is also a tendency for people on low incomes to buy and consume energy-dense and nutrient-poor food which includes junk food. It is up to ten times cheaper to provide calories in the form of foods high in fat, salt and sugar than it is to provide them from protective foods such as fruit and vegetables. For a family of two adults and two children shopping in a discount store, the cost of fruit and vegetables works out at approximately 45 (euro) cents per 100 calories compared with 17 cents per 100 calories for snacks and 4 cents per 100 calories for fat spreads and oils (Healthy Food for All, 2009).

Over the past 30 years there has been a huge growth in food banks in the US and Europe. In New York City alone, City Harvest, established in 1982 and one of the world’s first food rescue organizations, provides food to more than 300,000 people each week. Many of these are working families trapped in the gap between poverty officially ends and self-sufficiency starts. For example, a family of three with an annual income of US$ 23,900 would not qualify for SNAP food stamps even though they would need to earn more than US$ 60,000 to be considered self-sufficient (City Harvest, undated).

Each year City Harvest rescues 12.7 million kilogrammes of excess food from industry and food establishments for redistribution. This use of food that would otherwise be wasted has been adopted by many countries around the world. Some 241 organizations are part of the European Federation of Food Banks (FEBA), a movement that began in France in 1984 and now operates in 18 European countries.

The pressing need to revise the funding model is underlined by the fact that ‘in many cases despite the short term nature of individual donations, agencies have been implementing the same programme with short term goals almost continuously for many years, in the name of an emergency response’ (Hailey and Tewoldeberha, 2010).

### New emphasis on nutrition

In 2008, The Lancet ran a special series on mother and child nutrition, which drew attention to the fact that malnutrition was one of the world’s most serious and most neglected health problems. Since then, the extremely low priority given to nutrition by

World Disasters Report 2011 – Focus on hunger and malnutrition

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**Box 2.6 Rising hunger and malnutrition in the wealthy West**

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national governments and the international development community has been widely recognized. In 2009 more than 100 organizations came together under the leadership of David Nabarro, Special Representative of the UN Secretary-General for Food Security and Nutrition, to draw up a detailed plan to tackle world hunger and malnutrition.

Their efforts led to a report, Scaling Up Nutrition: a framework for action (UNSCN, 2010b), and a ‘road map’ for implementing the report’s recommendations. Both were presented in September 2010 at the summit meeting the UN General Assembly convened to assess progress towards the Millennium Development Goals (MDGs). The document, writes Nabarro in his introduction, “is a consensus document, based on the thinking and experience of the many individuals and institutions who participated in the process”. They include representatives of low- and middle-income countries, academic and research institutions, civil society organizations, the private sector, bilateral development agencies, United Nations specialized agencies and the World Bank.

The authors of the plan estimate that the package of direct nutrition interventions it recommends to try to ensure that all people everywhere have access to a healthy and adequate diet will cost a minimum of US$ 10 billion a year. But such an investment, they believe, “promises exceptional payoffs in terms of mortality, morbidity, physical and mental growth, contributions to MDGs, lifetime earnings and overall development. Indeed, these core interventions offer among the very highest rates of return feasible in international development”.

Chapter 2 was written by Sue Armstrong, a writer and broadcaster specializing in health and science issues. She also wrote Boxes 2.1, 2.2, 2.3, 2.4 and 2.5. Box 2.6 was written by Susan Nickalls, a journalist who writes about development issues.

Sources and further information


CHAPTER 2


