

World Disasters Report

Focus on hunger and malnutrition

2011



International Federation
of Red Cross and Red Crescent Societies

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Fundamental Principles *inside back cover*

Almost a billion hungry and malnourished:

Challenges of a failing global food system

The global food system is failing almost 1 billion hungry and malnourished people. What can and should be done to overcome this?

For decades, images of starving people have stirred the world's conscience. Less visible have been the millions who experience chronic hunger – today, nearly 1 billion or almost one in seven people worldwide.

How can we deny that there is a huge ongoing crisis when a world that currently produces enough food to feed everyone fails to do so – partly due to increasing inequalities, food and land becoming tradable commodities or commodities being sold to the highest bidder and thus violating everyone's fundamental right to sufficient nutritious food?

Across the globe, it is the poor, the majority living in rural areas but increasing numbers in urban areas, who experience hunger. They are also the powerless, those without the means to withstand the effects of climate change, increasing food and energy prices, and the negative impacts of agribusiness, the global marketplace and unfair terms of trade (whether at local, national or international level). In some countries where hunger is endemic, governments struggle to provide the range of services needed to prevent hunger and malnutrition – social protection, adequate potable water and sanitation, infrastructure, education, support for women and, most importantly, employment and empowerment.

To a large extent, today's food crisis has caught the world by surprise. For some decades there was a slow decline in the number of hungry people. Agriculture has never been high on the development agenda; in real terms, the share of overseas development aid to agriculture fell from just 18 per cent in the 1980s to less than 4 per cent in 2007. The numbers of hungry and malnourished people began to rise in the mid-1990s and then soared during the 2008 food price crisis. There are dire predictions of the number of hungry people increasing to well over 1 billion as many staple food prices continue to rise.

One of the targets of the first Millennium Development Goal is to halve the proportion of people who suffer from hunger by 2015. In many countries, there is little hope of meeting this rather modest goal without an investment of around US\$ 75 billion in agriculture and social protection.

The flipside of the coin is overnutrition. Well over 1 billion people in low- and middle-income as well as in high-income countries are overweight or obese. As people change their diets from traditional foods to processed and calorie-dense foods, they are experiencing the health effects – notably cardiovascular problems, diabetes and other lifestyle illnesses – of too much of the wrong type of food. Globally, one of the ten major causes of death is heart disease.

This edition of the *World Disasters Report* highlights that the issues of global food security, hunger and malnutrition go to the core of virtually all the major components and functions of the international system, from international trade to climate change, from water scarcity to scientific innovation.

We must tackle hunger and malnutrition – and fast. Given the likelihood of the global population increasing by 3 billion by 2050, experts predict there may not be enough food to feed everyone. **Hunger and malnutrition (both under- and overnutrition) are as much a threat to the world's health as any disease.**

National governments must acknowledge the right to food by implementing effective hunger prevention programmes. They need to increase investments in agriculture in a way that is fair, equitable and sustainable.

Both governments and donors should promote the participation of local farmers and acknowledge their wisdom and experience. More than half the number of people who go to bed hungry every night are women, and in many countries, at least 50 per cent are small farmers who are too often ignored and unsupported. Recent research estimates that productivity on farms would increase by up to 20 per cent if gender discrimination were to be eradicated.

Improving agricultural practices is only one of the solutions to prevent hunger. More global action is needed to tackle fundamental and related issues such as poverty and inequality; climate change and its effects on lower crop yields, land degradation and desertification; and the depletion of, and growing competition for, vital resources of land and water. Similarly, urgent action is necessary to stem the continuing rise in food prices exacerbated by commodity speculation, to discourage the use of land for biofuel rather than food production, and the acquisition of land in low-income countries by financial speculators.

Some might argue that all this is idealistic. However, this report features very concrete examples of good practice in agriculture and research, social movements empowering people, the use of new technologies and, at a global level, a more determined approach to prevent hunger and improve nutrition. The risk is that such improvements will be reversed because governments (both rich and poor) fail to tackle vested interests, fail to confront the major threats confronting the world over the next few decades and fail to protect and empower their most vulnerable citizens.

Decisive and sustained actions will be key for a world free of hunger and malnutrition. It is possible.



Bekele Geleta
Secretary General



Reworking the global food system

Although the world produces enough food to feed everyone, in 2011 almost 1 billion children, men and women go to bed hungry every night. Millions of these, particularly young children, suffer the dire effects of undernutrition. David Nabarro, the United Nations (UN) Secretary-General's Special Representative for Food Security and Nutrition, says: "Current levels of undernutrition reflect a massive and avoidable disaster for millions of the world's citizens. It is inexcusable and morally unacceptable that this situation persists to this day" (interview with Nabarro, 2011).

Hunger and food insecurity involve not only a lack of sufficient food for a healthy life, but also the anxiety associated with meeting future food needs including during the lean season (Maxwell, 1995). Hunger and malnutrition increase people's vulnerability to shocks and crises, weaken their capacity to produce food and/or to access affordable, nutritious food and undermine their health and future potential. Severe malnutrition permanently reduces children's capacity to learn, as Chapter 2 illustrates. Consequently, providing sufficient nutritious food to everyone poses a major challenge for all concerned with ensuring people's well-being – including governments and humanitarian agencies.

This edition of the *World Disasters Report* analyses the challenges, complexities and causes of hunger and malnutrition and advocates some solutions. They range from stronger support for smallholder farmers to improving regulation of financial speculators in order to calm the increasing volatility of food prices around the world, from advocating sustainable agriculture to empowering rural and urban communities, and from social protection schemes to strengthening the work of international institutions. It also examines the response to food insecurity and malnutrition in crises, and the challenges and constraints to improving these responses.

Some 30 years ago, Amartya Sen, Nobel laureate for economics in 1998, wrote: "Starvation is the characteristic of some people not *having* enough food to eat. It is not the characteristic of there *being* not enough food to eat" (Sen, 1981; original emphasis). Inequalities are built into the production, distribution and pricing of food everywhere. This introductory chapter analyses a food system that is failing to deliver a safe, secure, sustainable, sufficient and nutritious diet for all with equity.

Business as usual is not an option if this aim is to be achieved. As United States Secretary of State Hillary Rodham Clinton said (repeating what other politicians have said in slightly different ways over the decades): "The question is not whether we *can* end hunger, it's whether we *will*" (US State Department, 2009; emphasis added).

Photo opposite page: Narsamma Masanagari stands amid pigeon peas and sorghum on her family's farm in Pastapur village in the Indian state of Andhra Pradesh. She is a member of the Deccan Development Society which brings together local women to build local food sovereignty, and communicate their work globally through their videos.

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Hunger persists

Almost 40 years ago, the assessment prepared for the UN World Food Conference in 1974, following severe famines in Africa, noted: “The food crisis of the past two years has drawn attention dramatically to both the interdependence of production, trade, stocks and prices and the serious unpreparedness of the world as a whole to meet the vagaries of the weather” (UN, 1974). Little has changed.

There has been progress in feeding more people than ever before even as the world’s population has grown by around 50 per cent since the mid-1970s. Even so, the number of undernourished people in the world was higher in 2010 – 925 million according to the Food and Agriculture Organization of the United Nations (FAO) – than in the early 1970s (FAO, 2011a). There was a record peak of more than 1 billion hungry people in 2009 following dramatic food price rises in 2007–2008. This figure subsequently decreased, but at the time of writing, prices are rising and the number of hungry people looks likely to increase again.

Box 1.1 The voices of the hungry

Who are the hungry? They are people like Florence Nakaweesi and her six children who live on a smallholding in rural Uganda. She cannot afford the seeds or implements to make her small plot productive, nor earn enough from working her neighbours’ land to feed her family. Sometimes she only serves them hot water. “At least the water will put something in their stomachs until later when we might find some food to eat before bed,” she says. “I feel as if my life has no meaning... Because I can’t get any food, this is all I can give my children to keep them from crying for a while” (Concern Worldwide website).

They are people like Basran, who shares a small house on the shores of Manchar Lake in Pakistan with 20 members of her extended family and describes their lives as “daily death”. “The water used to be sweet, that is why we got a lot from it,” she says. But today the lake is overfished and polluted, and Basran and her family are constantly hungry (Panos website).

“To try to survive, we even eat bad fish [though] we feel that our insides are on fire... If we catch a bird, we even eat that now,” says Basran.

And they are people like Yeai from Yunnan province in south-western China, who ate tree roots when his supply of grains was exhausted (Panos website).

Soarahy, 50, from Petriky in Madagascar, is also struggling to feed her family. In the past, “the rice harvest was a special moment” and fish catches provided more than the family could eat. Nowadays, she says, survival “is the primary thought that each individual has” and her own stress and tension are evident. All her traditional sources of livelihood – farming, fishing and making *tsihy* (woven mats) – are precarious. Even when she catches fish, she cannot afford to eat it, and sells it in order to buy staple foods. While she insists people do not want to “sit and wait for donations”, she cannot foresee alternative livelihood options.

“In addition to farming and weaving, I also fished. My catch was good. Now, when I make a catch, about 2 to 3 *kapoaka* [3 *kapoaka* equals 1 kilogram] I don’t want to cook them... I walk to the market in Manambaro to sell them... Then with the money I make, I purchase a *kapoaka* of rice or cassava. Obviously, I don’t make much and therefore I am not able to provide enough food to nourish my children” (Panos, 2007).

In Zambia, Agatha Akakandelwa works long hours to feed the 21 people in her charge – including 14 of her grandchildren who are AIDS orphans. She farms maize, cassava and vegetables in two separate fields located some

distance from her home. In addition, she does a variety of other work in order to feed her family, including labouring on other people’s farms, making scones and brewing beer to sell. She does not get any external support and, despite her hard work, still struggles to feed her family.

“I really don’t feel good during the hungry time. I really pity the children. As an adult I can go all day without eating and then get up and go to the field the next day. But I get really concerned for the children during the hungry times... I am always in the fields working to try to feed my family” (Concern Worldwide website).

The majority of the hungry are in the Asia Pacific region, especially the Indian sub-continent, and in sub-Saharan Africa (see Figure 1.1). Most of the hungry live in rural areas. As a policy report prepared for the United Kingdom government states: “Half of the world’s undernourished people, three-quarters of Africa’s malnourished children, and the majority of people living in absolute poverty can be found on small farms” (Foresight Project, 2011).

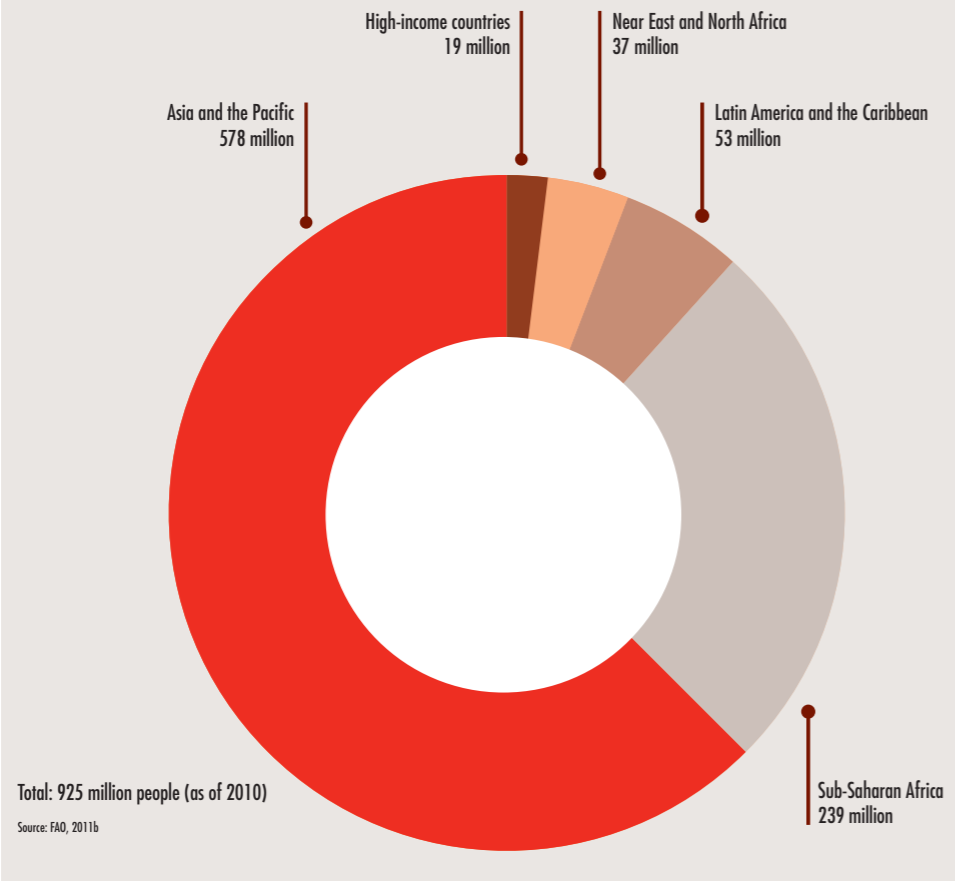
A key problem is that rural people are disadvantaged. As Niels Röling of Wageningen University and Research Centre in the Netherlands points out:

“...Small-scale African farmers... have only very few and small opportunities... African farmers have, on the whole, been able to produce food in keeping with the very rapid population growth over the past 50 years. They have done this with little use of external inputs or science-based knowledge, with little support from government (in fact, agriculture is a source of revenue for most African governments) and in the face of cheap food imports, climate change, conflict and disease” (Röling, 2009).

A substantial and growing number of the world’s hungry also lives in urban and peri-urban areas. The 2010 edition of the *World Disasters Report* reveals that 4.1 million urban poor in Kenya were classified as “highly food insecure” in March 2009, as slum dwellers were affected by rising food prices, disasters and crises that forced them to reduce their food intake. It indicates that the lessons learned from the World Food Programme’s operations in urban areas during the food price crisis point to “restricted food access” as the trigger, rather than “insufficient availability”.

People in high-income countries do not all escape hunger (see Box 2.6). The United States Department for Agriculture (USDA) reports that in 2010 about US\$ 68 billion

Figure 1.1 Where do the hungry live?



was spent through its Supplemental Nutrition Assistance Program – also known as ‘food stamps’ – to reach just over 40 million people – compared to US\$ 250 million (1969 prices) in 1969 that benefited some 2.9 million people (USDA, 2010).

Will the situation improve in the future? Unfortunately, on current trends, the prognosis is not reassuring. Halving the *proportion* of people experiencing extreme poverty and hunger – the first of the UN’s Millennium Development Goals (MDGs) – is very unlikely to be achieved (see Figures 1.2 and 1.3). It is also far too modest a target and less than the commitment at the World Food Summit in 1996, which was to halve the *number* of hungry people. Since the 1974 World Food Conference, when Henry Kissinger stated that “within a decade no man, woman or child will go to bed hungry”, governments have repeatedly made solemn promises to end hunger, but have failed to deliver (see Box 1.2).

Figure 1.2 Undernourishment data versus the MDG target

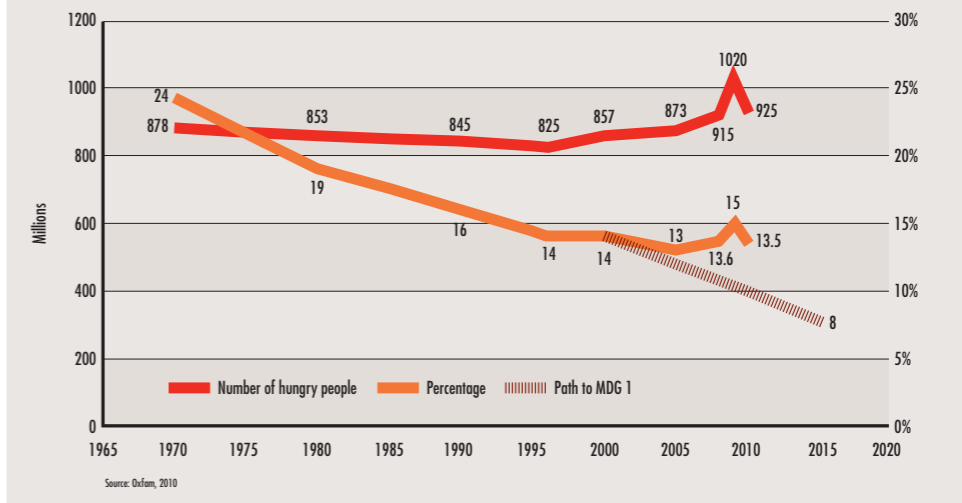
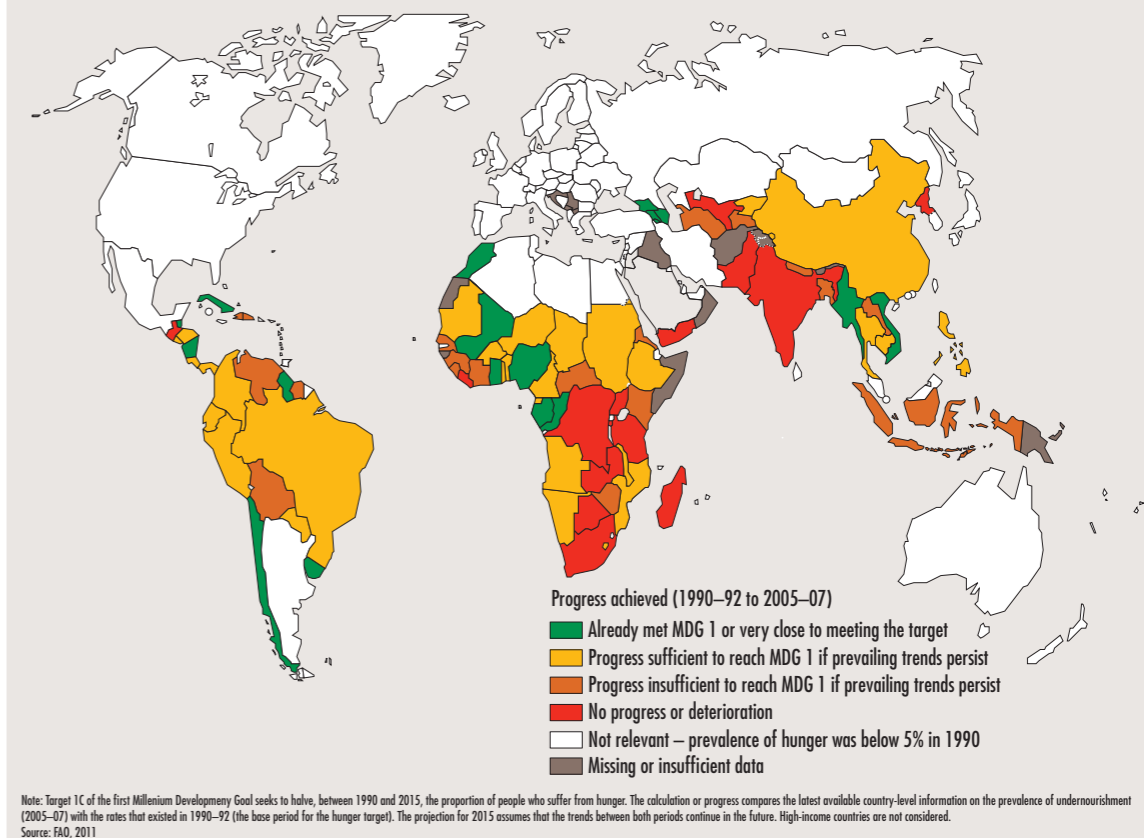


Figure 1.3 Progress towards Millennium Development Goal 1: Hunger target



Malnutrition spreads

Malnutrition is far more widespread than hunger. As explained in Chapter 2, at least 1 billion people are undernourished and lack key vitamins and minerals, while at the same time a staggering 1.5 billion people are overweight or obese (see Box 2.1 for definitions). The latter groups are likely to suffer long-term, debilitating and costly health problems: from heart disease and various cancers to diabetes (WHO, 2011). The risks to health of obesity are not only a problem for high-income countries or for the more affluent in low- and middle-income countries, but increasingly for poor countries and poor people in high-income countries.

The challenge is to create a food system that will enable everyone to be food secure in a sustainable and fair way. This requires action beyond the food system itself, as well as within it.

Box 1.2 Global aspirations, still unmet

“Everyone has a right to a standard of living adequate for the health and well-being of himself and his family, including food...” (Universal Declaration of Human Rights, 1948).

“States Parties... recognize the fundamental right of everyone to be free from hunger...” (International Covenant on Economic, Social and Cultural Rights, 1966).

“Every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties. Society today already possesses sufficient resources, organisational ability and technology and hence the competence to achieve this objective. Accordingly, the eradication of hunger is a common objective of all the countries of the international community, especially of the developed countries and others in a position to help” (World Food Conference, 1974).

“We pledge to act in solidarity to ensure that freedom from hunger becomes a reality” (International Conference on Nutrition, 1992).

“We, the Heads of State and Government, or our representatives, gathered at the World

Food Summit at the invitation of the Food and Agriculture Organization of the United Nations, reaffirm the right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger.

“We pledge our political will and our common and national commitment to achieving food security for all and to an ongoing effort to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015.

“...Food should not be used as an instrument for political and economic pressure. We reaffirm the importance of international cooperation and solidarity as well as the necessity of refraining from unilateral measures not in accordance with the international law and the Charter of the United Nations and that endanger food security” (World Food Summit, 1996).

Source: Tansey and Rajotte, 2008

Bigger challenges ahead

Creating a well-fed world will be even more challenging in the face of climate change, growing competition for resources, including land and water (see Box 1.3), increasing inequality within most countries (Sutcliffe, 2004) and continued high levels of public spending on research and development that focus on perfecting weapons of destruction rather than facilitating the creation and maintenance of resilient food systems as part of securing long-term human security (Abbott et al., 2006).

It is not clear how quickly climate change will affect food and farming. Many countries and regions seem to be experiencing far greater variability in weather patterns and more extremes – floods, droughts, storms, heatwaves and cold spells – which together with changes in growing seasons affect food production. According to the FAO:

“An aspect of the consequences in terms of food security, specifically, of the impacts of global warming includes but is not limited to the following: changes in the growing seasons’ length as well as the timing and amount of precipitation; changes in the snowfall season, the runoff season, the rainy season, the timing of flood recession farming, the hunting season, the fishing season, the water season; changes in the timing of outbreaks and increases in vector-borne diseases; rice farming following the replacement of saline water intrusion in rivers by freshwater after onset of rains (e.g. Mekong River); extended seasonal food crisis because of long-lasting drought conditions (e.g. “Monga” in Bangladesh), and so forth. Speculation about the foreseeable impacts of changes in seasonality is virtually boundless” (FAO, 2009).

Effective water management is central to maintaining food supplies. Yet many current methods of producing food are using unsustainable freshwater sources, such as fossil aquifers in the Arabian Peninsula, or sources threatened by climate change, such as glacial melt waters. Others use rivers that cross borders, where disputes may arise over dams and abstraction rates. The potential for conflict arising from disputes about water is growing; this adds to the complexity of tackling future food production (Brown, 2011).

Box 1.3 Human rights to water and sanitation

All people have the right to water and sanitation. The obligation that water and sanitation are available, accessible, affordable, acceptable and safe for all without discrimination at all times, must be progressively realized by states within

available resources. States must take concrete and targeted steps towards ensuring universal access to water and sanitation. Where domestic resources are insufficient for such efforts, states must seek international cooperation and assistance.

These human rights and the corresponding obligations were endorsed by the UN General Assembly in July 2010 and by the UN Human Rights Council in September 2010.

They are equally relevant in times of disaster, and guaranteeing the right to water and sanitation is essential for addressing hunger and malnutrition. Safe water and sanitation have a direct impact on health. Disease outbreaks in the aftermath of disasters are frequently attributed to the lack of safe water and sanitation. Unsafe sanitation, which allows human excreta to leak into the environment, can also pollute agricultural products, further contributing to malnutrition and disease.

Understanding water and sanitation as human rights provides a legally binding framework which adopts a holistic understanding of access, prohibits discrimination, empowers people and demands accountability for violations. The requirements of availability, quality, accessibility, affordability and acceptability can be further described as follows:

Availability: The water supply for each person must be sufficient for personal and domestic uses. Likewise, a sufficient number of sanitation facilities should be available. In the context of emergencies and disasters, the *Sphere Handbook* suggests a minimum provision of between 7.5 and 15 litres of water per person per day, as larger volumes may not be available to cover all personal and domestic needs. However, the amounts provided should be gradually improved with time.

Quality: Water has to be safe. It has to be of such quality that it does not pose a threat to human health. Sanitation facilities must be hygienically and technically safe to use. To ensure hygiene, access to water for cleansing and hand washing is essential. Preventing disease is an obligation of states, including dur-

ing emergency situations when it has a direct impact on the incidence of malnutrition.

Physical accessibility: Water and sanitation services must be accessible to everyone in the household or its vicinity on a continuous basis. Physical security must not be threatened by accessing facilities.

Affordability: Services have to be affordable. Realizing access to water must not compromise the ability to pay for other essential needs guaranteed by other human rights such as food, housing and healthcare.

Acceptability: Sanitation facilities, in particular, have to be culturally acceptable. This will often require separate male and female facilities. Also, facilities should be constructed to offer privacy and dignity.

In putting human rights into practice, priority is always given to those who are disadvantaged or excluded. For instance, special attention will be needed to ensure that people with disabilities have access to water and sanitation to protect their health and dignity. Also, the security of women and girls is often threatened when accessing water points and sanitation facilities. To address the needs of these and other vulnerable groups, they must be consulted and given opportunities to participate in the design and implementation of interventions. Other groups potentially requiring special attention might include minorities, single-headed households, unaccompanied or separated children, and the elderly.

Human rights also emphasize accountability and the rights to information and transparency. In humanitarian relief efforts, this translates into requirements for making information publicly available, including information on who is responsible for these services and where people can lodge complaints of abuse or neglect, or instances where their rights to water and sanitation were violated.

The Special Rapporteur on the human right to safe drinking water and sanitation has been working since 2008 to raise awareness about the requirements of the human rights to water and sanitation. She carries out this work

through thematic research, country visits to analyse the implementation of the rights in the domestic context, work on the MDGs and the collection of good practices.

However, there are solutions to improving the global food system, as will be seen throughout this report. Their exact nature will vary between countries due to differing circumstances and conditions. Some involve action at local, regional or national level, while others require interregional and international engagement. Nonetheless, all require the existence of sustainable, healthy and equitable food systems as the central focus of agriculture and water use.

Safety nets and public policies for hungry people

In Jharkhand, a poor province in eastern India, the monsoon rains were delayed in 2009. For many farmers, the initial rice planting failed. What was growing was not expected to yield well. However, a group of farmers in Jashpur village, not far from Ranchi, the state capital, seemed surprisingly unconcerned. Why? The promise from

Villagers fill up at a water point in the village of Kebra in Ethiopia. Water is an essential resource for improving livelihood and food security, but in many countries its increasing scarcity is a tremendous cause for concern.

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the government to provide a minimum of 100 days' work at the minimum wage (100 rupees per day) for a member of those families affected by the probable poor harvest. They would then be able to buy food. The Indian government maintains stocks of wheat and rice to meet times such as these as part of its National Rural Employment Guarantee Scheme.

This programme is one of the ways, like the subsidized food programme in the United States, by which governments can provide a safety net for people who cannot afford enough food. India also has the largest number of hungry people in the world – more than in all of sub-Saharan Africa. Tackling this problem requires more than a programme of government handouts in the case of emergencies. As Jayati Ghosh, professor of economics at Jawaharlal Nehru University in New Delhi argues, it requires drastically reducing the high levels of income inequality prevailing in the country (Ghosh, 2011; see Box 1.4).

Box 1.4 India's food security law will not feed the hungry

On 21 April 2011, a Supreme Court bench comprising Justice Dalveer Bhandari and Justice Deepak Verma heard a petition from the People's Union for Civil Liberty on streamlining the public distribution system that provides food to the hungry. What Justice Bhandari observed while listening to the arguments was a reflection of the paradox of plenty that prevails in India.

In a country that has emerged as the world's fifth largest economy with a growth rate of almost 9 per cent, more than 700 million people remain food insecure. "See what the stark contradictions in your whole approach are," Justice Bhandari told the Additional Solicitor General. "You say you are a powerful economy. You have a bumper crop this year and our *godowns* [warehouses] are full, and it is a happy situation, no doubt. When you have your *godowns* full and people are starving, what is the benefit? You cannot have two Indias."

This was not the first time that the Supreme Court had chided the government for its inaction in feeding the hungry. Historically, through

a mass-based public distribution system – a network of ration shops spread across the areas lacking enough food – India has provided essential grains at subsidized prices to both poor and non-poor populations. But swamped by rampant corruption, leakages, spoilage and distribution bottlenecks, such food has remained outside the reach of a majority of those who need it.

India's public distribution scheme technically caters to 316 million people who are in the 'below the poverty line' category. Add the 'above the poverty line' category and the scheme is supposed to provide food to more than 900 million people. But the way the below the poverty line (which should be dubbed the 'starvation line') has been drawn, the distribution scheme fails to provide them with their minimal daily food intake. If the scheme had been even partially effective, there is no reason why India should be saddled with the largest population of hungry people in the world.

Despite four ministries administering 22 programmes to alleviate hunger and poverty,

the budget allocation for which is enhanced almost every year, the poor still go hungry and hundreds of children die every day in India from malnourishment.

It is primarily because of the inability of the state agencies to feed the nation that India retains the dubious distinction of having the largest population of hungry people in the world. This is reflected in the 2010 multi-dimensional poverty estimates developed by the Oxford Poverty and Human Development Initiative for the UN Development Programme (OPHI website). Eight states – Bihar, Chhatisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal – have more desperately poor people than the 26 poorest African nations. In 2006, India ranked 66th in the Global Hunger Index prepared for 88 countries by the International Food Policy Research Institute (Wiesmann, 2006). The low ranking of India in the Global Hunger Index is despite the distribution scheme, which is designed to provide a safety net for the vulnerable sections of society.

According to the recommendations of the Indian Council of Medical Research, each able-bodied adult needs a minimum of 14 kilograms (kg) of grains a month. Given that an average family comprises five members, the household allocation would be 70kg. The distribution scheme at present provides only 35kg of wheat and rice to each family, so the hungry remain perpetually hungry.

In 2009, soon after being sworn in, the government announced its decision to pass a national food security act, in fulfilment of the ruling party's electoral promise to provide food to all. After much deliberation and many objections, the draft was submitted to the government.

The scope of the proposed food security legislation remains restricted to 46 per cent of

the population in rural areas and 28 per cent in the urban centres.

The proposed act cannot be an isolated activity. It has to be integrated with various other programmes and policy initiatives to ensure that hunger is eradicated. To achieve this objective, the food security plan should essentially aim at adopting a five-point approach:

Public policies for zero hunger: A combination of structural policies to address the real causes of hunger and poverty, specific policies to meet the household needs for long-term access to nutritious food, and local policies that are informed by local needs and focus on the concept of sustainable livelihoods.

Sustainable livelihoods: In a country where agriculture is the mainstay of the economy, the strengthening of low external-input, sustainable agricultural practices is paramount. This includes revitalizing the natural resource base, restoring groundwater levels and providing higher incomes to farmers.

Public distribution system: The present classification of below and above the poverty line needs to be revisited. Instead, the finding of the National Commission on Enterprise in the Unorganised Sector, that 836 million people in India spend less than 20 rupees (40 US cents) a day on food, should be the criterion for a meaningful food-for-all programme. The average ration of 35kg per family also needs to be revised upwards, coupled with the need to expand the food basket to include coarse cereals and pulses.

Food grain banks: The restructuring of the public distribution system has to be accompanied by the setting-up of food grain banks at the village and *taluka* (sub-district) levels. Any long-term food security plan cannot remain sustainable unless the poor and the hungry become partners in hunger prevention. There are ample examples of successful models of

traditional grain banks (e.g., the *gola* system in Bihar), which need to be replicated through a nationwide programme involving self-help groups and non-governmental organizations.

International commitments: Global commitments – such as the World Trade

Organization (WTO) agreements, free trade agreements and various bilateral trade deals – and neo-liberal economic policies should not be allowed to disrupt the food security plan, nor displace farming communities and jeopardize national food security.

Wherever you go, it is the poor who are hungry. It is the poor who suffer most from abrupt price rises, poor harvests and the like – as they lack the assets which provide people with the resilience to ride out such times.

One problem in India, according to the Deccan Development Society and others, is the neglect of small farmers – especially women – who are the main producers of local foods and traditional grains such as millet and sorghum. The Deccan Development Society has been working with poor, illiterate *dalit* (untouchable) women to help them to restore the fertility and productivity of the almost barren lands they received from the government as a result of land reforms and to have the means to communicate about their needs (see Box 1.5). It also works to get the government to include the millets and sorghums, which grow so well in drier areas such as the Deccan, into the national food distribution system and to consider actions to promote their production and consumption as a priority.

Box 1.5 Saving seeds and speaking out: the women of Medak district, Andhra Pradesh, India

The pigeon peas are waist high and the sorghum soars above the head of Narsamma, working on her family's farm in Pastapur village on the Deccan plateau in Andhra Pradesh. It is a semi-arid area in the heart of India often hit by drought. Most farmers here work on small plots on marginal lands.

Narsamma is one of around 5,000 women, mostly from the *dalit* or untouchable caste, who have become organized into women's *sanghams* (voluntary village-level associations of the poor) over the past 20 years. The Deccan Development Society and *sanghams* in about 80 villages have been working together

to build local food sovereignty. They are improving dryland farming and building up the capacity and autonomy of these marginalized peoples. Activities include saving seeds of local varieties of crops and creating seed and local grain banks that offer an alternative local public distribution service in times of need.

But the women felt that this work was not enough. They wanted to share their knowledge, skills and experience with each other and more widely. It was clear to them that their voices were not heard by the outside world.

Although the women were not literate, P.V. Sathesh, the Deccan Development Society's

co-founder and director, felt that should not be a barrier to communication. It was this understanding, and the realization that with modern video technology they could more easily be given a voice, that took some of them, including Narsamma, beyond work on their own farms.

"At some point of time [late 1990s]," says Narsamma, "the elders of the *sanghams* were discussing that whenever we want to say something and whenever we want to show something, why is it that we must always depend upon outsiders. Why can't we teach our own people, our own children about these things? And when these discussions were happening there was a programme called learning without frontiers. So in that meeting with UNESCO [UN Educational, Scientific and Cultural Organization] there was a discussion about it and the UNESCO people were saying that this can only be done with people who have literacy and our people can't even read and write. How can they [these women] do it? So our people argued saying that if that is the case we have to constantly depend upon outside people, why can't our people learn and teach them and let's see what happens. And that's how we started learning and they [the elders] said that if our people learn they'll be accessible to us, they'll be under our control."

"I'd never seen any cameras in my life before I started becoming a part of DDS [Deccan Development Society]. For us even coming for *sangham* meetings was a great thing and so how could we think of becoming camerapersons and film-makers?" says Manjula, from Eedulapalle village. But trained in filming they were, and despite initial scepticism from others in the village, produced remarkable results.

"Initially [other] people [in the village] thought we were incapable of learning and every week [when] we used to come here for

practice, they used to make fun of us. 'What can you people who've never gone to the school, what can you do?' But once I learned, I had the camera in my home in the village for six months of time. During that time I filmed a number of things. Sowing the fields, harvesting the fields, various agriculture operations, various festivals, etc. And when our people saw that, then they started appreciating it. In fact, the big landlord of the village, he told me once that 'I never thought you would do anything like this but now I see that you are doing a great work'," says Laxmamma, from Humnapur village.

It was important for them to set the agenda and decide what should be filmed, what stories needed to be told.

"We do issues that concern us... our cropping systems, our seeds and what is our farmers' situation – are they doing well, are they not doing well? Why? These are the kind of films we make. We don't do other kinds of films. In fact, after we finished our training we did take an oath that we would not go into commercial kind of film-making," says Narsamma. In 2001 the group, which now numbers 20 (17 film-makers and 3 working on radio with their own small community radio station), together formed the Deccan Development Society's Community Media Trust.

"We do it because there are plenty of people who do the other kind of films and there is hardly anyone who does our kind of films. And our people, our communities – there is no one who listens to them, who would like to project their issues. And therefore we decided that it's our duty to project their issues, make them heard. And there are so many things whether it is our seeds, whether it is our farming, whether it is our festivals, whether it is our language, all these are things that are being lost. And therefore we want to capture them and put it in front of people," adds Laxmamma.

It has not just been an empowering process for the women involved, but also affected their communities and state policies and reached communities worldwide.

“Professionally we had done films on BT cotton [a genetically engineered variety of cotton] and our films played a big role in getting Monsanto banned from the state of Andhra Pradesh. And that was a great triumph. And that this film also got translated into several languages is a professional high for me. And, personally, my father is dead so I have the responsibility for my family. I was able to educate my brother, I was able to perform the marriage of my sister, and all this came because my own awareness and thinking developed when I became a film-maker. This was a personal great,” says Tammali.

Narsamma says, “We were completely unrecognized people and now our films are being shown in film festivals, we are getting awards, we are mixing with [people at the festivals], we are being invited to those kind of things, so that’s for me a very big thing that has happened to us. We have trained people from different organizations, as well as students from Hyderabad University. So we have been able to do a lot of that. And we also share a lot of films that we make with lots and lots of organizations, [in] several parts of South Asia; since we started doing this, many other farming women learnt this skill from us and they were also inspired by us to do this. And we have also been to Peru and have trained some indigenous people there.”

Getting to the root of the problem

The problems of chronic hunger and malnutrition are deep-seated and not amenable to quick technological fixes. They are built into the very structure of today’s global food system and their solution requires political, economic, legal and social innovation and systemic changes if we are to create a well-fed world for all.

Formulating an adequate policy response requires some understanding of the history that has brought us to where we are now. The history of food is very much a history of human expansion and imperial conquest – of the rich seeking exotic foods and spices, and (for the last few hundred years) of Western powers restructuring much of the world to suit their needs. These are the structures that have led to today’s commodity production and trade patterns, which are now dominated by relatively few corporations.

The food system is a biological one which requires a healthy biosphere to function. The loss of biological and agricultural biodiversity that gives resilience to biological systems has increased since the 1970s. It has led to various international agreements such as the 1992 Convention on Biological Diversity and the 2001 binding International Treaty on Plant Genetic Resources for Food and Agriculture. The convention promotes the conservation, sustainable use and sharing of the benefits from biodiversity in general. The international treaty focuses on plant agricultural biodiversity, recognizes the role that small farmers around the world have had in creating and maintaining it, and

includes a section on farmers’ rights and the need to maintain this diversity *in situ*, as a key element of future food security.

Human nutrition has come to depend upon very few crops as its staples. Just three crops – rice, wheat and maize – account for more than half the energy intake from plants. Another six – sorghum, millet, potatoes, sweet potatoes, soybean and sugar – take the total to more than 75 per cent, while 90 per cent of humanity’s calorie intake comes from just 30 crops. Around 120 crops are important nationally in different countries – for example, teff in Ethiopia – while some 7,000 plants have been grown or gathered as food out of an estimated 30,000 edible plants. The vast majority of research, however, has focused on just a few.

Given the key role of those few plants, “it is particularly important that the diversity within major crops is conserved effectively, available for use, and managed wisely” noted a global survey by FAO (FAO, 1998). Much of this diversity has been developed and maintained by small farmers, but it was the replacement of these local or farmers’ varieties or landraces by improved and/or exotic varieties and species that was “the major cause of genetic erosion in all regions except Africa” (FAO, 1998). A second survey noted that the diversity found in farmers’ fields is still largely inadequately documented and managed (FAO, 2010).

Much of the analysis in the continuing debate over food security examines neither the root causes of hunger nor the complexities and interactions of poverty and power. A report on chronic vulnerability in the Sahel, for example, found that much of the analysis tended to divide vulnerability to drought into ‘immediate’ and ‘structural’ issues, and that the latter were largely ignored. By contrast, the reality of food-related vulnerability in the Sahel was found to be “complex and nuanced... [it] can be influenced by gender, ethnic group and generation issues, and by contemporary and historical social processes that are often not analysed and not explained” (Trench et al., 2007).

If we want to see an end to hunger and malnutrition, we must think about the structures and systems as well as what we eat. Shifts in consumption from grain-based diets towards diets rich in meat, dairy and fats have been promoted by vested interests and are seen as desirable. Further pressures arise from governments and agribusiness to use land for biofuel production, as discussed in Chapter 4.

Overproduction and saturated markets

Given that 15 per cent of the world’s population now goes to bed hungry, it is ironic that excessive production has driven so much innovation in high-income countries’ food systems during the past half-century. The necessary and successful strategies to increase production after the Second World War in Europe and North America,

using a complex mix of policy instruments, including subsidies, extension services and financial incentives to farmers, led to other problems.

The core problem for businesses dealing with food is that there is a limited demand for it (OECD, 1981). All we need is enough food for a healthy diet – and that can be gained from a wide range of sources, as the fantastically diverse range of food cultures shows. But in high-income countries, as affluence grew, markets quickly became saturated. This placed strong pressures on businesses working in the food sector – which were competing for investments with businesses in other sectors where it was easier to persuade consumers to buy more and more of your product. One can buy as many clothes or shoes or consumer goods as one’s budget allows, without necessarily affecting one’s health; but increasing one’s food consumption beyond the body’s basic needs could trigger the onset of lifestyle diseases linked to overweight and obesity (see Box 2.6).

This led to high-income countries focusing on developing technological innovation to reduce costs and give innovators a competitive advantage. Businesses also concentrated on product diversification. They found ways of turning cheap and nutritious plant foods into more expensive animal products such as grain-fed, intensively reared meat and dairy, of developing products with higher ‘value added’ than basic foodstuffs and of finding ways to tempt people to eat more of these through marketing and advertising. It also contributed to policy-makers worldwide generally neglecting agriculture and downplaying its importance. As populations became more affluent and competition among businesses increased, food marketing found new themes – buying new products was associated with fun, entertainment and excitement or to obtain the love of offspring or partners. From the very beginning, supermarkets were designed both to cut retailers’ costs and to increase consumption (Patel, 2007).

With increased urbanization and richer consumers in low- and middle-income countries, much investment focused on serving them. Aspirations in these countries followed the patterns set in the larger economies, and were often spurred by firms seeking to expand operations beyond the confines of saturated home markets. From 1988 to 1997, for example, “foreign direct investment in the food industry increased from US\$743 million to more than US\$2.1 billion in Asia and from US\$222 million to US\$3.3 billion in Latin America, significantly outstripping the level of investments in agriculture” (FAO, 2004). At the same time, sales through supermarkets grew as much as they had in the United States over 50 years.

Food supply chains also went global, offering out-of-season produce all year round to those who could afford it. Poorer and smaller producers at the end of these fresh fruit and vegetable supply chains – which tend to be dominated by fewer and more integrated companies – faced downward pressures on prices and small farmers became more marginalized (Vander Stichele et al., 2006).

Farming in high-income countries made maximum use of technology and machinery based on cheap fossil fuels and minimized the use of labour. Such an industrial approach, focusing on one or two attributes of the farming system such as labour productivity, grain yield or animal production, led to increasingly monocultural production systems. The result was an emptying of the countryside and the squeezing out of small farmers, leaving a landscape very different from that still found in many low- and middle-income countries.

Misdirected research and development

This industrial approach has also become the iconic image of what development is all about. It is this image that politicians and policy-makers around the world aspire to – a view largely shared by the bilateral and multilateral aid agencies. Much development policy has focused on industrialization and has neglected rural and agricultural development over the last 30 years. Attention has shifted away from agriculture in the big development agencies, such as the World Bank, which lent about 26 per cent of its total budget to agriculture in the 1980s but only 10 per cent in 2000 (Millstone and Lang, 2003).

Research and development (R&D) funding also moved from the public to the private sector in most OECD (Organisation for Economic Co-operation and Development) countries. In the United States, for example, from 1986 to 2009 the public share of R&D in agriculture fell from 54 per cent to 28 per cent (Benbrook, 2011). Today, much publicly funded R&D has shifted to fundamental research, the results of which only firms with big R&D facilities can use, rather than applied research aimed to benefit and be freely adopted by farmers. Even publicly funded R&D supposedly for the benefit of small farmers has often failed because it was inappropriate to their needs and conditions (Harwood, 2009). Experience from a wide range of projects shows that, from farmer field schools to participatory plant breeding, working *with* small farmers brings better results and yields products better suiting their needs (IAASTD, 2009; Song and Vernooy, 2010; Pimbert et al., 2010).

The relative complacency about food and farming has been shattered in the past few years. Factors such as major price rises in 2007–2008 (which increased the number of hungry people and led to riots in some countries), the growing costs to health services of obesity, concern over the impact of climate change with a rising population and the likelihood that as 2015 approaches the MDGs will remain unfulfilled, have contributed to refocusing the attention of politicians and policy-makers on food.

Future choices

Recently there has been a veritable avalanche of reports on the future of food and farming. Many focus on how to feed a world of 9 billion people in 2050. Sometimes, though, looking into the future can distract us from dealing with the problems we

face at present. These, if dealt with quickly and effectively, could reduce such future challenges. The choice about the best path to the future must be made here and now.

Reports such as those from the Royal Society and the Foresight Project of the Government Office of Science in the United Kingdom recognize the very complex mix of challenges, including avoidance of waste and the many social and economic factors affecting hunger and malnutrition. Yet, fundamentally, they still implicitly assume that technology will deliver the key solutions (Royal Society, 2009; Foresight Project, 2011). They share the vision that the problems of hunger and malnutrition will be overcome through an approach to food, farming and economic development that remains industrial in its thinking, technologically dominant in its approach and increasingly controlled by large corporate actors.

Other reports, such as Agrimonde (Paillard et al., 2011) from France and the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD, 2009), also acknowledge the complexity of the issues but argue that a fundamental change of direction is needed. These two reports concentrate more on an agro-ecological approach to farming; a view that builds upon existing diversity, seeks to create rural jobs and increase rural wealth, and sees a central role for the small farmer (see also Chapter 4). Thus, technology and economics can work in support of an equitable and ecologically sound system.

Rethinking food security in a changing world

This agro-ecological approach connects to the considerable evolution in thinking about food security since the 1970s. At that time, the emphasis was on creating nationally managed stocks around the world, as well as curtailing commodity price speculation and price volatility which adversely affect the poor (see Chapter 3). By the mid-1990s, the notion of food security was framed by three keywords: access, availability and affordability. In the last decade, there has been a growing emphasis on the need for sustainable food systems.

But even this approach has been challenged by peasants' and farmers' organizations that have combined into what is now known as the food sovereignty movement. Their critique is that the sustainable food systems approach ignores power. For the new movement, it is crucial that the power to control and decide the direction of change in the food system rests with local communities and farmers (see Box 6.3).

Growth of big business and the impact on global rules

Some of the biggest changes to the food system over the past 60 years have taken place off the farm (Tansey and Worsley, 1995). The last half of the 20th century saw an

ever-increasing economic concentration of power among the providers of agro-chemicals, machinery, seed and other inputs to farmers, among food manufacturers and retailers, and even among catering businesses around the world. Fewer and fewer firms gained control of increased market share in all of these areas. Today, four or five grain traders control most of the grain moving around the world, a couple of companies control poultry stocks and, in most high-income countries, four or five supermarket chains account for most of the food bought by consumers. These supermarket chains are also expanding rapidly in low- and middle-income countries. This gives these large multiple retailers a major advantage in bargaining with small suppliers, with supermarkets also increasingly setting the standards that must be met.

These large companies, especially those dealing with consumers, can use the power of brands, trademarks and advertising to influence desires and consumption patterns. Other companies, more focused on farm inputs and seeds, can increasingly use patents and plant breeders' rights to control their products, especially those that have been genetically engineered. Rules concerning patents, trademarks, plant variety protection, copyright and trade secrets – usually grouped under the term 'intellectual property' – have also become global since the mid-1990s, as have rules on agricultural trade.

Agreements on Agriculture, Trade-Related Aspects of Intellectual Property Rights and Sanitary and Phytosanitary Measures are all part of the set of agreements that bind members of the World Trade Organization (WTO), established in 1995. Unlike the treaties and conventions on biodiversity, human rights or agricultural biodiversity, WTO rules are legally binding on members. They are supported by a binding WTO disputes settlement mechanism, which itself is backed by sanctions. So why do they matter for hunger and malnutrition? Essentially, because they may constrain the freedom of action of countries to set the policies that are needed to end hunger and malnutrition. They also increase the power of the large firms operating in the food sector, especially those seeking to dominate the seed markets globally (Tansey, 2008; ETC Group, 2005 and 2010). Indeed, it was the powerful actors – both states and corporations – that were most influential in shaping the rules of the world in their interests at the end of the 20th century.

This shift in global trade rules, especially those on intellectual property – better understood as monopoly or exclusionary privileges that are granted to some in exchange for public good benefits – in reality entrenches the power and privileges of large corporate players in the food system. Such rules tend to induce technological innovation in areas and ways that can be controlled through patents or plant variety protection. That means, for example, that plant breeding becomes the main focus of response to climate change as opposed to innovations that may require changing practices and shared knowledge, and which cannot easily be patented, privatized and turned into varieties for sale. Overall, it makes moving to the more agro-ecological approach more difficult and will require changes to corporate law and accountability (Vanloqueren and Baret, 2009).

The availability of patents on living organisms has helped maintain the focus on genetically engineered crops and underpinned the expansion of chemical companies into plant breeding and of takeovers in the seed business. The result is that, at present, only a few companies control an expanding range of seed businesses around the world (Howard, 2009). These companies' bargaining power and capacity to influence governments greatly outweigh that of small and marginalized farmers. The rewriting of these global rules over the past 20 years leaves farmers' rights, rights on biodiversity and the right to food defended by relatively weak legal instruments lacking enforcement mechanisms, while those under the WTO are much stronger.

Changing the functioning of the food system

The key questions for changing the food system are determined by the amount and types of food that are required, food production and distribution mechanisms and the means for apportioning the benefits that accrue from food provisioning. Currently, it is not small farmers – those who actually produce most of the food in the world – who receive the benefits. Nor is food produced in ways that develop rural infrastructure, create jobs and increase rural prosperity, so helping others to afford good food.

This means that there must be fundamental changes to food provisioning as currently practised, not just in farming (discussed further in Chapter 4) but also in the way food is treated beyond the farm and in how the problem of hunger and malnutrition is understood.

The most effective way to change a whole system is to change the paradigm we use to think about it. Questions of climate change, global justice and ecological sustainability demand a radical change of tack – they require us to reframe the rules and incentives in a manner that encourages people to create a well-fed world. Big business recognized the need for global rules when it reshaped the international rules on intellectual property and had them formalized by the WTO. But system change also means ensuring people have the freedom to adapt, to experiment and to act together locally – which is where the need for participation, empowerment and building from the bottom up are so important in changing the food system for the better. We also need to make sure that there are safeguards in the system, such as physical stocks of grain held nationally or regionally for when unforeseen events disrupt supplies. Such problems go to the heart of our economics; prices must reflect 'external' costs in a way that they do not at present.

Accepting the challenge, keeping up the pressure, enforcing rights

Hunger and malnutrition will persist if we do not undertake systemic changes beyond technology. They will persist as long as those with the power to tackle poverty refuse to change... or until the hungry have the power to make them do so. Ideally, change

should be a matter of partnership, one dedicated to improving livelihoods, reducing poverty and developing fair, resilient and ecologically sound food provisioning systems with thriving and equal rural and urban communities – with as much fair trade and exchange at all levels as possible and just rewards for all.

To achieve such an end also calls for greater civil society and humanitarian activity in monitoring and evaluating progress and in calling states and businesses to account, to live up to commitments already made and to become the moral – if not the legal – enforcers of such commitments.

Chapter 1 was written by Geoff Tansey, a writer and consultant on food system issues. He also wrote Boxes 1.2 and 1.5. Box 1.1 was contributed by Sue Armstrong, a writer who specializes in health and science issues. Box 1.3 was written by Lucinda O'Hanlon, Human Rights Officer, Special Procedures Division, OHCHR. Devinder Sharma, a leading Indian journalist and co-founder of the India against Corruption movement, wrote Box 1.4.

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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

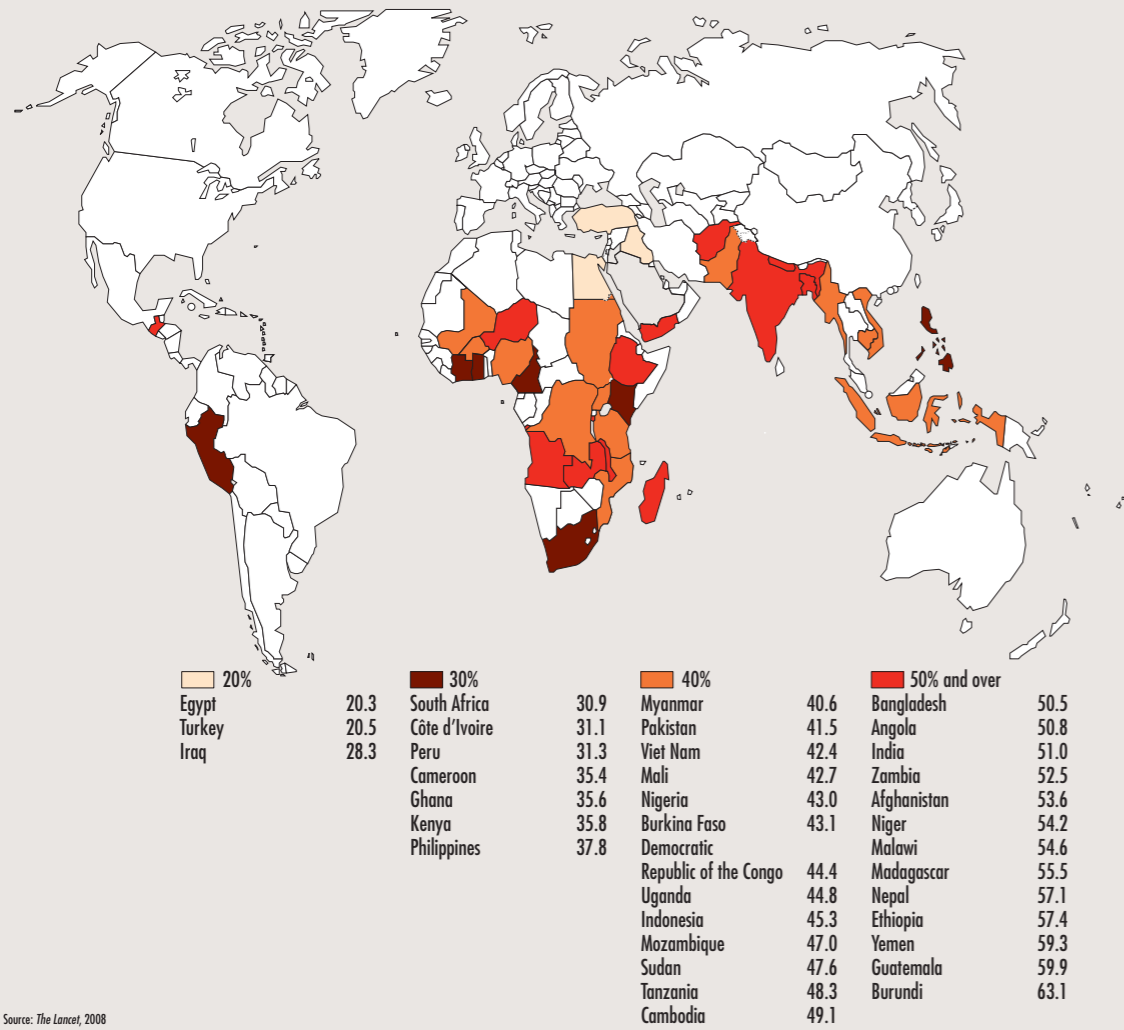
The critical period of growth and development is the 1,000 days from conception to a child’s second birthday. The problem of stunting has its roots in poor nutrition during this time: undernourishment during the foetal period contributes up to half of a child’s failure to grow by the age of 2 (UNSCN,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

Photo opposite page:
David Pataule, aged
11, eats a meal in
his family’s home in
Kiziba refugee camp
in Rwanda’s Kibuye
district. Rwandan
small farmers are
partially responsible
for providing food aid
for the refugee camp
through the Gates
Foundation’s Purchase
for Progress initiative.

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Gates Foundation

Figure 2.1 Countries with the highest prevalence of childhood stunting



Source: The Lancet, 2008

Box 2.1 Questions of definition

Malnutrition is a broad term that refers to all forms of poor nutrition. It has a range of manifestations, from undernutrition at one end of the spectrum to obesity at the other. (Please note: in this chapter, the term is used to describe undernutrition rather than obesity, unless otherwise stated.)

Undernutrition exists when inadequate food intake and repeated infections lead to one or more of the following conditions: stunting, wasting or being underweight. Another form of undernutrition consists of deficiencies of essential micronutrients – vitamins and minerals,

especially iron, iodine, zinc and vitamin A. Micronutrient deficiencies are also referred to as 'hidden hunger' because they are often present without showing any clinical signs, and may remain undetected until they become very severe and life-threatening.

Stunting – being short for one's age – reflects the cumulative effects of undernutrition (often referred to as 'chronic' malnutrition).

Wasting – having a low weight for one's height – reflects acute undernutrition resulting from inadequate food and nutrient intake and/or repeated or severe disease (often referred to as 'acute' malnutrition).

Underweight is low weight for chronological age and reflects either stunting or wasting or both.

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)

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 – '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).

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 disease becomes ‘problems of the past’. But what we are seeing in developing countries undergoing rapid economic transition are undernutrition, overnutrition 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 consume 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, explain 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 nutrition 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 (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 with 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\$ 1.6 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 (Grantham-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

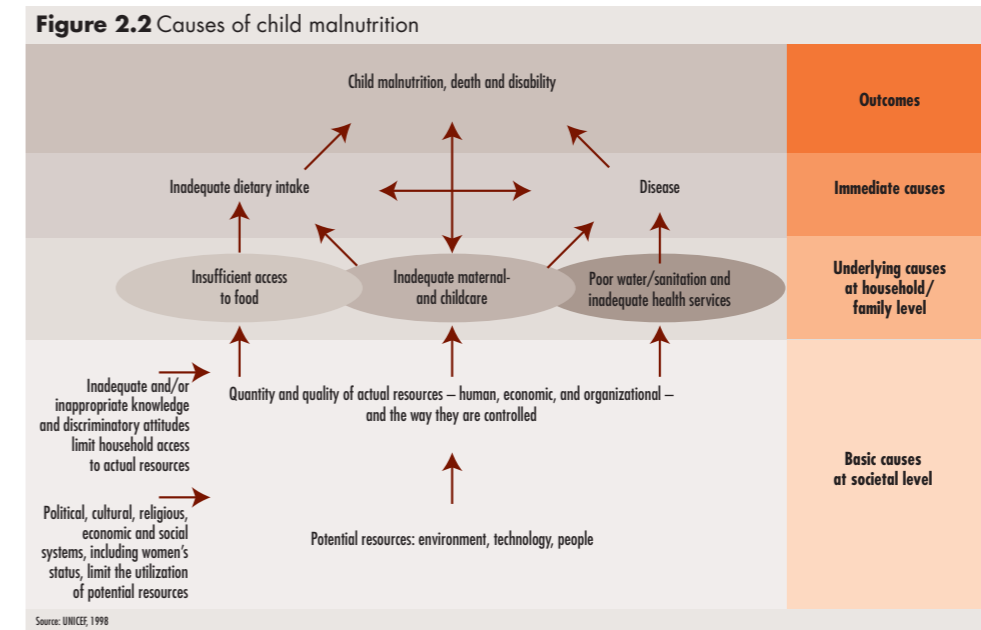
near Manchar Lake in Pakistan, describes how they rely on remittances from a brother working abroad. “We took out a loan and sold our livestock to generate funds to send him to Saudi Arabia so that he can earn for us, because we were passing through a very bad phase of our life,” Bux says. “He sends 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



A malnutrition screening campaign in the village of Gourma, Niger, organized by the Red Cross Society of Niger.

© Julien Goldstein/IFRC

Box 2.3 Urban hunger and backyard agriculture

About one-fifth of the world's 1.85 billion undernourished people live in towns and cities (MIT 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. So I have entered into prostitution to look after my husband 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 Rameshbhai 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 169 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 informal 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).

‘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).

Figure 2.3 Comparison of the cost of a diet based on energy-only requirements with the cost of a healthy diet



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

Box 2.4 Healthier food for people living with HIV and AIDS in Lesotho

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

prevalence is 23.6 per cent, the Lesotho Red Cross Society (LRCS), in partnership with the German Red Cross, is running a programme aimed at helping people living with HIV and AIDS to have a healthy and adequate diet. Lesotho, a small mountainous kingdom completely surrounded by South Africa and home to just over 2 million people, is one of the world's poorest countries, ranking 141st among 169 nations in the Human Development Index (UNDP, 2010). Agricultural land is limited 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.

However, this project to help people to feed themselves well faces some serious challenges. Lesotho's weather is unpredictable and often extreme. Hailstorms and torrential rain in December 2010 and January 2011, for example, caused flooding and battered fields. Another problem is free-roaming livestock, particularly goats, which eat people's crops.

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."

things they had to witness, community care volunteers for people living with HIV in South Africa told a researcher. "I thought I was going to give healthcare, but then you find there's no food in the house, the whole family is hungry, there's no money coming in, and you feel you can do so little," said Gladys (UNAIDS, 2000).

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 (Water Aid 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 (Water Aid 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, health-care 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 Lartey. "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 Viet Nam, 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.

Figure 2.4a Percentage of infants exclusively breastfed for the first six months of life (2000–2006)

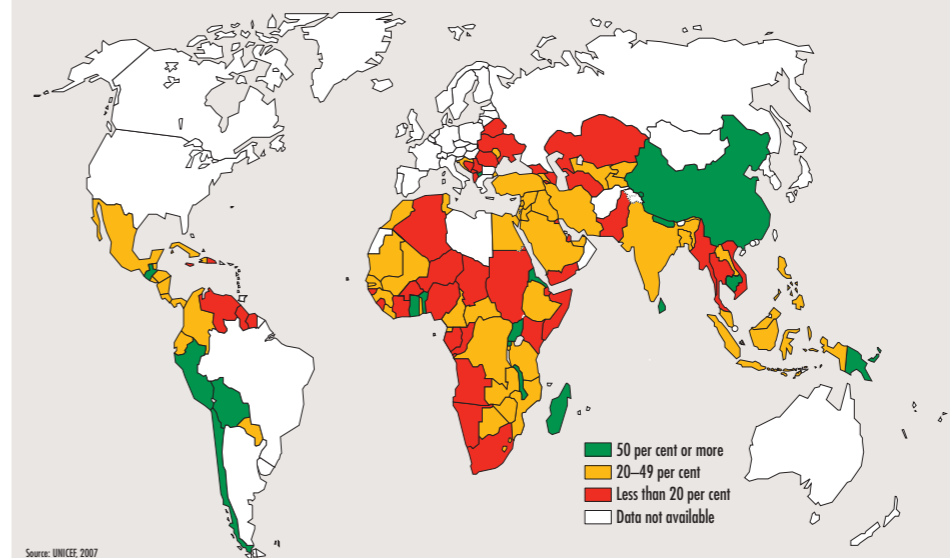
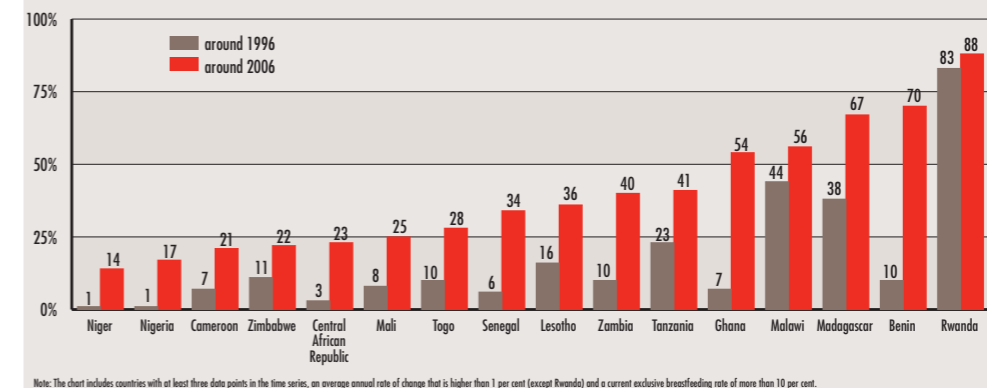


Figure 2.4b Increase in percentage of infants in 16 sub-Saharan African countries exclusively breastfed for the first six months of life (around 1996 and around 2006)



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

Box 2.5 Tackling micronutrient deficiency

“Investing in vitamins and minerals is probably the most cost-effective development intervention that we have in the world today,” says Venkatesh Mannar, president of The Micronutrient Initiative (The Micronutrient Initiative, 2010), which was set up in 1992 to further the aims of the 1990 World Summit for Children. These included the reduction of anaemia prevalence by one-third and virtual elimination of other micronutrient deficiencies by 2000.

Judging by current statistics, that was a hopelessly unrealistic target. But in 1996 Stanley Zlotkin, senior scientist at the Hospital for Sick Children Research Institute in Toronto, Canada, threw his weight behind the effort to tackle the global anaemia problem. In 1997 he developed ‘Sprinkles’, a mixture of iron, zinc, folic acid and vitamins in powdered form for adding to food just before it is eaten.

Trials began in 1999 in Ghana and showed that the product was effective at treating anaemia in children aged 6–24 months. Since then, a multi-micronutrient

product has been developed and Sprinkles – which comes in small sachets about the size of individual sugar sachets, has a shelf-life of two years, requires no refrigeration and costs less than 4 US cents a sachet – has been tested in projects in developing countries across the world. A 2002 pilot project in Bolivia, for example, cut anaemia prevalence among children aged 1–6 years from 35 per cent to 9 per cent in two months, using the micronutrient powder alongside a treatment to eliminate intestinal worms that affect nutrient absorption (Sprinkles Global Health Initiative website). In 2007, a study carried out in rural Haiti by researchers from the International Food Policy Research Institute and the Division of Nutritional Sciences at New York's Cornell University found that adding Sprinkles to children's diet as part of a special food aid programme reduced anaemia from 54 per cent to 24 per cent after two months and to 14 per cent seven months later (News-Medical.Net website).

“Sprinkles are one of the most promising innovations in nutrition today,” said Cornell University's Purnima Menon, who led the 2007 study. “They offer an inexpensive option that mothers seem to love and children can consume

easily” (News-Medical.Net website). Since then, a number of micronutrient powders have come on the market and provide a choice for mothers and programmers concerned about micronutrient deficiency.

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.

“Some nutritionists have always questioned whether you should use manufactured products for nutritional programming in developing countries,” comments Peter Hailey. Others argue that having developed a product that is so effective, it would be unethical to restrict its use or try to make decisions for poor people about what is appropriate for them. The way forward, they suggest, is to draw up a code of conduct similar to that governing the promotion of baby milk products, to try to prevent such products undermining breast and complementary feeding.

Another contentious issue is the patent that Nutriset, as manufacturer of the first RUF, has taken out on the formula. Although there are now Plumpy’nut franchises in ten African countries and a number of alternative RUFs made in countries not covered by the patent, such as India, Norway and South Africa, the patent does inhibit many other low- and middle-income countries from developing their own products using local ingredients to suit local tastes. And Nutriset has at times tried to prevent competitor products even transiting through countries where its patent operates by threatening legal action (MSF, 2009).

Undoubtedly questions about how, where and for what purposes RUFs should be used will continue to tax and divide nutritionists for some time to come. But what should not be overlooked, says Hailey, is the new status their development has given to nutrition as a specialism.

“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.

With the funding of CMAM, says Hailey, “we’re still stuck in a grey area – between a programme that was originally conceived as an emergency response and one that hasn’t yet made it into the development agenda”.

Box 2.6 Rising hunger and malnutrition in the wealthy West

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, 72.5 million people, falling into this category in 2009 (CDC, 2010).

In the United Kingdom, it is predicted that 60 per cent of the adult population could be obese by 2050 with associated National

Health Service costs projected to double to £10 billion a year by this time. Being overweight has become the norm for adults, with a quarter of adults and 10 per cent of children now obese (Foresight Project, 2007).

Numerous action plans have been introduced in countries to reverse the obesity tide. Since 2005 there have been health warnings in French TV adverts and bans on vending machines in schools, students at California’s Stanford University are paid not to use their cars while schools in Wales have adopted ‘walking buses’.

However, despite such expensive and extensive government-sponsored healthy eating campaigns, many people on low incomes either do not have enough money to buy the food recommended by health experts or are unaware of how to cook and prepare nutritious meals.

Low-income households often spend a higher proportion of their income on food. In Ireland for example, they spend 23–25 per cent compared to the national average of 18 per cent (CSO, 2005). Moreover, food prices in Ireland are higher than the EU norm with up to 15 per cent of the 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 where 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 kilograms 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.

FareShare is a member of FEBA and distributes food to 29,000 people a day via 15 operational centres located in England, Scotland and Ireland. The organization maintains that if they received just 1 per cent of the 3 million tonnes of food wasted by the UK industry every year, this would represent 70 million meals they could redistribute.

In the UK, some 4 million people are unable to afford regular healthy meals (Gordon et al., 2000) and many are turning to food banks such as the Trussell Trust which redistributes donated food through churches and other community organizations. This network has expanded from one in 2000 to 92 in 2011, with the most recent 40 of these depots set up in 2010 alone. The trust’s staff fed 61,000 people in the 2010–2011 financial year, a 51 per cent increase on the previous year (Trussell Trust website).

However well-intentioned their staff, food banks cannot solve the fundamental causes of hunger – poverty and inequality – and may be seen as an excuse for governments to shirk their responsibilities. With little agreement or joined-up thinking on policies relating to emergency food distribution either in the EU itself or within the individual countries, it is likely that the number of food banks and those using them will rise as the recession bites and more social services are cut.

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

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.

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Continued price instability questions reliance on global food markets

In outlining the impact of price volatility on food insecurity and hunger, this chapter argues that higher food prices can be explained by a number of intertwined factors such as slowing growth in food production, lower stock levels, increased use of agrofuels and growing commodity and financial speculation. In contrast, increased demand from emerging economies like China and India is not a major factor in explaining higher food prices.

Against the background of powerful forces at play in today's globalized world, a number of realistic measures are highlighted and suggestions made for coping with price instability. These include government measures to limit domestic inflation and the neglected and often crucial role of remittances and safety nets. Food aid programmes and the ability of the global food market to supply sufficient and cheap food must be viewed with scepticism. Rather, the way forward lies in regulation, social protection and increased food production.

After decades of relative stability, international prices of major cereals started to rise in 2007, then doubled in the first months of 2008. In one year, global wheat prices increased by 150 per cent, more than doubling the price of bread, while high oil prices increased the costs of transport and manufactured goods.

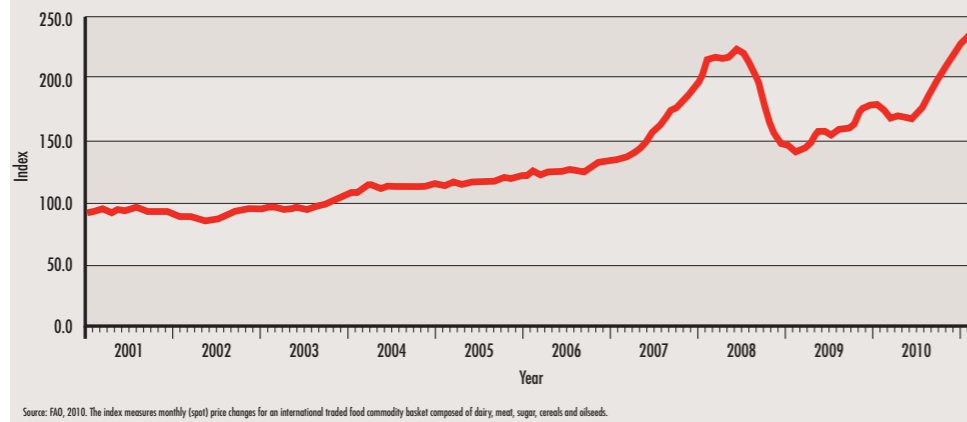
High prices have resulted in a massive increase in food insecurity around the world. The Food and Agriculture Organization of the United Nations (FAO) estimated that by the end of 2008, high food prices had added 109 million people to the ranks of the undernourished, raising the number of hungry people to an all-time record of 1 billion in 2009 (FAO, 2007; 2009). Save the Children estimated that in 2008 alone, a minimum of 4.3 million (and potentially as many as 10.4 million) additional children in low- and middle-income countries may have become malnourished as a result of food price rises (Save the Children, 2009a). These figures confirmed the correlation between food prices and the level of child malnutrition identified by previous research in Asia and Africa (Save the Children, 2009b; Torlesse et al., 2003; Mousseau, 2006; see also Box 3.1).

Poor people in both rural and urban areas, who typically spend between 50 and 80 per cent of their income on food, were hardest hit. Faced with high food prices, poor people in low- and middle-income countries cut back on the quality and quantity of food they consume, struggle to pay for education and healthcare and are forced to sell assets (Hossain et al., 2009). High food prices also resulted in civil unrest in some

Photo opposite page: Food is distributed in Buge, a village in Ethiopia, which experiences chronic food insecurity and where higher food prices have placed millions more people at greater risk of hunger. Yet Ethiopia is one of many countries where land is increasingly used to grow agrofuels rather than food; thus there is a greater need for food aid and expensive food imports.

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Figure 3.1 FAO food price index, 2001–2011



30 countries in 2007–2008, putting many governments under pressure (Mousseau, 2010). Social disorder toppled the government in Haiti (Reuters, 2008), while demonstrators were killed not only in Haiti but also in Cameroon, Mozambique and Senegal.

International food prices decreased in the second half of 2008 and in 2009, leading some observers to believe the crisis could have been an ‘accident’. However, a new round of food inflation in 2010–2011 confirmed that the world is facing a major problem of unstable agricultural markets and volatile food prices. After 18 months of relative stability, FAO’s food price index increased by more than 30 per cent between June and December 2010 (FAO, 2010). The price of cereals jumped a staggering 57 per cent over the same period. This new increase in prices again resulted in social unrest: 13 people were killed in the food riots that took place in the wake of high bread prices in Mozambique in early September 2010 and the price of food was one of the triggers that led to the massive protests which spread across the Arab world in early 2011.

The increases in food prices in 2007–2008 and 2010–2011 (see Figure 3.1) have highlighted the diverging views among experts, policy-makers and activists about the causes of price volatility and fuelled the debate about the policy responses required to address this volatility.

Box 3.1 The impact of higher food prices on child nutrition

The link between food price volatility and childhood hunger and malnutrition has been studied in several countries. In Bangladesh, three studies of the effect on children of food price rises – one looking at price fluctuations in the 1990s (Torlesse et al., 2003), the other two at the price spike of 2008 (Sulaiman et al., 2009; Save the Children, 2009b) – illustrate

not only the threat of acute childhood malnutrition but also the often-neglected background epidemic of chronic undernutrition.

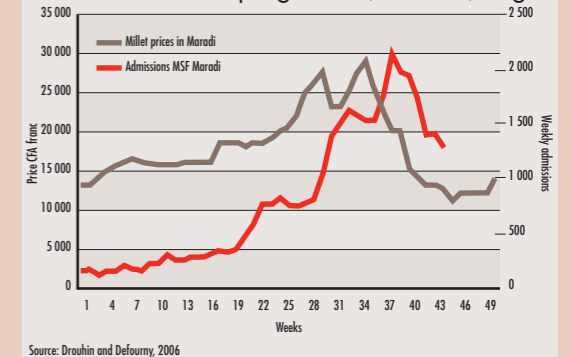
Across Bangladesh, when the price of rice increases, rice consumption remains steady or even increases as non-rice consumption falls (Torlesse et al., 2003). When households are already spending most of their income on food – and often more than half of their food costs on rice alone – there is no safeguard when prices increase. Families will therefore maintain rice consumption at the expense of more nutritious foods, such as vegetables, fruits, meat, fish and dairy.

The strategies that poor households employ to cope with higher food prices often have far-reaching detrimental effects, especially on children. As well as reducing the consumption of nutritious food, such strategies include cutting back on health expenditure, removing children from school (often so that they can work) and selling productive assets (e.g., livestock). These problems are compounded when poor families borrow money in times of high food prices, often prioritizing loan repayments over investing in livelihoods or more diverse diets (Save the Children, 2009b).

A comparison of children under the age of 5 in 2006 with children of the same age in 2008 (when rice prices were significantly higher) showed that the prevalence of underweight children increased by 5.5 per cent among the very young (0–6 months old) in 2008 and 6.7 per cent among older children (2.5–5 years). For the very young, most of whom are breastfed, maternal health is likely to have a major influence on child malnutrition (Sulaiman et al., 2009).

Looking at a rural community in Bangladesh in late 2008, Save the Children (2009b) found that up to half of the community’s households had a lower disposable income than before the price spike. Furthermore, higher rice

Figure 3.2 Millet prices and admissions to the MSF treatment programme, Maradi, Niger



prices had a much greater effect on disposable income than did the failure of the 2007 wet-season rice harvest. Many poor families were unable to afford an adequately nutritious diet and the proportion of households unable even to meet their energy requirements doubled. Comparing stunting in children who were very young at the time of the price hike with that in older children – who were born at least two years before the crisis, in less challenging conditions – suggested that the incidence of chronic malnutrition was 7 per cent higher than it would have been had prices remained stable.

The 2005 food crisis in the West African country of Niger presents another stark example of the danger to children of high food prices. In the first quarter of 2006, Médecins Sans Frontières (MSF) treated 26,000 children suffering acute malnutrition in the country’s Maradi region, up from fewer than 20,000 for the whole of 2004. Figure 3.2 shows the dramatic correlation between millet prices and severe malnutrition, with admissions of both children and adults to the MSF treatment programme spiking five weeks after price rises (Drouhin and Defourny, 2006).

Ways to prevent or mitigate food crises could include feeding programmes in schools.

They are important although they do not reach the youngest children, who are most at risk of mortality due to malnutrition. In addition, the hungriest and most undernourished children are often not in school (Mousseau, 2010).

When disasters strike areas where childhood malnutrition is already prevalent, a vicious cycle is set in motion. The resultant malnutrition, devastating in itself, will in turn render

children less able to cope with the social and physical effects of disaster. Children's long-term development is not only compromised directly through malnutrition, but also indirectly if, for example, families cannot afford to keep children in school. The effects of current price spikes thus reverberate through time, making communities less resilient in the face of future disasters.

Increases in food prices have been explained by a variety of factors. Decreases in food production and low global stocks, growing demand in emerging economies, the rise of agrofuels, trade measures – namely export bans – taken by some countries and financial speculation are among the key elements thought to drive inflation.

A stretched global food market

A number of gradually evolving long-term trends have slowed the growth of food production in the past two decades and resulted in a reduction of global food stocks.

Compared to the period between 1970 and 1990, when the production of aggregate grains and oilseeds rose by an average of 2.2 per cent per year, the annual growth rate since 1990 has declined to about 1.3 per cent (Trostle, 2008). Several factors have contributed to this decline, including reduced state intervention in the agricultural sector, reduced public support and overall investment in agriculture in terms of both financial resources and the design of adequate policies, and a decline in research and development by governmental and international institutions.

The decrease in the rate of growth of production has also been affected by scarcity of resources – land degradation and water depletion – as well as by the effects of climate change. Each year, 5 to 10 million hectares of agricultural land are lost due to degradation caused by water shortages (Stigset, 2008).

Agricultural production is weather sensitive, and a drought or flood can reduce output significantly. Adverse weather conditions in some major grain- and oilseed-producing areas, such as Australia, the European Union (EU) and Ukraine, contributed to the decline in production in 2006 and 2007. In 2010, wildfires and bad harvests in the Russian Federation and other major cereal-producing regions of the former Soviet Union reduced the availability of cereals on the global market. Droughts, floods and freezing weather due to climate change are expected to continue having an adverse impact on agricultural output and food security in low- and middle-income countries (FAO, 2007).

Beyond production, it must be noted that the largest flows of global trade of grains such as maize, rice and wheat originate from only a small number of exporting countries. Argentina, Brazil and the United States together account for 90 per cent of world maize exports; India, Pakistan, Thailand, the US and Viet Nam represent 80 per cent of world rice exports; and Argentina, Canada, the EU, the Russian Federation and the US are responsible for 74 per cent of world wheat exports (Jiang, 2008). Rice is particularly sensitive because its international market is slight, i.e., only a small proportion of total rice grown enters into international trade (most major consumers are also major producers). Any climate-related fall in output of such exportable crops or change in the policies of these major cereal-exporting countries will have a significant impact on world markets.

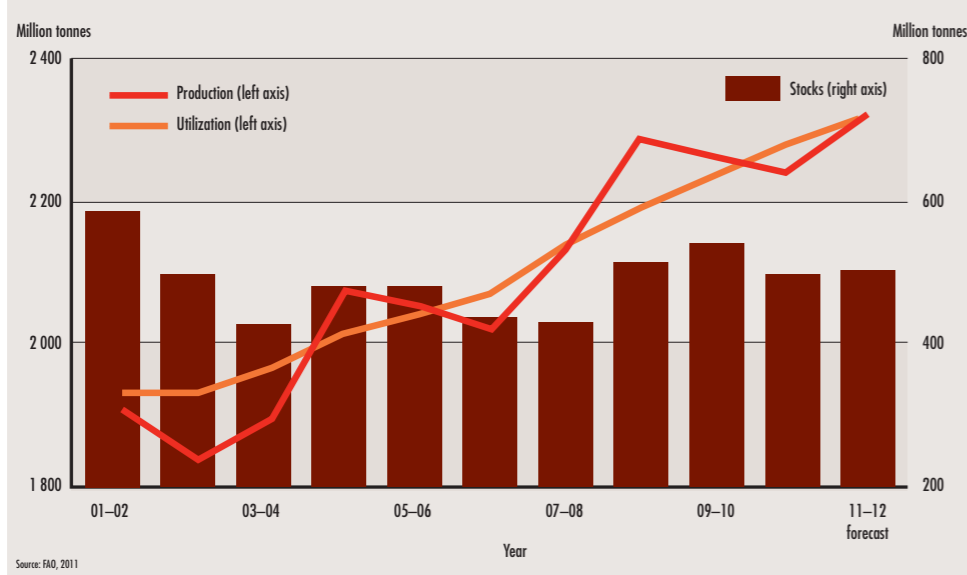
The decline in agricultural growth has been accompanied by a decline in grain stocks (see Figure 3.3). FAO estimated that world cereal stocks had fallen to just 418 million tonnes at the end of 2008, their lowest level since 1982 (FAO, 2008b). World wheat stocks dropped to 147 million tonnes in 2008, the lowest level since 1977. In 2008, wheat stocks in the United States were at their lowest level for 60 years, as reductions in exports from other key exporting countries caused a rise in US exports to cover the global shortfall. Global food stocks recovered slightly in 2009 and 2010, when they increased to 501 million and then 525 million tonnes, but since the beginning of 2011 they are estimated to have fallen to 479 million tonnes (FAO, 2010).

Several factors are responsible for declining grain stocks. Given that the cost of holding grain stocks is as high as 15–20 per cent of the value of the stock per year (Lin, 2008), government-held buffer stocks have been discouraged after nearly two decades of low and stable prices. Furthermore, as agricultural markets have become increasingly liberalized, there has been a general perception of the reduced need for individual countries to hold public grain reserves. The private sector and international financial institutions have maintained that holding public stocks is costly and inefficient; the rise of 'just-in-time' inventory management and years of readily available global supplies were further incentives to reduce stock holdings (Trostle, 2008).

Low stocks and high prices have threatened the food security of many countries dependent on imports for their food supply, and a number of governments realized how vulnerable they had become. The need to secure their food supply, through the constitution of stocks, export restrictions or a rush to buy food commodities on the international market, was another aggravating factor pushing prices even higher.

Agrofuels and the tighter relationship between food and energy

The relationship between food and energy has gone through three stages. The first stage corresponds to the past few decades; the prices of food crops and energy have become

Figure 3.3 Cereal production, utilization and stocks

increasingly linked to each other due to the use of fossil fuels in food production (for fertilizers and irrigation) and transport. According to cost-of-production surveys and forecasts compiled by the US Department of Agriculture (USDA), the doubling of prices of energy-intensive components of production, including fertilizer and fuel, led to a rise in production costs in the United States for maize, soybeans and wheat of around 22 per cent between 2002 and 2007. This rise in production costs increased the export prices of food commodities by about 15–20 per cent between 2002 and 2007 (Mitchell, 2008).

The second stage has seen this ‘old’ relationship between energy and food tighten dramatically in the past decade, following the increase in demand for coarse grains due to agrofuel production in the United States and the EU. High oil prices in recent years, together with concerns over energy security and climate change, have led to the promotion of the use of agrofuels as a supplement to fossil fuels. Agrofuels have received a further boost through generous policy support (subsidies and tariffs on imports) and ambitious mandates.

The 2007 US Energy Bill almost quintupled the agrofuel target to 35 billion gallons (132bn litres) by 2022, while the EU aims to use agrofuels for 10 per cent of its transportation fuels by 2020. The EU, the largest biodiesel producer, began to increase biodiesel production in 2005. US ethanol production jumped from 1 billion gallons (3.8bn litres) in 2005 to 5 billion (19bn) in 2006 and 9 billion (34bn) in 2009. Between 1980 and 2002, the amount of maize used to produce ethanol in the US rose by 24 million tonnes. Between 2002 and 2007, it increased by 53 million tonnes, accounting for 30 per cent of the global growth in the use of wheat and feed grains (Trostle, 2008). As ethanol production has expanded, maize stock levels have declined

and maize prices have increased. According to FAO Director-General Jacques Diouf, by early 2011 the expansion of agrofuel production had already diverted 120 million tonnes of food from human consumption (Reuters, 2011).

Significantly, land-use changes due to expansion of acreage under agrofuel feed-stocks reduced production of other crops. For instance, US rice production decreased by 12 per cent from 2006 to 2007 after 16 per cent of the land used for rice production was redeployed for maize production (Berthelot, 2008a). Maize expansion also resulted in a 16 per cent decline in land for soybeans, thereby reducing US soybean production and leading to a 75 per cent rise in soybean prices between April 2007 and April 2008 (Mitchell, 2008). Similarly, the expansion of biodiesel production in the EU diverted land from wheat to oilseeds, slowing the increase in wheat production. The eight largest wheat-exporting countries expanded land area for rapeseed and sunflower production by 36 per cent between 2001 and 2007, while the wheat land area fell by 1 per cent (Mitchell, 2008).

Many observers, including Donald Mitchell at the World Bank, have argued that this increase in demand and shifts in land use triggered the spike in food prices in 2007–2008. Without the increase in agrofuel production, said Mitchell, “global wheat and maize stocks would not have declined appreciably, oilseed prices would not have tripled, and price increases due to other factors, such as droughts, would have been more moderate” (Mitchell, 2008).

The third stage of the relationship between oil and food started in 2007–2008, with the expansion of agrofuel crops in low- and middle-income countries. In addition to the effects on global demand, the development of the agrofuel industry and the setting of targets in rich countries encouraged the development of energy crops in low- and middle-income countries, including in many food-insecure countries such as Ethiopia and Mali. As a result, agricultural investments for agrofuel development have been booming in these countries, with a major increase in areas planted for energy crops and a significant impact on the availability of water and land for food production. This development is an issue of serious concern for food security as land and water resources are taken away from smallholders and pastoralists, and there is potentially a higher dependency on food imports for countries shifting from food to agrofuel cultivation.

Beyond the role of agrofuel expansion on the price increase of 2007–2008, the tighter relationship between food and energy markets constitutes a major factor in the long-term volatility of food prices since any event affecting oil prices (such as conflict in a major oil-exporting country) could drive up oil prices, affect the demand for alternative energy sources such as agrofuels and increase the price of food as a result. This relationship was again evident in early 2011, when high fuel prices resulted in more food crops being used to produce agrofuels. USDA estimated in April 2011 that the use of maize to produce ethanol rose from 31 per cent of total maize output in 2008–2009 and would reach a projected 40 per cent in 2010–2011 (IRIN, 2011).



Increased demand from emerging economies: a reason for price increases?

The surge in food commodity prices has also been attributed to “strong per capita income growth in China, India, and other emerging economies” which “buoyed food demand, including for meats and related animal feeds, especially grains, soybeans, and edible oils” (IMF, 2008). FAO’s Diouf declared in 2008 that higher demand from countries like India and China, where gross domestic product (GDP) is growing at 8–10 per cent was responsible for high prices (*National Post*, 2008). It is plausible that mass consumption in India and China, two countries accounting for more than one-third of the world’s population and which grew at 9.2 per cent and 11.4 per cent respectively in 2007, could contribute to the 2007–2008 price increases. However, closer examination reveals otherwise. Demand for food is ‘income inelastic’ – the quantity of food people demand does not vary significantly and rapidly with income, though the composition of the food basket may change. Increased incomes lead to demand for more expensive, presumably ‘higher quality’ food (such as meat), in line with Bennett’s law, i.e., the share of animal products in calories consumed increases as incomes rise.

In addition, both India and China maintain a food trade surplus, thus remaining net exporters of cereals. China maintained an average food trade surplus of US\$ 4 billion from 2000 to 2006 and has long been a net exporter of cereals (Berthelot, 2008a).

India, too, has been a net exporter of agricultural and food products since 1995. It is also a net exporter of meat and dairy products. By contrast, the EU remained the largest importer of oilseeds and the fifth largest importer of cereals in 2007–2008, while its food trade balance remained in deficit (Berthelot, 2008b). A World Bank report puts the low- and middle-income countries’ role behind the food price crisis in perspective: “Increase in grain consumption in developing countries [sic] has been moderate and did not lead to large price increases. Growth in global grain consumption (excluding agrofuels) was only 1.7 per cent per annum from 2000 to 2007, while yields grew by 1.3 per cent and area grew by 0.4 per cent, which would have kept global demand and supply roughly in balance” (Mitchell, 2008).

Although the growing demand in emerging economies cannot explain the sudden price increase seen in 2007–2008, it may nevertheless have been an indirect cause. The result of highlighting the growing demand in cereal markets may have helped fuel financial speculation and the growing interest of investment funds in food markets.

Financial speculation on the rise

Doubtless increasing demand for food crops in a context of high prices and low levels of stocks has encouraged growing commodity speculation in recent years, further fueling the food price hikes (ADB, 2008). However, favourable market prospects alone are not sufficient to explain the high levels of speculation seen in recent years.

The recent deregulation of financial markets has removed quantitative restrictions on speculative positions in agricultural futures contracts and allowed the creation of a number of new financial products (derivatives in particular) and a massive expansion of speculation on food markets (Jones, 2010).

Regulatory loopholes have also facilitated the surge in speculative investment in commodity markets to unprecedented levels in recent years. Moreover, with the bursting of the housing bubble in the United States in mid-2007 and low levels of global grain stocks, financial investors saw opportunities in the food commodities markets to diversify their portfolios and speculate in commodity futures, putting further upward price pressure on food and energy commodities. In June 2008, the US Homeland Security and Governmental Affairs Committee held pension funds responsible for price spikes and noted that the amount of fund money invested in commodity indexes had risen from US\$ 13 billion in 2003 to US\$ 260 billion in March 2008 (IUF, 2008). Box 3.2 provides more details about financial speculation and policy options to curb it.

Can global food markets be durably stabilized?

The above argument suggests that there is no single cause of price volatility but several intertwined factors, which mutually reinforce each other during feverish periods. A

A man harvests wheat on a farm in Sindh, Pakistan. The sharecroppers who occupy the land earn a percentage of the wheat they cultivate. Many sharecroppers fall into debt when purchasing seeds and fertilizer, and may be compelled by lenders to sell their crops below market value. Because of this system, sharecroppers rarely benefit from increased food prices.

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Box 3.2 Tackling speculation in financial markets

There is today a growing consensus on the significant role of financial speculation in the volatility of food markets. In its *2009 Trade and Development Report*, the UN Conference on Trade and Development (UNCTAD) found that increased commodity trading contributed strongly to the rise in food prices in 2007–2008 (UNCTAD, 2009). In his 2010 briefing, Olivier De Schutter, the UN's Special Rapporteur on the Right to Food, observed that the "changes in food prices reflected not so much movements in the supply and/or demand of food, but were driven to a significant extent by speculation that greatly exceeded the liquidity needs of commodity markets to execute the trades of commodity users, such as food processors and agricultural commodity importers" (De Schutter, 2010).

'Traditional' commodity speculation relates to so-called 'futures contracts' for agricultural products. The futures market is intended to be a stabilizing tool for farmers, who can sell their harvests ahead of time with limited exposure to price movements (otherwise known as 'hedging'). Food traders thus act as 'insurers' to farmers, allowing them to invest with a guaranteed return on investments. In a futures contract, quantities, prices and delivery dates are fixed, sometimes even before crops have been planted. As food traders are supposed to buy when prices are low and sell when prices are high, such contracts serve to make prices less volatile rather than more so. Such 'traditional' speculation thus appears as a normal and healthy pattern in agriculture, where all actors, including farmers themselves, speculate over production and future market situation.

However, recent deregulation of financial markets has transformed the stabilizing

instrument constituted by futures contracts into a factor of instability. In its 2010 report *The Great Hunger Lottery, How Banking Speculation Causes Food Crises*, the World Development Movement observes that "deregulation that began in 2000 encouraged hyper-speculative activities by market players who had no interest in the underlying physical commodities being traded. [...] Banks such as Goldman Sachs created index funds to allow institutional investors to 'invest' in the price of food, as if it were an asset like shares. [...] These commodity index funds have since become the primary vehicle for speculative capital involvement in food commodity markets" (Jones, 2010).

Recent deregulation, especially in the United States, has favoured the creation of these new instruments and also removed quantitative restrictions on, and control over, speculative positions in agricultural futures contracts. The US Commodity Futures Modernization Act in 2000 thus exempted over-the-counter (OTC) derivatives – which are not traded on exchanges, but as bilateral contracts between private parties – from the oversight of the US Commodity Futures Trading Commission (CFTC). As a result, such trading was allowed to take place without any position limits, disclosure requirements or regulatory oversight (Mittal, 2009).

This 'modernization act' helps explain why the number of futures and options traded globally on commodity exchanges increased by more than 500 per cent between 2002 and 2008. The value of outstanding OTC commodity derivatives grew from US\$ 0.44 trillion in 1998 to US\$ 0.77 trillion in 2002 and to more than US\$ 7.5 trillion – half the size of US GDP – in June 2007 (De Schutter, 2010). Between 2006 and 2008, it is estimated that speculators dominated

long positions in food commodities. For instance, speculators held 65 per cent of long maize contracts, 68 per cent of soybean contracts and 80 per cent of wheat contracts (Jones, 2010). This massive expansion was made possible by the arrival of non-traditional investors, such as pension funds, hedge funds, sovereign wealth funds and large banks that started dealing in the commodity index instruments mentioned above (Kerckhoffs et al., 2010).

The major problem posed by these commodity index funds is that money moves into and out of derivatives due to factors unrelated to the supply and demand for a particular commodity, creating financial bubbles and destabilizing commodity markets. This led the UN Special Rapporteur on the Right to Food, along with number of NGOs and government officials, to call for a comprehensive reform of the global financial system in order to protect food security, particularly within poor, net food-importing countries. Two main sets of actions have been identified to curb speculations on food commodities on financial markets.

Ensuring transparency

In contrast to what happens in an exchange, where who is selling what for how much is clearly visible, most future contracts are currently set in private through OTC instruments. The resulting opacity makes it impossible to know how much of what is being traded and to identify the actors involved. This contributes to the uncertainty of the food market and benefits financial speculators rather than serving farmers and actual food traders.

Ensuring that such trading is registered and cleared in a fully transparent manner through exchanges would have a stabilizing effect on commodity markets. Registering such trades is also a necessary step to obtain real-time information, enabling adequate control and regulation of these markets.

State regulation

The US CFTC must be given back its regulatory role and the capacity to enforce 'position limits' to restrict the amount of financial speculation possible in a particular commodity market. The CFTC has not played its role in recent years, which has allowed financial speculators to operate on food commodity markets without any limit.

Europe does not yet have such a market regulation mechanism, but it is hoped that the regulation system proposed by Michel Barnier, the EU Commissioner for Internal Market and Services, in September 2010 will be adopted (EC, 2010). Barnier's proposals would impose mandatory reporting and clearing of OTC derivatives and set a number of rules that would place obstacles in the path of index speculators' participation in commodity index funds.

Regulation could go beyond setting limits and rules. As certain experts have suggested, one could simply ban commodity index funds, which do not provide liquidity that favour investment the way 'traditional' hedging and speculation in commodity markets used to. They are instead a source of instability and, as such, could be easily removed by governments (Jones, 2010).

The problem of speculation is well recognized and relatively simple solutions have been identified. However, as observed by the World Development Movement, it is to be feared that "the corporate lobby [including banks such as Goldman Sachs] will act to maintain their ability to make vast profit out of unregulated trading in commodity derivatives" (Jones, 2010). London is host to the highest amount of commodity trading outside the United States and the recent opposition to EU regulation of hedge funds by the United Kingdom's Treasury highlights the importance of this concern.

bad harvest in one major food-producing country may give a signal to speculators who are then likely to accentuate price fluctuations by their operations, much more than if the market were responding only to the information about supply. Similarly, the first signals of a price increase on the global market may lead a country – its government or private traders – to proceed to purchase in order to secure supplies at a low price, which in turn increases inflation.

Several of the factors of volatility identified above can be tackled through adequate measures and policies:

- Measures in favour of food production and stocks, including through international assistance to low- and middle-income countries, are likely to reduce pressure on the global food markets.
- Measures to limit speculation through the regulation of financial markets and restrictions imposed by governments on certain financial products can do the same.
- Policy changes in rich countries (including the EU and the US), which have favoured the development of agrofuels, can slow this expansion – for example, by abandoning agrofuel targets and subsidies, as well as by imposing fiscal measures that could discourage the expansion of these energies.

A number of non-governmental organizations (NGOs), experts and even some heads of state (for example, President Sarkozy of France) have already advocated that such measures be taken by governments to reduce the instability of food markets (De Schutter, 2010; Jones, 2010).

However, some of the most powerful forces at play in today's globalized world drive several of the factors explaining volatility: the energy security of rich nations; the political instability in a number of oil-exporting countries; the profit-driven practices of financial corporations; and the weather hazards resulting from climate change. Furthermore, rich countries are the main grain exporters, i.e., those who take advantage of high food prices on international markets and also those who have the power to reduce volatility through their policies on financial regulation, agrofuels, international aid to low- and middle-income countries and climate change.

It therefore seems unlikely, even if the political will existed, that all the factors affecting volatility could be tackled effectively and simultaneously in the short run. Although periods of stability are to be expected, the global volatility of food prices is here to stay. No government can assume today that the global market will ensure an adequate supply of food at affordable prices for its people in the future. This represents a major departure from the conventional wisdom that has dominated policies in the past 30 years, namely, that low and stable food prices would prevail. Such a departure will have important policy implications for all governments and international actors fighting food insecurity and poverty.

Lessons learnt from the responses to the 2007–2008 crisis

Since 2007, governments and international organizations have put in place a number of measures to respond to high food prices. But how effective and relevant have these responses been?

The 2008 global food crisis was less 'global' than generally thought. A number of countries were successful in preventing price transmission to domestic markets. For example, the price of rice actually decreased in Indonesia in 2008 while it was escalating in neighbouring countries. Public interventions to prevent this transmission were a mix of trade facilitation policies (for instance, cutting import tariffs or negotiating with importers) and trade restrictions or regulations (such as export bans, use of public stocks, price control and anti-speculation measures).

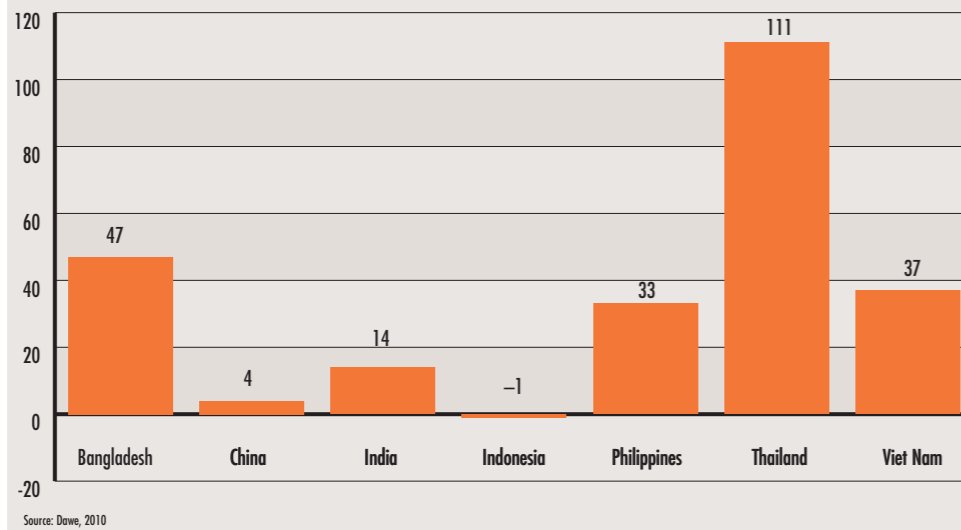
Analysis by an FAO economist shows that the price transmission from world to domestic markets varied from country to country in Asia (Dawe, 2010). From the second quarter of 2007 to the second quarter of 2008, real domestic prices increased by more than 30 per cent in Bangladesh, Philippines, Thailand and Viet Nam while others had much lower inflation: China (+4 per cent), India (+14 per cent) and Indonesia (-1 per cent) (see Figure 3.4).

This analysis determined that the main factor behind this difference was the governments' attitude towards trade, i.e., countries limiting exports and deciding the volume of trade in order to preserve availability of food domestically. Thailand, which never banned exports during the crisis, saw the largest variation of prices at 132 per cent in early 2008.

Research conducted by the Netherlands' Wageningen University in East Africa showed that, in the same way, food prices decreased in Tanzania in 2008 while they increased in neighbouring countries (Meijerink et al., 2010). The main reasons were a combination of good harvest, import facilitation and export bans.

The success of measures taken to limit domestic inflation depended primarily on governments' ability to control domestic availability and regulate markets, often based on pre-existing public systems. Export restrictions, especially on rice, were certainly responsible for increased inflation in global food markets and adversely impacted food-importing countries which could no longer buy from traditional suppliers. For instance, Pakistan's restrictions affected Afghanistan, Indian restrictions affected Bangladesh and Nepal, and Tanzania's export ban affected Kenya. Nevertheless, these measures appear to have constituted a fast and effective way to protect consumers by mitigating the effect of global markets on domestic prices.

Figure 3.4 Increase in real prices of rice, Q2 2007 to Q2 2008 (%)



Other factors also helped limit price transmission for a number of countries, including low reliance on international trade and availability of large public stocks, which reduced the likelihood of speculation and hoarding. A clear message from governments plus sound policies prevented speculation and panic among domestic farmers, traders and consumers.

A little-discussed response was the role of remittances sent by migrants to their families struggling to cope with high food prices (see Box 3.3).

Box 3.3 Remittances and kinship at the forefront of the response

The plethora of international conferences and summits that focused on policy responses to high food prices and international assistance to poor countries has tended to ignore the fact that the burden of the rise in 2007–2008 prices was borne by the poor. Remittances by migrants played a key role in helping their families and communities to cope with the

increased food costs. Recorded remittances totalled close to US\$ 340 billion in 2008, a 40 per cent increase compared to US\$ 240 billion in 2007. The true size of remittances, including unrecorded flows, is believed to be even larger (Ratha et al., 2007), amounting to more than US\$ 500 billion in 2008 (ABC, 2008). In 2008, recorded remittances were

about three times the annual amount of overseas development assistance provided to low- and middle-income countries by rich countries and constituted the second largest source of external funding after foreign direct investment.

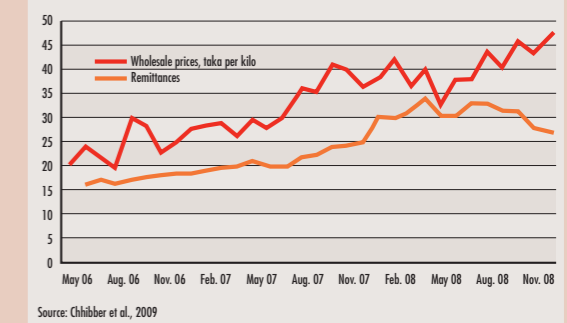
According to Oxfam, remittances to Nepal, for example, increased by 30 per cent in 2008 (Oxfam, 2010). Figure 3.5 shows a similar evolution for Bangladesh. For sub-Saharan Africa, remittances jumped from an estimated US\$ 13 billion in 2006 to above US\$ 20 billion in 2008, i.e., an increase of more than 50 per cent in two years. Oxfam’s findings are corroborated by a 2008 study published by the World Food Programme on migration in Nepal entitled *Passage to India: Migration as a Coping Strategy in Times of Crisis in Nepal*. The study found that 64 per cent of the very poor and 62 per cent of the poor said that they would migrate after a price shock. Many said they would change their mind if they had sufficient access to food or were guaranteed full employment for three months (WFP, 2008).

A number of studies also indicate that different forms of help, such as borrowing from relatives or neighbours, or securing credit, was one of the most widely used mechanisms to cope with high food prices. For instance, a national survey in Cambodia found that, along with cutting expenditure on meals, 70 per cent of the people responded to higher food prices by borrowing in cash or kind (Compton, 2010).

The level of remittances slightly decreased in 2009 as a consequence of the economic crisis in the rich countries. In Bangladesh, remittances declined by 9 per cent in February 2009 when large numbers of migrant workers were sent home, mainly from the Gulf states. Ghana experienced a 16 per cent decline in remittances compared to the previous year (WFP, 2008). However, at US\$ 317 billion, the global sum of remittances in 2009 was

still higher than before the 2008 crisis (World Bank, 2009b). Following the 2009 slowdown, remittances rose again, reaching US\$ 325 billion in 2010 (World Bank, 2010).

Figure 3.5 Remittances and rice prices, Bangladesh, June 2006–December 20



Despite its importance, especially in times of crisis as in 2008, the issue of remittances remains a marginal area of research, advocacy and policy work. People’s own responses to high food prices go mostly unnoticed by policy-makers and practitioners, who tend to focus on international assistance or foreign investments.

There are a number of possible ways to maximize the impact of remittances and thus favour a form of assistance that is based on work and community solidarity mechanisms. In its 2006 report *Economic Implications of Remittances and Migration*, the World Bank observed that the “remittance fees are high, regressive, and non-transparent, and reducing remittance fees will increase remittance flows to developing countries” (World Bank, 2006). This study suggested that decreasing the cost of each transaction by as much as 33 per cent would still produce profits for some of the companies involved in the remittances business. It also found that a 12 per cent reduction in remittance costs could result in an increase of up to 11 per cent in remittance flows to low- and middle-income countries. Such an increase, worth more than US\$ 3 billion, would represent the

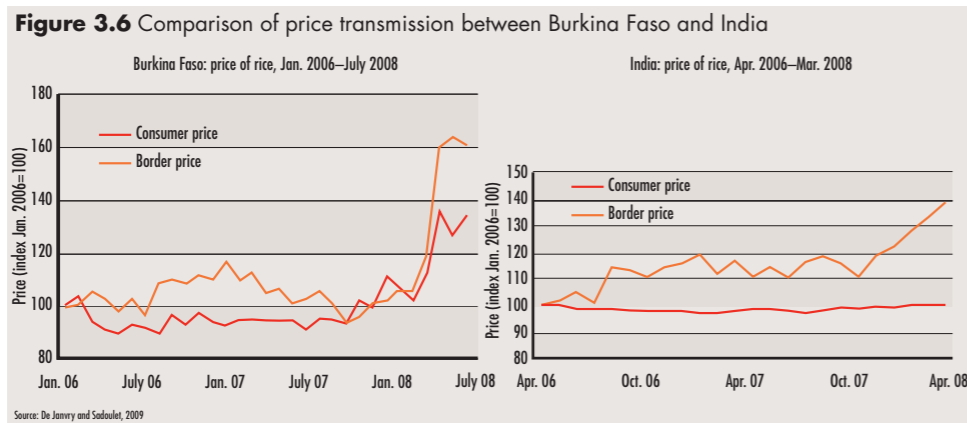
equivalent of the total international development assistance spent by rich countries in rural development and agriculture in the developing world.

Some NGOs are, therefore, campaigning to cut profit margins (as high as 20–30 per cent) in the lucrative industry devoted to money transfers, which generates more than US\$ 15 billion in annual revenue (TIGRA, 2011). The World Bank has also identified a number of other options to increase the potential of remittances to help poor people in developing nations (World Bank, 2006). These include simplifying and harmonizing regulations relating to remittances; encouraging competition in the remittance market; improving access of smaller remittance service providers such as credit unions and larger microfinance institutions; and improving the access of undocumented

migrants to formal remittance channels, especially banks.

The latter highlights the question of immigration, which is often ignored in humanitarian and development discussions. Yet the socio-economic conditions of migrants and the legal and fiscal arrangements in host countries constitute important humanitarian issues. This was evident in the aftermath of the 2010 earthquake in Haiti, when intense debates took place in Canada and the French island of Guadeloupe about allowing more migrants as a humanitarian measure.

Immigration and remittances have already become humanitarian issues in the globalized world. It is up to humanitarian actors and advocates to engage, research and reflect upon these issues in order to identify the best ways to integrate them into advocacy work.



Moves to reduce taxes and tariffs on food imports had limited impact because tariffs are already generally very low in most countries as a result of economic liberalization. Besides, they result in net losses in fiscal revenues for governments.

Overall, large and middle-income countries had a greater capacity to restrain transmission of global price shocks to domestic markets than poor countries. This is well illustrated in Figure 3.6, which compares real border prices and consumer prices for rice in Burkina Faso and India, with strong transmission in the first but very limited in the second.

Price volatility in Burkina Faso reflects a common feature in many countries in sub-Saharan Africa, where food prices have remained high and volatile, indeed often higher than international prices after the peak of mid-2008. This pattern varies between countries depending on their production and consumption particularities. Inflation in the rice market was, for instance, much lower in Mali than in Burkina Faso in 2008 because Mali produces rice and is less dependent on imports (Abbott, 2010).

While international prices went down after July 2008, local prices in a number of countries such as Malawi, Mozambique and Zambia continued to rise for almost a year after the global price peak, then fell back in 2009. They still ended up 60 to 70 per cent above their January 2007 levels (RHVP, 2010). In many poor countries, especially in sub-Saharan Africa, seasonal volatility, due to a combination of domestic and international factors, is significant and constitutes a threat to the livelihoods of millions, regardless of the level of prices (Devereux et al., 2008a). This volatility of domestic prices actually overshadows international price instability as an urgent policy issue for many African countries.

High food prices required a reassessment of safety nets

With uneven success, many governments have tried to protect their poor citizens through large-scale safety net systems. Some in Asia, such as in India or Indonesia, have found important synergies between social protection for the poor and support provided to food production, generally tied to the management of public stocks.

Cash transfers to consumers can be very effective in addressing hunger, due especially to their multiplier effects on the economy and stimulation of local food production and trade. Cash transfers have been increasingly used as safety nets in recent years (see Chapter 4). However, high food prices undermined the value of the transfers and ultimately the effectiveness and relevance of the instrument. Thus, some national programmes could not be adequately adjusted to high prices, which resulted in a dramatic drop in beneficiaries' purchasing power. This was the case in Ethiopia (see Box 3.4). Similarly, in Bangladesh, spending on safety nets only increased by 25 per cent to compensate a 48 per cent rise in rice prices (World Bank, 2009).

Box 3.4 Ethiopia's PSNP struggles to adjust to high food prices

The Ethiopian Productive Safety Net Programme (PSNP) is the largest in Africa. The Ethiopian government set it up with international support in 2005 to help tackle the country's chronic food insecurity in a more effective way. Prior to its establishment, Ethiopia was subject to

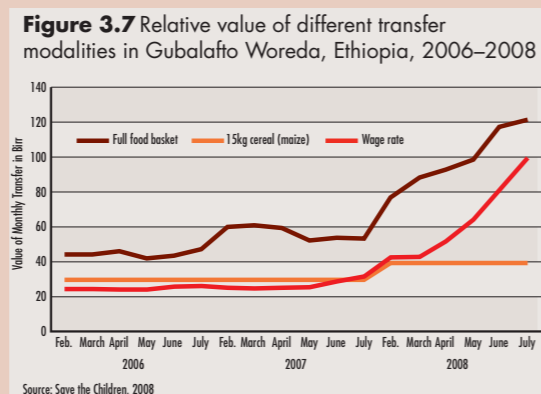
recurrent food emergencies, which occurred every other year or so and to which international donors and organizations generally responded through late but massive relief operations and large amounts of international food aid. This practice was recognized as costly and inefficient, with potentially important side-effects on local food producers. The PSNP relies on the long-term commitments of government and donors, which has made aid more predictable. Cash or food transfers are delivered via a permanent mechanism, led and budgeted for by the government.

In 2010, the PSNP was estimated to reach more than 8 million chronically food-insecure people – about 10 per cent of the population – a difficult undertaking for a poor but geographically large country like Ethiopia (USAID, 2010).

The PSNP aims to protect the assets of vulnerable households and to provide them with access to food by offering predictable transfers of cash and/or food. In 2007, 57 per cent of programme resources were provided in cash, with the remainder provided in food (MoARD, 2008). The programme's public works component aims to improve community assets such as roads, schools and water sources.

The resources provided by the programme are generally just sufficient to meet people's most basic needs. In theory, the combination of food and cash should allow flexibility in people's response to the market situation. However, this did not happen in 2008, when the PSNP provided mostly cash transfers, despite people's need for in-kind aid once food prices started to increase. The cash component of the programme proved to be insufficient due to high inflation in 2008. As shown in Figure 3.7, the value of cash transfers increased by only 33 per cent in 2008, which was far from keeping up with the 300 per cent increase in the cost of the food basket (Save the Children,

2008). This mismatch required the setting-up of a massive humanitarian operation in parallel with the PSNP.



It is difficult to imagine that a large-scale programme such as the PSNP could ever have been fully inflation-indexed, especially in the context of important seasonal fluctuations and resource constraints. As a 2008 study by Save the Children observed, "A one birr adjustment in wage rate results in a US\$25 million increase in the cost of the PSNP per year. There are similar implications in providing a greater proportion of transfers in food. Therefore, any increase in the wage rate and in the proportion of food in the PSNP will exacerbate already existing funding deficits and undermine PSNP predictability in both the short and the long-term [*sic*]" (Save the Children, 2008). International donors provide about US\$ 500 million a year to the PSNP. Adjusting the programme to a 200 per cent increase in food prices would cost several hundred million dollars simply to cover those already benefiting from the programme; it would cost even more if the programme were to reach all those pushed into food poverty as a result of high prices.

The initial aim of the programme was to allow 'graduation' out of aid dependency through a combination of predictable cash and food

provision and the creation of assets. To date, the programme has helped only a few people effectively to graduate out of aid dependency. By 2008, it had allowed many to become more resilient to shocks, with beneficiaries' incomes doubling over a two-year period, whereas incomes of non-beneficiaries declined during the same period (Devereux et al., 2008b).

When food prices increased dramatically in 2008, the PSNP undoubtedly served as a

buffer. However, the overemphasis on cash resources, the lack of flexibility to adjust and scale up activities and the stand-alone nature of the programme (it is not linked to a system of food reserves which could have allowed a swift adjustment through an increase in the share of food commodities provided to PSNP beneficiaries) have clearly shown the limits of the programme as originally designed.

Combining cash with food in safety net programmes and indexing cash transfers on inflation are valid options for sustaining the effectiveness of safety nets and protecting livelihoods against price fluctuations. However, they seem insufficient to deal with situations of high price volatility as seen in recent years. This makes it necessary to consider combining these options with some price stabilization measures and with stock mechanisms through which food can be procured early enough, when food is available and prices are low.

The higher cost of food aid

Food aid programmes were used to respond to high food prices in dozens of poor countries. However, high food and oil prices dramatically raised the operational costs of the World Food Programme (WFP) and limited the potential to expand such programmes at a time when it had become much more expensive to buy and transport food commodities. While its resources increased by US\$ 2.3 billion or 85 per cent in 2008, extra operational costs limited WFP's ability to expand its operations to the same extent. The number of WFP beneficiaries and the tonnage distributed increased by only 19 per cent and 18 per cent respectively between 2007 and 2008 (WFP, 2009a).

WFP's historic budget increase in 2008 allowed the programme to reach a total of 100 million people, an increase of some 20 million (WFP, 2009b). However, this number is modest when one considers that high food prices added another 109 million people to the ranks of the undernourished. International food aid, therefore, appears necessary and important for the millions of people who are able to meet their food needs through such programmes, but far from sufficient to cope with the amplitude of world hunger and the effects of high food prices.

The different paths of the agricultural responses

When food prices went up, many policy-makers realized the importance of increasing food production as a way of taking advantage of the good market prospects to increase sales and exports or to decrease dependency on unaffordable and uncertain food imports. The nature and amplitude of responses in support of boosting food production following the 2007–2008 price increases varied among countries, depending on available resources, external support received and policy objectives.

Many countries were successful in raising production levels through a variety of interventions, such as:

- Tax waivers, vouchers, subsidies or distributions of agricultural inputs
- Tax waivers or subsidies on fuel for irrigation
- Price support to producers (guarantee of minimum prices)
- Public procurement for food distribution, subsidized sales and national stocks
- Support to credit and insurance, cancellation of farmers' debts
- Support to value chain management and market information
- Support to irrigation and storage infrastructures.

The most common policy response in agriculture was the provision of agricultural inputs. The provisional estimate for Africa's short-term needs due to high food prices, made by the Comprehensive Africa Agriculture Development Programme in May 2008, was US\$ 1.29 billion, including US\$ 112 million for seeds and US\$ 749 million – nearly 60 per cent of the total – for fertilizers (NEPAD, 2008). Through its Initiative on Soaring Food Prices, FAO distributed agricultural inputs to some 370,000 smallholders in more than 80 countries. Of the 40 countries assisted under its Global Food Crisis Response Programme, the World Bank provided 20 with agricultural inputs. For several of them, such as Benin, Ethiopia, Nicaragua, Niger and Rwanda, inputs represented 90 to 100 per cent of the funding (World Bank, 2009).

In countries with public procurement systems in place, such as Bangladesh and India, the governments were able to support farmers by procuring rice at a higher price and providing subsidies to poor and marginal farmers to mitigate higher costs of production for irrigation and fertilizer. In Bangladesh, the higher procurement price combined with an increase in procurement for public food stock from 1 million tonnes to 1.5 million tonnes contributed significantly to the bumper *boro* (rice) harvest, as farmers took this as a big incentive and increased their production (World Bank, 2009a).

In such countries, these actions in the agricultural sector aimed to ensure that enough food was produced to feed the population and reduce tension on prices as well as to sell food to the poor and low-income groups at subsidized prices.

A boost to regional integration

It is easier to put some policy responses into place in large countries – e.g., trade facilitation and market regulation – than in smaller countries in sub-Saharan Africa. Borders are often porous, with cross-border movement of food or cattle well integrated in a regional economy; this makes it difficult for individual countries to intervene effectively.

This explains to some extent why high food prices have favoured an acceleration or a revitalization of regional integration processes, including policy dialogue (e.g., around cross-border trade) and the development of common instruments such as food reserves. In West Africa, the implementation of the common agricultural policy was revived and boosted; it had been prepared for the region in 2005 but never implemented.

As in other regions of Africa, the strong interdependence of West African countries, their high level of regional integration and the limited capacity of most of them to address the volatility of food prices on their own, make it necessary to develop common policies and mechanisms to ensure the availability of affordable food for all in the region. For most countries in sub-Saharan Africa, regional integration appears to be the only way to implement ambitious agricultural policies and enhance their bargaining position with rich countries and international institutions.

The way forward: regulation, social protection and food production

The measures needed to limit the volatility of food prices at the global level are known. However, people in low- and middle-income countries cannot trust rich countries to take the necessary decisions, in particular regarding their support to agrofuels or the regulation of financial markets, where such decisions conflict with their economic interests and their energy security. Furthermore, even if adequate measures were taken tomorrow at the global level, major elements of uncertainty would remain, such as the price of oil, which has become a determinant for food prices, or weather hazards which can affect production and world trade at any time. This makes it critical to abandon trust in the ability of global food markets to supply cheap food, a dominant assumption of policy-makers for decades.

Giving up this assumption requires a revival of sound food and agriculture policies in low- and middle-income countries so that they can reduce their vulnerability to the fluctuations of global markets. The review of the responses to high food prices in 2007–2008 provides some useful lessons that can inform the design of such policies.

Our argument suggests that dealing with high food prices on the global markets is always easier for countries with resources, institutions and public mechanisms in place to support food production, manage domestic availability of food and prevent the transmission of global prices to their domestic markets. It also demonstrates that providing

aid – food or cash – to the poor, however important, is an insufficient defence against hunger in those countries unable to limit domestic food price inflation.

In recent years, the development of safety nets has often been confined to the sole establishment of cash or food transfer programmes targeting vulnerable groups. Yet broader models have been in place for years, with apparent success in countries where social protection was developed through a comprehensive, more integrated approach to food security. For instance, in Brazil, family farmers benefit from credit, insurance schemes, technical assistance and a food procurement programme that buys food from them for redistribution to the poor, along with cash transfer programmes (MDS, 2008; see also Chapter 4).

Public distribution systems, used in response to the high food prices in Bangladesh, India or Indonesia, are primarily supplied by purchases from farmers. The system provides farmers with a minimum price for their crops and, therefore, some insurance over their investment in production. Such programmes stabilize prices, support farmers' incomes and provide food for the public distribution system. Furthermore, unlike imported food aid, which may undermine local agriculture, domestic procurement of food reserves can greatly benefit local farmers.

The high cost of integrated public systems like those in place in certain Asian countries has often been cited in favour of the liberalization of the food and agriculture sectors. But there are solutions to limit the cost of holding physical stocks. Food reserves may be combined with financial reserves for the procurement of food. There is also room for innovation in the way governments manage food availability and regulate markets. As described in this chapter, regional systems have an important potential, especially for a number of small and interdependent African countries. Other innovations include instruments – such as purchase options guaranteeing capped or fixed prices for food imports – which have been successfully introduced by countries like Malawi in recent years (Dana, 2007).

Finally, the cost-effectiveness of public mechanisms is difficult to evaluate given their multiple objectives; the cost argument needs to be reassessed in an era of volatility. Such reassessment should consider the benefits of regulatory public intervention in these sectors for the people, the economy and the vitality of the agricultural sector. Ethiopia's costly PSNP (see Box 3.4) is an illustration of the sort of undertaking that is possible in resource-poor African countries when the vision and the political will are present.

Chapter 3 was written by Frédéric Mousseau who is Policy Director at the Oakland Institute, California, United States. He has worked for almost 20 years with international agencies such as Action Contre la Faim, Médecins Sans Frontières and Oxfam International. He also wrote Boxes 3.2, 3.3 and 3.4. Box 3.1 was written by Adam Barclay, a science writer who specializes in international agricultural research.

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Achieving livelihood stability through agriculture and social protection

Parts of Kenya have increased farm production by smallholders fivefold by managing the soils and accessing new markets (Mortimore and Tiffen, 1994).

Tens of thousands of African farmers have escaped the spectre of famine thanks to micro-insurance schemes accessed by their mobile phones (Syngenta, 2011).

Malawi has doubled its maize yields in five years through subsidies to small farmers for fertilizer (Denning and Sachs, 2007).

Ten million Indian farmers have found food security by joining the world's largest system of dairy cooperatives (Government of India, 2011).

We have become used to doomsday narratives about rising populations, environmental disaster and declining yields among small farms in Africa and elsewhere in low- and middle-income countries. Usually there are two responses. One is that a commercial transformation of agriculture is taking place in which hundreds of millions of smallholdings are sold or reassigned to agribusiness in the name of feeding the world. The second is that small farmers require an endless diet of handouts and social safety nets.

Both are misguided, because the doomsday narratives are wrong. Smallholder farming is the solution rather than the problem – a success story waiting to happen. Finding how to trigger its revival is the key to eliminating hunger and ensuring food security in a future world of 9 billion people or more. A growing catalogue of success stories in unlikely places is testament to this (Godfray et al., 2010).

A looming crisis

Forecasts suggest that, to feed a world population likely to grow from the present 7 billion to more than 9 billion by mid-century, while at the same time meeting changing dietary demands, will require a doubling of world food production (Beddington, 2011).

No wonder an increasing number of governments – notably those in Asia and the Middle East – are trying to secure their food supplies for the future by doing deals with fellow governments in Africa and elsewhere to access ‘underutilized’ land.

Photo opposite page: A woman waters vegetables in a field in Kipushi in the Democratic Republic of the Congo's Katanga Province. Community members tend the fields to generate income and improve the nutritional status of children and their families.

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UNICEF

Meanwhile, the spectre of climate change looms. Global warming and changing rainfall patterns are expected to undermine food production in some nutritionally vulnerable parts of the world, including much of Africa. Efforts to reduce the industrialized world's emissions of the greenhouse gases that cause climate change are resulting in African land once devoted to growing food being turned over to the production of biofuel crops such as sugar cane, jatropha and cassava. Agriculture itself is increasingly identified as a key contributor to the atmospheric gases that drive climate change, through annexing forest land, draining peat bogs and producing emissions from nitrogen fertilizers, rice paddies and livestock.

Amid this turmoil, and after years of being ignored, agricultural production and global food security are major topics of international debate and investment once again. At the G8 summit in Italy in 2009, global leaders pledged to “act with the scale and urgency needed to achieve global food security” (USDA, 2010). But how?

The ultimate purpose of agriculture is not to grow food, still less to make money. It is to grow healthy, well-nourished people and to ensure that the human right to food provision is realized. Food production is the means to that end. And while making agriculture profitable and productive will probably help that process, it does not guarantee the outcome. So what kind of investments and policy interventions can deliver nutritious food for all?

The fear is that investment to ensure food security in some countries may undermine food security in others, particularly among the vulnerable poor rural people of low- and middle-income countries. And with financial speculators looking for profits in a resurgent agribusiness sector by investing in agriculture, farmland and commodities, addressing such concerns has never been more urgent.

Investors are fuelling the boom in soybeans in Latin America, much of it to feed livestock and deliver meat to newly wealthy Chinese. They are investing in jatropha and other biofuels in Africa, destined for the fuel tanks of cars across the rich world. But will all that investment deliver wealth in sub-Saharan Africa – or simply create more hunger? Perhaps the solution is to let commerce rip, and generate the wealth to provide safety nets for those who lose their land or livelihoods along the way – or perhaps not. More investment in agriculture sounds good. But we urgently need to ask the questions: investment in what, and for whom?

The investment conundrum

There is a case for investment of any kind in agriculture; the benefits do often help the poorest. The World Bank's *World Development Report 2008* concluded that each 1 per cent gain in gross domestic product (GDP) that derives from agriculture typically generates a 6 per cent increase in spending by the poorest tenth of the population, with

higher-income groups gaining less (World Bank, 2009). The International Food Policy Research Institute (IFPRI) has argued that only agricultural spending lifts the poor out of poverty in sub-Saharan Africa (Thurlow, 2007).

This perception has coincided with a renewed optimism in the business community about investing in Africa in general. Many African economies have been growing at more than 5 per cent a year in the past decade. Cheap land prices – coupled with soaring prices for agricultural commodities like sugar, grains and coffee – are encouraging major investments in agriculture there. According to one estimate, 60 per cent of the world's uncultivated potentially arable land is in Africa. Commercial farms are eyeing it for growing biofuels and plantation crops (Roxburgh et al., 2010). But it cannot be presumed that all investment is of equal value.

In the past 40 years, during which the world's population has more than doubled, food production has always kept ahead of population growth. But the hungry remain hungry. Average global calorie consumption has risen – but so has the number of hungry and malnourished people.

One reason is that only about one-third of the food produced is actually eaten. Nearly half of the grain harvested each year is not fed to humans, but is converted into biofuels or fed to livestock to produce meat or dairy products – an extremely inefficient method of feeding people, since it requires eight calories of grain to produce one calorie of beef. Sustaining livestock now occupies a staggering 80 per cent of the world's agricultural land, either through grazing pastures or cultivation of feed crops (Steinfeld et al., 2006).

Additionally, an estimated 30 per cent of all food crops is wasted. In low- and middle-income countries, crops fall victims to pests or rot in warehouses and elsewhere in the supply chain. In larger economies, the resulting processed food is often simply thrown away by the profligate. Investing in addressing such failures is crucial. Halving the amount of food that is wasted by 2050 would cut the amount of food required by one-quarter of today's production.

The case for smallholders

Whatever the failings of the current global food system, more investment in agriculture is essential. The big question, particularly in Africa, is whether agricultural investment should target improving the output of smallholder farmers and pastoralists or whether it should be shifted to encouraging capital-intensive, large-scale farming, which may often need to displace the poor, through purchase or otherwise.

Opinion is strongly divided. The promoters of the big-farm solution argue that agricultural advance has failed in sub-Saharan Africa, where per capita food production has only

recently returned to the levels of the early 1960s – whereas per capita production has increased by 100 per cent in Asia and by 60 per cent in Latin America (Pretty et al., 2011).

Yes, Africa's population has grown faster than that of other continents in recent years. Its fertility rates remain substantially higher than most of the rest of the world. But yields (output per hectare) are also generally much lower than elsewhere and have risen by less. Typically African farmers only produce 1.5 tonnes of grains per hectare, compared to more than 5 tonnes in East Asia and 2.6 tonnes in South Asia (Hunt and Lipton, 2011).

This, say the proponents of large-scale agribusiness, is because African agriculture has remained in the hands of smallholders. So, they argue, Africa needs a technology-led and investment-led 'green revolution' of the kind that transformed Asia and Latin America more than a generation ago.

For many, the model is the dramatic success of Brazil in transforming its once-empty grasslands region, known as the *cerrado*. Over the past 15 years, this has gone from largely natural grassland to a prairie landscape in which agribusiness produces 70 per cent of the country's farm output, one of the great success stories of world farming. As *The Economist* asked recently: "Can the miracle of the *cerrado* be exported to Africa?" (*The Economist*, 2010).

But while such a strategy might suit investors keen to profit from Africa's new-found reputation as the 'last frontier' for agribusiness, it may not suit Africans so well. The counter argument is twofold. First, if the aim is to feed Africa, production is not the primary issue – it is poverty and access to food. Today three-quarters of that continent's malnourished children live on farms (Hazell et al., 2007).

In recent years, failures of governments across sub-Saharan Africa have meant that smallholders have lacked the basic infrastructure and government extension services needed to do their job well. Yet half the world's food supply and 90 per cent of the food produced in Africa are grown by small farmers (Curtis, 2010). So isn't this the place to start? Surely, crowding out smallholders with a drive to agribusiness, which employs only a fraction of the labour, is a recipe for increasing hunger, not ending it.

The second argument is that smallholders have at least as much productive potential for foodstuffs as big farms. Right now, yields on small labour-intensive farms are often higher than on more capital-intensive enterprises. Evidence from India and elsewhere in Asia shows that smallholders consistently produce higher yields than larger capital-intensive farms. Small farmers generally use their land more intensively than larger operations, because they utilize every scrap and corner. Most importantly, there is an inverse relationship in low- and middle-income countries' economies between farm

area and both labour and output per hectare, because smallholders aim to maximize food production.

Moreover, there is increasing evidence that small farms have a great potential to increase their output – and with it raise the incomes and improve livelihoods of their operators – through existing technologies. It would help employ Africa's most abundant resource, its people. Labour-intensive agriculture built round smallholder entrepreneurs also builds social capital, such as knowledge and networks of marketing and expertise, in ways that agribusiness often does not.

There is a surprisingly wide agreement, at least in theory, that smallholder farming is the way forward in Africa. A 2009 World Bank study on "awakening Africa's sleeping giant" concluded that "there is little evidence that the large-scale farming model is either necessary or even particularly promising for Africa". There were "few obvious scale economies in production systems" in Africa and "smallholder farms typically had lower shipment values", because production and delivery costs are lower (Morris, 2009).

A paper for Chatham House, *Green Revolutions for Sub-Saharan Africa?*, concluded that the Asian green revolution told a similar story. "Asian experience shows that... employment-intensive, small-scale farming is usually both more efficient and more pro-poor than available alternatives." The need is not for an alien neo-colonialist form of agriculture for Africa, but for the development of the infrastructure and incentives to help small African entrepreneurs do it for themselves (Hunt and Lipton, 2011).

Box 4.1 The overlooked resilience of pastoralists

An estimated 50 million pastoralists and up to 200 million agro-pastoralists live from west to east across dryland Africa (de Jode, 2009). Within sub-Saharan Africa, Somalia and Sudan have the largest populations – 7 million each – of pastoralists and agro-pastoralists, followed by Ethiopia with 4 million. Drylands make up 43 per cent of Africa's inhabited surface and are home to 268 million people – 40 per cent of the continent's population.

It is hard to think of the word 'pastoralists' without the word 'plight'. We are so accustomed to the idea that pastoralists are in a near

constant state of crisis from 'droughts', that we assume that they are the poorest populations in Africa and the most vulnerable to the threat of natural hazards.

There are two kinds of assistance that pastoralists need, according to this perspective: food aid and feeding programmes when the rains are poor; and projects such as irrigation schemes to help them settle down and farm, so that they can become less vulnerable – especially if, as predicted, climate change makes rainfall patterns even less reliable. This perspective is pushed hard by the politicians

in the countries where they live, including by ministers responsible for their welfare, most recently and forcefully in Ethiopia and Uganda.

This view is based on the idea that keeping the pastoralists in their current livelihood system of nomadic or semi-nomadic livestock keeping is condemning them to permanent poverty and backwardness. Development partners may not always agree with the rhetoric, but they too have often given financial and technical support to projects that focus more on farming and settlement, in other words on transforming the livelihoods of pastoralists, rather than on improvements to the existing livelihoods system. This should be surprising: since nomadic livestock management is an evolved (and evolving) response to living in arid areas with unreliable rains, one would expect pastoral livelihoods to be resilient to these conditions and indeed the best placed to cope with future climate change.

Assistance to pastoralists is not always good at joining up the dots and there appear to be three related problems. Firstly, there is little good evidence about how serious their vulnerabilities are. For example, do pastoralist children suffer higher or lower rates of malnutrition than their non-pastoralist counterparts? Since anthropometric surveys are almost always area-based and state monitoring systems use administrative boundaries for disaggregation, it is rarely possible to know whether malnutrition is higher in the pastoral parts of a district than in farming areas, if it is higher among those who have become sedentary and how it relates to the size of herds owned. Even where reliable data are available, they are usually restricted to malnutrition rates on a snapshot survey.

There is rarely evidence that can be used for a causal analysis of malnutrition, without which it is impossible to know what responses would be appropriate. Malnutrition, as the standard

conceptual model shows, can be caused by any combination of lack of household food security, problems in the way children are looked after and fed, or health problems – and a problem in one of these areas will not be addressed by a solution targeting another problem.

Secondly, we need far more evidence-based analysis of the resilience of pastoral households to drought and to other threats.

One recent study (ECHO, 2010) in north-east Uganda gathered comprehensive quantified information about livelihoods and then used simple economic analysis and herd modelling to run livelihood 'stress tests'. These clearly showed that all but the poorest pastoral households could cope even with successive years of poor rainfall without any need to use distress strategies, whereas households that had turned to farming could not cope. Information about herd dynamics enabled livestock experts to indicate one or two critical areas – in this case, the high frequency of goat abortions – where a simple animal health intervention could have a huge impact on resilience. Higher reproduction rates would bring down the threshold at which a herd reached resilience, i.e., where food purchases in a bad year could be sustainably afforded by selling animals (without herd depletion). Value chain analysis then showed that livestock keepers were losing much of the value of their herds because of market dynamics around insecurity. Improvement in markets would have a significant impact on the profitability and resilience of pastoral systems. Unfortunately, development priorities in pastoral areas of north-east Uganda almost entirely ignore support to pastoralism in favour of support to farming.

Thirdly, livelihood support in pastoral areas is also constrained by the common problem of the divide between so-called 'development' actors and 'humanitarian' actors, about which much has been written (see Chapter 6). Crisis

response tends to be targeted at repeated symptoms, rather than underlying causes. This reinforces the view that pastoral livelihoods are inherently outdated and vulnerable to drought. In fact, the main threats to pastoral livelihoods are more usually caused by insecurity (including government responses to insecurity), poor markets and endangered land rights.

These often come from the very policies designed to 'help' pastoralists, by taking away their dry season grazing reserves, held as common property, and turning them into farm land for a few settled individuals (or for foreign investment). The professional divide between humanitarianism and development makes it much

harder to analyse the links between these kinds of factors and how livestock keeping can be broadly supported within a pastoralist system on the one hand and household food security and child malnutrition on the other.

The recent independent review of the British government's humanitarian aid called for resilience to become a central principle that would unite humanitarian and development aid within a single framework, with development assistance given the responsibility for reducing vulnerability to crises (HERR, 2011). It also called for assistance to be more firmly based on evidence. Support to pastoralism across Africa would be a good place to start.

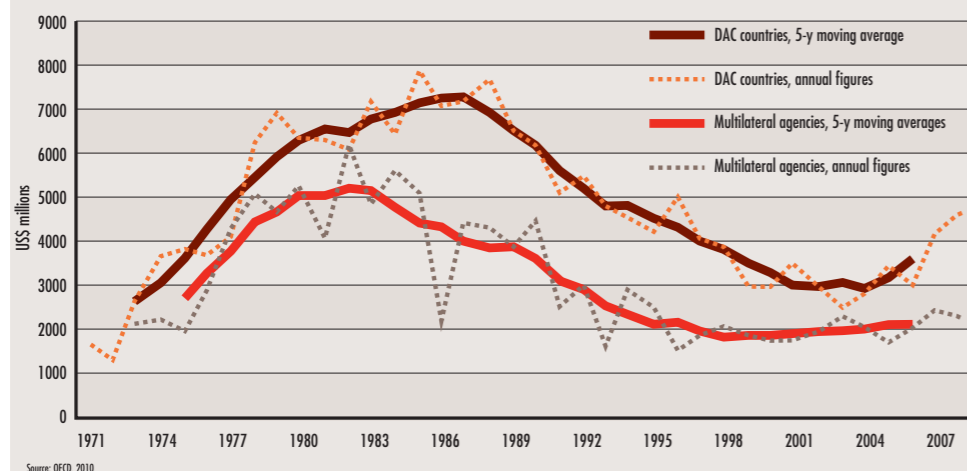
There is no doubting the infrastructure task here. Higher yields are no good without the means to distribute and market the product. In 2002, the coincidence of good weather and the introduction of new seeds and fertilizer produced a bumper maize crop in Ethiopia. The result was not richer farmers, but 300,000 tonnes of grain rotting in fields and a market glut that saw the maize price fall by 80 per cent.

An important reason why smallholder farming has stagnated in many parts of Africa is that the state infrastructure needed to underpin it has been stripped away, often in the name of free markets and structural adjustment programmes.

Spending on agriculture by governments in low- and middle-income countries, particularly in Africa, has fallen both in absolute terms and as a percentage of state spending, often to below 5 per cent. African governments have concentrated their investment funds into airlines, industrial enterprises and urban infrastructure instead of also allocating resources to seeds, fertilizer and rural infrastructure. Parastatal bodies that once underpinned local economies by buying and selling crops at stable prices have been abolished. Extension services that spread best practice have shrivelled and research budgets have been slashed. Alarming, public spending on agriculture, as a proportion of government budgets, is lowest in the same countries where agriculture has the greatest share of GDP (World Bank, 2009).

The problem has been recognized. In 2003, African leaders pledged to raise the proportion of their budgets allocated to agriculture to 10 per cent. But only 7 of the 53 nations had achieved this by 2008, and on average the figure remains around 7 per cent – or less than US\$ 20 per year per rural inhabitant (ActionAid, 2009).

Figure 4.1 Commitments to agricultural aid, 1973–2008, 5-year moving averages and annual figures, constant 2007 prices



Donors too have taken their eyes off this ball. Commitments to agricultural aid by both donor governments and multilateral agencies such as the World Bank halved between the mid-1980s and the millennium, bottoming out at 3.4 per cent of total aid. They have only recently begun to recover (see Figure 4.1)..

The reasons are complex. As the British government’s 2011 Foresight report on the future of world farming noted: “Many in the donor community had thought that globalisation had reduced the need for production of local food [even though] many of the most food insecure countries today are poorly served by markets and have little room for error if markets generate significant price fluctuations” (Curtis, 2011).

However, it was revealed that such assumptions were, to put it mildly, over-optimistic. Whether this was a result of the market forces themselves, or the failure of the markets to operate according to economic theory, is a matter of debate. But it is hard to see how or when fully functioning markets will operate in the rural regions of poor countries where food insecurity is greatest.

If local food production is critical for feeding the world, then the case for investment in smallholders producing food in and for these communities is underlined. How should this be done? The answer, many say, can be summed up in the phrase ‘sustainable intensification’ – investment in scaling up innovations that increase productivity without destroying the resource base on which extra productivity depends (Pretty et al., 2011).

Sustainable intensification

Where should this investment go? Where are the models for transforming African agriculture? The answer is often in Africa itself where, according to the United States

Department of Agriculture, “new market-oriented approaches to small-scale agriculture deliver results on a large scale” (USDA, 2010).

For example, since 2005 Malawi has radically raised maize yields following the distribution of ‘fertilizer coupons’. More than 1.5 million Malawian farmers use them to buy two bags of fertilizer at just 10 per cent of the market price (Curtis, 2011; Dorward and Chirwa, 2011).

The coupons now absorb more than 6 per cent of GDP and 60 per cent of the budget of the Ministry of Agriculture. This has raised questions about how cost-effective they are. Without other essential resources, such as water, simply pouring more fertilizer onto fields may not increase yields. The national picture suggests good returns on this public investment. The Farm Inputs Subsidy Programme has coincided with a period in which the country has gone from having a regular food deficit to becoming a food exporter. The programme also appears to have contributed to broader economic growth, boosting both agricultural and non-agricultural jobs.

Malawi’s success has been widely applauded. Development expert Jeffrey Sachs of New York’s Columbia University claims the same could be done for the whole of Africa for US\$ 10 billion (Denning and Sachs, 2007). But critics point out that the yield advances have also coincided with close to optimal rains and question whether a monoculture of maize fed by chemical fertilizer will degrade the country’s soils in the long run.

Also, the picture of success is often patchy at village level. Studies show that parts of the country still lack food at certain times of the year and three-quarters of the vouchers end up in the hands of men, even while most of the farm work is done by women.

Elsewhere, a revival of basic research into traditional African crops such as cassava, pigeon peas and teff, a grain popular in the Ethiopian highlands, has brought big yield gains. Innovative breakthroughs at the International Centre of Insect Physiology and Ecology’s Mbita Point research station on the shores of Lake Victoria in Kenya have banished pests without the expensive chemicals that most African smallholders cannot afford. Tens of thousands of maize farmers in East Africa now grow a weed called Napier grass round their maize fields. Napier grass attracts the stemborer, a common pest of maize, while leaving the crop free of the pest. It has also acquired another new use – it is harvested as a feed for dairy cattle across western Kenya (Khan et al., 2011).

Sometimes, though, farmers have taken their own decisions, ignoring the supposed experts. Often they have had spectacular results. In the Sahel, farmers on the desert margins have stabilized their soils and increased yields by planting tens of millions of trees – a reversal of the advice given to them by foreign agronomists, who said trees cut yields and should be removed (Reij et al., 2009). In Zimbabwe some 10,000 smallholders have begun growing soybeans in among their maize as a source of cash

Box 4.2 Successful participatory plant breeding in low- and middle-income countries

Productive crop varieties that meet the environmental and cultural needs of the people who grow and consume them are essential for food security. This is particularly true in agriculturally marginal areas in low- and middle-income countries, where many farm households are simply trying to produce enough food for their own consumption.

The conventional model for plant breeding, which dominates the development of new varieties, tends to be centralized in national and international agricultural research organizations and the private sector. Varieties are selected according to established criteria that are determined by the researchers rather than the intended users. Priorities include yield, pest and disease resistance, performance over a wide geographical area and genetic uniformity (Ceccarelli et al., 1996).

This approach has produced some impressive results, contributing to major increases in productivity and food supplies in many areas, especially for major staples such as rice, wheat and maize. However, it has tended to benefit farmers working in favourable environments or those who can afford to modify their environment (e.g., by applying inputs, such as fertilizer, or through chemical control of pests, weeds and diseases). Such varieties, developed in the favourable conditions of experiment stations, have generally failed to deliver the same benefits to farmers grappling with marginal environments. As these represent the poorest farmers, they and their families are also the most vulnerable to hunger and malnutrition.

Furthermore, the seed of modern varieties is commonly too expensive for or unavailable to the poorest farmers, and its adoption can

reduce the biodiversity that increases agricultural resilience against unfavourable conditions (Ceccarelli and Grando, 2007).

One way to overcome the shortcomings of conventional breeding is to 'decentralize' the selection of new varieties – that is, to test and select them in their target environments. In other words, adapting crops to the conditions in which they will be grown, rather than modifying the conditions to suit crops developed for more favourable environments (Ceccarelli et al., 2000). This approach, however, will still fail to take into account farmers' knowledge and experience, which has been built up over generations, if not millennia. Participatory plant breeding attempts to capture this accumulated and invaluable understanding: farmers themselves are involved in the selection of candidate varieties from the very early stages of the breeding process, rather than simply testing a small sample of candidates at the end of the process. By incorporating farmers' needs, knowledge and preferences – which can differ markedly from those of researchers – into the entire breeding process, there is less chance of eliminating potentially successful varieties along the way (Ceccarelli and Grando, 2005).

The barley breeding programme at the International Center for Agricultural Research in the Dry Areas illustrates the differing priorities of farmers and researchers. Because of the participation of farmers, breeders have included two characteristics – height under drought conditions and soft straw – that would have been discarded with conventional thinking. Typical breeding criteria would include short plants with stiff straw, on the basis that such plants are less likely to lodge (fall over) in high-yielding

environments. For many farmers, tall plants reduce the need for hand harvesting in dry years and soft straw is associated with more palatable grain (Ceccarelli et al., 1996).

Further study into the effectiveness of decentralized participatory barley breeding at the research centre compared the performance of candidate varieties selected by Syrian farmers with that of varieties selected by breeders. Although some criteria were shared by both groups (larger kernels, higher grain yield and biomass, and taller plants), the farmers chose substantially fewer candidate varieties. However, those they did choose covered a wider range of traits. Not only did this decentralized and participatory plant breeding prove to be the most efficient type of selection for identifying the highest yielding varieties in farmers' fields, but the farmers' selections also yielded at least as much, if not more, than the breeders' selections. Based on these results, much of the responsibility for selecting new varieties can be transferred from breeders to farmers (Ceccarelli et al., 2000).

Research carried out in Guangxi province in south-west China by the Center for Chinese Agricultural Policy provides another encouraging case study for the effectiveness of this method. A participatory maize breeding programme was initiated in 2000 in response to a 1994–1998 assessment of the impact of the International Maize and Wheat Improvement Center's maize varieties on poor farmers in the area (Song, 1998).

The impact assessment revealed that incompatibility between the formal seed system, which provides conventionally bred varieties, and farmers' informal seed systems (e.g., farmers developing and disseminating their own varieties between themselves) meant that modern maize varieties were not meeting farmers' needs and thus were not being widely adopted. Further, despite the modern varieties'

unpopularity, overall genetic diversity in farmers' fields was decreasing (Song, 1998).

By linking the formal and farmer seed systems, all partners from farmers to breeders were able to act as equals and benefit from each other's collective knowledge. After eight years, from more than 80 trialled varieties, four farmer-preferred varieties were selected and released into the participating six villages, with good evidence that they have also been adopted by farmers in neighbouring villages (Song et al., 2010).

Furthermore, the participatory plant breeding process has given farmers a more powerful voice, and the promising results are influencing provincial and even national agricultural institutions. For example, the Guangxi Academy of Agricultural Sciences' Rice Research Institute is introducing participatory approaches into its rice breeding programme and the Ministry of Agriculture will include them in its national extension reform pilot programme. Farmers themselves have expanded the test areas and neighbouring villages (and, recently, provinces) have begun their own participatory breeding programmes (Song et al., 2010).

Developing productive crops that better suit farmers' needs can promote the robust, resilient agriculture that help poor farm households avoid the hunger and malnutrition so often faced in marginal environments. In a more direct sense, the International Food Policy Research Institute lists participatory plant breeding as a key element in developing bio-fortified crops – which have been bred to contain increased levels of micronutrients – if they are to be accepted by farmers (IFPRI, 2002).

The International Treaty on Plant Genetic Resources for Food and Agriculture (article 9(2)(c)) recognizes that farmers' rights extend well beyond participation in breeding programmes to "the right to participate in

making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture". Participatory plant breeding undoubtedly has a major role to play in helping poor farmers worldwide ensure their own food security and in preventing malnutrition.

– “exploding,” as one researcher put it, “a long-held belief that soya bean is not a suitable crop for smallholders” (Giller, 2008).

There are also many success stories from elsewhere that Africa could usefully replicate. The Indian dairy industry has gone from being the 78th largest in the world to number one in just a few decades, almost entirely on the basis of cooperative dairies collecting milk from small farmers whose small herds are fed with home-grown fodder crops.

Box 4.3 The Machakos miracle

Before Kenya’s independence from the United Kingdom in 1963, colonial administrators wrote off the Machakos district as destined for desertification and destitution, due to overpopulation. Since then, the population has indeed tripled but Machakos’ farmers have increased output five-fold, while at the same time reducing soil erosion and increasing the tree cover. Desertification has been put into reverse. Today the inhabitants, still working small family plots, sell vegetables and milk to Nairobi, mangos and oranges to the Middle East, avocados to France and green beans to the United Kingdom. Their trick?

Managing the land better, through terracing hillsides and capturing rainwater, while accessing new markets for high-value produce (Mortimore and Tiffen, 1994).

Jane Ngei, a single mother, built her own small dam with an ox-plough, a spade and a

wheelbarrow to collect the rainwater that ran down the road by her house after the rains. The water is enough to irrigate her four hectares of maize, vegetables and fruit trees. After feeding her family she now has enough maize to maintain six cattle. They contribute manure to keep her fields fertile, as well as milk that she sells to a dairy in nearby Masii town (interview with author, 1998).

Such prosaic steps to sustainability have led to researchers calling this region the ‘Machakos miracle’. It is not so unusual. In many such ways, an environmental narrative – which argued that much of Africa was at the limits of its carrying capacity and risked widespread ‘desertification’ – has been called into question through ‘sustainable intensification’ of smallholder farming.

The knowledge that a truck from the dairy would be collecting milk from the local village every morning has done wonders for the productivity of farmers like Jitbhai Chowdhury, who farms two hectares of irrigated alfalfa in Kushkal village in northern Gujarat. He feeds the alfalfa to half a dozen cattle in a shed. Every day he carries churns

containing their 25 litres of milk to the village where it is collected by the Amul dairy, which supplies products across India. These cooperatives currently collect from 10 million farmers like Chowdhury in more than 80,000 villages (Pearce, 2006).

Urban markets create new opportunities for smallholders. While supermarkets and shopping malls are spreading fast, including in Africa, large parts of the food business remain beyond their reach. In Addis Ababa, Ethiopia, for instance, the bulk of the milk and honey sold in the city comes not from large commercial enterprises but from informal markets supplying the output of smallholders.

Jules Pretty of the UK’s University of Essex, who oversaw the collation of the Foresight case studies, argues that these forms of intensification, in which the smallholders themselves are intimately involved, create ‘social capital’ that underpins wider development of rural and periurban communities. Such social capital could never emerge from turning smallholders into labourers for large corporate farms (Pretty et al., 2011).

In many places use of technologies – notably mobile phones – has helped to revolutionize the ability of small farmers to access markets and check the prices for their produce. Pretty opines that they are “radically opening up access to external knowledge... among even the poorest”. Smallholder farmers have been able to penetrate export markets traditionally dominated by large commercial plantations, selling tea to major brands like Lipton, and fresh vegetables for airfreight to European supermarkets (Mitei, 2011). Cotton cooperatives have flourished in Mali, now a major supplier of cotton to world markets.

New markets can sometimes experience unexpected risks. The Icelandic volcanic ash cloud shut airspace in Europe in early 2010 and led to thousands of tonnes of fresh vegetables harvested by smallholders rotting in roadside collecting sheds across Kenya (Waihenya, 2010). Under such circumstances, and with few resources to fall back on in bad times, few farmers can abandon subsistence food production, nor should they. But the net effect of planting such cash crops, where successful, has been to turn farming from, at best, an ‘old man’s business’ into something young adults seek out even when they have the chance to go and work in cities.

Box 4.4 The potential productivity of women farmers

If the small farm is a sleeping resource that needs awakening, then one key catalyst is women. The widely quoted assertion that women do between 60 and 80 per cent of the labour on

African farms may not have a sound research base (Doss, 2010). Equally, national statistics suggesting women comprise 43 per cent of the global agricultural workforce underestimates

their role as smallholders and tenders of household 'kitchen gardens' that are often essential to household food security (FAO, 2011).

Whatever the precise figures, women are clearly essential workers on most of the small farms in low- and middle-income countries and many of the larger commercial farms as well. They produce most of the household food, growing vegetables and subsistence grains, and raising farmyard chickens on what are often pejoratively termed 'kitchen gardens'. Meanwhile men often restrict themselves to cash crops such as coffee and livestock. These are more visible to outsiders, through market transactions, and thus appear in national statistics on trade, employment and income-generating activities. Some research suggests that male agricultural workers also work shorter hours than women, coupled with the revelation that male farmers typically contribute less to the food security of the household (Doss, 2010).

In spite of this, women's agricultural work is often far less visible and their influence on agricultural policy and finance is eclipsed by that of men. Men typically dominate access to key inputs like fertilizers and agricultural credit. Agricultural research and extension support too often concentrate on 'male' crops and target their services at men. Past studies (albeit in the 1980s) carried out by the Food and Agriculture Organization of the United Nations (FAO) found that only 5 per cent of public extension services were aimed at women and only 15 per cent of extension staff were female (Jiggins et al., 1997). The differences in use of credit are not as large as this. FAO statistics suggest male-headed households are typically 10–20 per cent more likely to use credit than female-headed households.

Lack of access to credit may be an important reason why women are generally slower to adopt new agricultural technologies or even

use basic inputs such as fertilizers. But cultural and legal norms may also restrict women. In much of Africa, women do not normally engage in ploughing, for instance. In many countries, it is rare for women to hold the title to land, which (where it exists at all) is normally held by men (Concern Worldwide, 2009).

According to the FAO Gender and Land Rights Database (FAO website), women represent fewer than 5 per cent of all agricultural land holders in North Africa and West Asia, 15 per cent in sub-Saharan Africa and 25 per cent in parts of Latin America. In general, where they hold land, they hold less than men. Women-run farms also typically hold fewer livestock (less than a third as many in Bangladesh, Ghana and Nigeria) and what livestock they own is generally smaller – poultry, goats and pigs rather than cattle and oxen.

Lack of land is one reason why women are often largely excluded from contract and outsourced farming. Women hold fewer than 10 per cent of the contracts for outsourcing of high-value export crops such as fruit and vegetables in Kenya, for instance – even though managers of the schemes say they are often more innovative and industrious than their menfolk (interview with author, 2007).

Perhaps for this reason, while the men generally hold the contracts, day-to-day management of outsourcing farms is frequently done by women (FAO, 2011). Women are thus poorer, lack access to land, suffer systemic social and political discrimination and are physically vulnerable to gender-based and sexual violence (Daley, 2010).

One result of sidelining 'women's farming' is revealed by the output data. In Burkina Faso, one study found that productivity on women's plots was 30 per cent less than on men's plots, even within the same household. A review of data from Bosnia and Herzegovina, China, Ghana and Nicaragua found that the value of crops produced by female-headed households was less than that from male-headed households (Doss, 2010).

Thus agriculture is underperforming in many low- and middle-income countries in part because women lack the resources and opportunities to make the most productive use of their time. As agriculture globally becomes more technologically sophisticated and commercially oriented, the danger is that the role of women will be further marginalized and further undervalued – with potentially damaging repercussions for household food security and rural development.

This has to change. Closing the gender gap is important not just for women, but also for agricultural output. IFPRI estimates that improving women's access to key resources would probably raise output overall by at least 10 per cent. On women-run farms,

FAO's *The State of Food and Agriculture 2010-11* report estimates yield gains of 20–30 per cent, potentially reducing the number of hungry people in the world by 12–17 per cent (FAO, 2011).

And since other studies show that income generated by female farmers is more likely to be devoted to food and the needs of young children, an investment in women's needs on the farm would likely lead to future generations that are healthier and better educated.

As *The State of Food and Agriculture* report concluded, "Closing the gender gap in agriculture would produce significant gains for society by increasing agricultural productivity, reducing poverty and hunger and promoting economic growth" (FAO, 2011).

Robert Watson, chair of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), makes the case for supporting smallholders (IAASTD, 2009). Feeding the world, he says, is primarily "not a technical challenge; it's a rural development challenge. Farm yields across [Africa] can be raised from a typical one tonne per hectare to four or five tonnes... Small farmers will remain the predominant producers in sub-Saharan Africa. The question is how to help them, to empower them" (interview with author, 2009).

Watson's view is not universally shared. The renewed interest by international capital in the potential profits from agriculture in low- and middle-income countries means that the case for agribusiness as the 'saviour' of the world's food supply is increasingly heard.

Land and agribusiness

The most obvious manifestation of the commercial forces behind 'investment' in agriculture today is 'land grabbing'. This is a crude catch-all term for the insertion of large capital-intensive farms into the traditional landscape of smallholders and pastoralists across Africa and other low-income areas where farming systems are deemed to be 'underperforming'.

Dozens of governments, particularly in Africa, have begun courting foreign farmers and foreign capital with offers of cheap leaseholds on large stretches of fertile land, as a means to kick-start agricultural economies (von Braun et al., 2009).

In the past six years, Ethiopia, Ghana, Madagascar, Mali and Sudan have granted more than 2 million hectares of their land in plots greater than 1,000 hectares to outside investors (von Braun et al., 2009). Some investors are state sovereign funds which want to boost food security for their own nations, even at the expense of food security in the nation whose land they take. For instance, Mali has granted Libya a lease on 100,000 hectares and water from the River Niger to grow rice. The result will be more landless local farmers and reduced food security for up to 1 million people living immediately downstream in the Niger's inland delta.

In Ethiopia, two foreign companies – Saudi Star from Saudi Arabia and Karaturi Global from India – won concessions from the central government covering some 400,000 hectares of the remote and underpopulated region of Gambella, on the border with south Sudan (Bloomberg, 2011). Elsewhere, governments from the Republic of Congo to Nigeria and Mozambique are offering prime land to South African and Zimbabwean commercial farmers (BBC, 2009).

The crops being grown in these large new developments are rarely the staples of the countries where the land is situated. Biofuels are prominent, whether jatropha, sugar cane or palm oil. European companies are frequent land grabbers, seeing a large guaranteed market back home as European Union regulations now require biofuels to be blended with fuel sold at forecourt pumps.

A conference on land grabbing held at the University of Sussex's Institute of Development Studies in the United Kingdom in April 2011 heard how governments often made extravagant claims that the land they were offering for lease was empty or unused. However, this is rarely so, says Liz Alden Wily, a leading expert of farmers' land rights. "The idea that Africa is full of unused and unclaimed land is a myth," she said. The land may not be fenced; its owners may not have formal title, but few landscapes lack claimants for their hunting and gathering rights or shifting cultivation zones. The conference concluded that few large-scale land grabs had lived up to their promise of providing abundant jobs and local food supplies to replace those lost (Future Agricultures, 2011).

Even the threat of large land grabs has often proved unpopular. Controversy over an agreement in Madagascar to lease 1.3 million hectares to Daewoo Logistics Corporation from the Republic of Korea for maize and palm oil contributed to the overthrow of the government there in late 2009. It was another sign that the globalization and commodification of farming is a politically volatile trend (von Barun and Meinzen-Dick, 2009).

Even if the bulldozers and irrigators have not yet moved in, the inhabitants are left either fenced out or unclear what their fates will be. Land grabs – and the threat of them – have underlined one of the major problems slowing the necessary new vibrancy in smallholder agriculture – land rights.



African policies vary greatly, but much land is either without formal title or is vested with the central government. There is a growing campaign for a new wave of land reform in Africa that will vest full title with the occupants of the land, either individually or, in the case of common land, collectively (De Schutter, 2011).

Approaches to social protection

After more than two decades in which the default assumption was that markets could, or should, deliver an end to poverty and vulnerabilities of all sorts, there is a growing recognition that this view is mistaken. Some market-based strategies for increasing agricultural production may actually disadvantage the poorest and those most vulnerable to hunger. In any case, maximizing agricultural output alone is not enough to ensure an end to hunger. Publicly funded social protection is essential for individual well-being, social cohesion and even political stability.

The need is urgent. Fewer than one in ten workers in Africa, including smallholders, has any kind of formal social insurance. Women are the most disadvantaged. But social protection needs to go beyond simply doling out to the poor what markets fail to deliver. It should also be about empowerment for and within communities, including the rights of women, and widening and underpinning rights to land and other key resources.

Farmers harvesting rice in the traditional way in a paddy field in Niger. A machine to sort rice is being developed by Niger's agricultural development office. The machine should cut losses in production by 10 per cent compared to traditional techniques.

© Julien Goldstein/IFRC

If the Foresight report is right that “the era of cheap food is at an end” and that, as a modelling exercise by IFPRI suggests, the real price of staple crops is set to rise by between 30 and 100 per cent by mid-century, that could be good news for farmers with surplus crops to sell. But it would be bad news for the rest, including rural households who do not grow all their own food and the growing proportion of the world’s poor now living in or on the margins of cities and towns (Nelson et al., 2010).

Many governments have traditionally met the challenge of high food prices with subsidies for staples like bread, wheat and rice. There has also been a traditional approach of food-for-work programmes built around public works projects. Such programmes are on the wane. Social safety nets have survived in the form of specific fortified foods for particular groups, like lactating mothers, infants and people with HIV or tuberculosis. With the impacts and cost-effectiveness of more widespread interventions under question in recent years for not being sufficiently targeted, many programmes have been replaced with direct cash transfers and food vouchers to the poorest.

Pakistan has had a voucher scheme since 1994, originally as an alternative to food hand-outs. Many African countries – including Kenya, Lesotho, Namibia and South Africa – have cash transfer programmes such as child benefits and old-age pensions. Kenya’s Hunger Safety Net programme targets unconditional cash payments to the chronically food insecure ‘bottom 10 per cent’ in a country with rising income inequality.

Such transfers are taking new forms. Syria delivers vouchers to Iraqi refugees by mobile phone. India, Kenya, Liberia and South Africa all use electronic payments using smart cards or mobile phones (World Food Programme, 2010).

Some cash transfers are unconditional, while others have some stipulations. Proponents say the latter can deliver a double benefit, rewarding with cash those who sign up for additional vulnerability-reducing programmes such as child immunization or nutrition programmes. Critics argue that conditionality is costly to monitor, can amount to coercion and is not necessary.

There is growing evidence that unconditional cash transfers are widely used by the poor to buy educational and health services, where these are available. Nonetheless, the evidence is not universal. Studies of the 30-year-old Bangladesh Asset Transfer programme, which provides cash and other assets for the poorest households, found that while it has boosted income and removed thousands of households from extreme poverty, there had been little impact on children’s education (Sulaiman, 2010).

A recent study for the UK’s Department for International Development concluded that cash transfers have helped poor households to improve their livelihoods and obtain access to credit, but that ‘supply-side problems’ such as well-trained teach-

ers and health professionals were hampering the potential benefits from such cash transfers (Arnold, 2011).

The decade-old Mexican conditional *Oportunidades* programme helps 5 million poor families; it has reduced poverty and hunger and improved nutrition through food supplements. It also stimulated greater education among the children of the poorest households by providing millions of scholarships each year (Levy, 2006).

The world’s largest conditional cash transfer scheme is currently Brazil’s Bolsa Familia. It offers cash – usually to women – in return for school attendance by their children and signing up for vaccines and prenatal care. It reaches more than 50 million people, a quarter of Brazil’s population, and underpins development among the poorest in a fast-growing economy at risk of widening income differentials. Yet it costs less than 0.5 per cent of the country’s GDP (ILO, 2009).

Similar initiatives being undertaken in Africa include Ghana’s new Livelihood Empowerment Against Poverty programme, which provides cash transfers to some 160,000 poor households comprising orphans, the elderly and the disabled.

Box 4.5 Innovations, insurance and risk finance

The World Food Programme (WFP) is a leading actor in disaster risk reduction, working to develop innovative approaches and systems to support national capacities. One key area of innovation relates to new services in weather risk management, insurance and finance mechanisms to help communities and governments more effectively manage food security-related risks.

IFAD-WFP Weather Risk Management Facility

Launched in 2008 with the support of the Bill & Melinda Gates Foundation, the Weather Risk Management Facility is a joint initiative of WFP and the International Fund for Agricultural Development (IFAD). It draws on IFAD’s experience in rural finance and on WFP’s expertise in climate change and disaster risk reduction. The facility supports the development of and access to innovative weather risk management

mechanisms – including weather index-based insurance – for agricultural development and disaster risk reduction.

The Weather Risk Management Facility focuses on four areas:

1. Building the capacity of local stakeholders in weather risk management
2. Improving weather and climate services, infrastructure, data monitoring and management
3. Supporting the development of an enabling environment
4. Promoting inclusive financial systems.

The facility has cooperated closely with the public and private sectors in China and Ethiopia in developing weather index-based insurance pilots for poor rural smallholders vulnerable to frequent drought. As part of these activities, it helped local private stakeholders to collect and analyse data, develop an index, draw up

contracts and price the product, and build capacity in marketing and client education.

The facility has also researched good practices in weather index-based insurance to support donors' and practitioners' work with in-country implementation partners. Two resources have been developed: *The Potential for Scale and Sustainability in Weather Index Insurance for Agriculture and Rural Livelihoods* (Hazell et al., 2010) and *Effective ways to support index insurance: A technical guide for donors and practitioners* (WFP and IFAD, unpublished).

The next phase of the partnership will focus on testing innovative index insurance mechanisms in combination with complementary risk reduction measures in Mali and other Sahelian countries.

Innovative climate risk management at the national level

Increases in temperature and erratic rainfall patterns are projected to have profound and direct impacts on agriculture production and food systems in low latitude regions, increasing the number of people at risk of hunger.

WFP helps governments to develop comprehensive climate risk management frameworks which bring together risk management, risk transfer and social protection. This approach aims at enhancing communities' disaster resilience through effective safety net programmes and disaster risk reduction-oriented activities. It also supports governments' preparedness and risk management capacities by linking contingency planning, early warning and capacity building to contingent funds and innovative risk transfer tools. This enables governments and donors to reduce the costs and increase the effectiveness of food assistance and social protection programmes, thus marking a radical shift from managing disasters to managing climate risk.

Livelihoods, Early Assessment and Protection project

Ethiopia is particularly vulnerable to drought and flood risks, and climate change represents a real challenge for food security due to the expected increase in extreme weather events and the modification of traditional rainfall patterns.

To respond to this challenge, the government of Ethiopia launched in 2004 a national food security programme and set up the Productive Safety Net Programme (see Box 3.4).

As part of the national food security programme, the government engaged in a partnership with WFP and the World Bank to improve its capacity to manage drought and flood risk and develop an integrated national risk management framework through the Livelihoods, Early Assessment and Protection project.

This risk management project supports the development of a nationally owned risk finance and management framework linking early warning, contingency planning and capacity building to a US\$ 160 million contingency fund in order to enable the effective scaling-up of the safety net programme in case of a major drought. The project is also a cutting-edge food security early warning tool that combines livelihoods and vulnerability information, climate modelling and agro-meteorological drought and flood monitoring.

R4 – Rural Resilience

WFP and Oxfam America have entered into a strategic partnership to develop a comprehensive approach to address the issues of availability and access to food, disaster risk reduction, risk transfer and capacity building in rural communities to reach the poorest of the poor and enable them to graduate from extreme poverty.

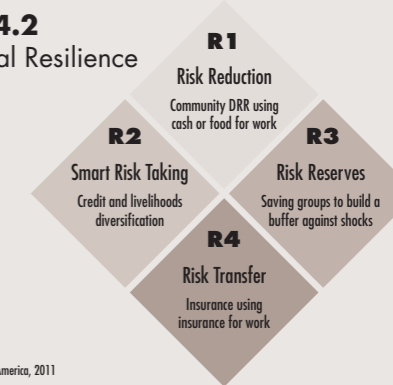
The R4 – Rural Resilience programme is a five-year partnership in which WFP and Oxfam America will build on the Horn of Africa Risk Transfer for Adaptation programme successfully implemented by Oxfam America in Ethiopia's Tigray region. This programme broke new ground with its holistic approach in supporting cash-poor farmers and landless rural households to pay for their insurance with their own labour. R4 leverages WFP's experience and innovations in managing productive safety nets with governments, which provide disaster relief and food assistance through food- and cash-for-work transfers.

This Ethiopian programme will be scaled up to reach 15,000 households in 50 Ethiopian villages in 2011. During the five-year period, R4 will replicate the programme in three additional countries to cover a similar number of households in each country.

The R4 framework hinges on:

1. *Food security* through food and cash transfers by creating immediate temporary employment through public works for disaster risk reduction under the safety nets of governments

Figure 4.2
R4 – Rural Resilience Initiative



Source: WFP and Oxfam America, 2011

2. *Social protection* by involving the community and safety net participants to educate and train on savings, productivity improvements and the management of individual and community finances
3. *Adaptability to climate change* by leveraging public-private partnerships, both global and local, to build the capacity of rural smallholder farmers to transfer risk of unprecedented and unmanageable climate and productivity shocks through various agriculture insurance programmes, including innovative use of technology to deliver sophisticated index-based insurance.

However, many communities do not need help all the time. What they really require is protection against price shocks or crop failures. This category of people is likely to grow as prices become more volatile and climate change makes weather less predictable. And, for the present at least, cash transfer schemes – along with other social protection schemes – are not generally flexible enough to take account of variable prices and so risk failing to address hunger when it occurs (see Box 3.4).

Many social protection schemes have their origins in strategies for the urban poor, so a critical question is how to find synergies between smallholder agriculture and social protection. This can be difficult because policies that create benefits for producers, such as higher food prices, create problems for those who do not produce food, or not enough food, and need to buy.

One avenue has been to provide employment through public works in rural areas – such as digging irrigation ditches and improving roads – which should also improve agricultural economies, while directly rewarding effort and so preventing capture of

the funds by local elites. India's National Rural Employment Guarantee Scheme, for instance, guarantees every Indian household 100 days of paid employment. Rwanda's Vision 2020 *Umurenge* aims to "eradicate extreme poverty by 2020" through a combination of public-works employment, credit packages and direct support (Government of Rwanda, 2007). Such schemes are valuable at times of stress but some studies suggest the longer-term benefits remain unproven.

Of potentially greater long-term benefit are fertilizer subsidy programmes, such as that in Malawi, which are claimed to boost both incomes and food availability (Devereaux, 2009; Pretty et al., 2011).

A current favourite social intervention is crop micro-insurance schemes for farmers, based on a weather index. Conventional insurance, which depends on assessing the impact of bad weather on actual output of an individual farmer, is far too cumbersome to police for small farmers and creates perverse incentives to farm badly. The new micro-schemes simplify the process by paying out when the index crosses a threshold.

Box 4.6 Using Earth Observation data for the agricultural sector: crop insurance in China

Access to risk data is a key condition for insurance. In the case of agricultural and climate risks, the role of data is important throughout the risk transfer process: from assessing risks to setting up an insurance scheme and establishing new risk management practices. Past historical data, accurate current data about crops and weather, and information about potential future changes due to climate change and other socio-economic factors are all relevant in this context.

Some of these challenges can be overcome by using Earth Observation (EO) data provided from satellites and remote sensing applications. In some parts of the world like Canada and the United States, remote sensing observations, such as the Normalized Difference Vegetation Index (NDVI) and the MERIS Global Vegetation Index (MGVI), are already used within the agricultural sector for assessing and managing crop risks.

The application of these data techniques is currently being assessed in a pilot project in China's north-eastern regions. With support from the European Space Agency, a consortium of meteorological experts, mapping firms and insurance experts are working together to explore the potential use and value of EO data for managing crop risk and assessing exposure to climate change in developing countries.

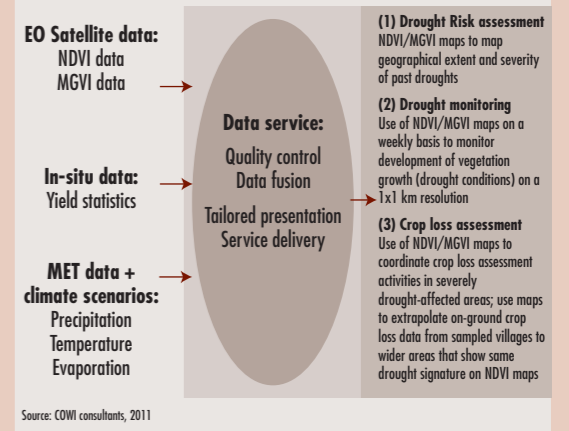
The project focuses on the regions of Heilongjiang, Jilin and Liaoning, which constitute one of China's main agricultural areas, but with a view to applicability across other regions and countries.

The crop data service concept is illustrated in the figure below. It combines EO-derived data with meteorological data and in-situ data (yield statistics from the relevant areas) to produce

three distinct data services: drought risk maps, drought monitoring and crop loss assessments.

These data applications not only support the development of crop insurance in the relevant regions, but they can also assist a wider range of stakeholders with assessment and management of current and future drought risks. Key stakeholders with an interest in this type of crop data are farmers, financial institutions, food processing companies (using crops as production input), governments (at local, regional and national levels), private and public insurers, reinsurers, relief agencies and even fertilizer and seed manufacturing companies. The data application is currently being tested and the consortium hopes to share results and start a wider role-out in the autumn of 2011.

Figure 4.3 Crop insurance data concept



Typically drought payments follow a season of low rains, as measured at recognized weather stations. Pioneers include India's Comprehensive Crop Insurance Scheme and the Malawi Maize Index. Many more recent schemes employ new technologies to innovative effect (Regional Hunger and Vulnerability Programme, 2010).

Kenya's *Kilimo Salama* crop micro-insurance programme, promoted by Syngenta, employs solar-powered local weather stations to input more accurate localized weather data and sends policies to customers' mobile phones by text. It then makes payments using the hugely popular mobile phone money-transfer service – in this case involving the local provider Safaricom – which acts as an informal banking system for millions of Kenyans. In the first two years, some 50,000 farmers in western Kenya adopted this scheme, the largest agricultural insurance programme in Africa, operating in a region notorious for droughts (Syngenta, 2011).

But absolute rainfall is not always a reliable guide to crop yields. Too much depends on the precise timing of the rains. So there is now a move to use satellite observations of the land to create a local vegetation index. The thinking is that vegetation growth is a better proxy for likely crop yields.

Such safety nets are usually seen as a backstop against hunger but they serve a wider function in development. Poor farmers who have access to affordable and reliable crop insurance will be less risk averse in their planting and able to plant more of their fields with cash crops, knowing that if their subsistence maize fails they will not be left destitute.

But the fundamental means for providing social protection is to encourage rural development in a form that ensures jobs and incomes for households from a variety of livelihoods, some based on local resources, including farming, processing of farm produce and sometimes fisheries and handicrafts, but also supplemented by external sources of income.

Conclusion

Between the early 1960s and the turn of the century, world population more than doubled from 3 billion to just over 6 billion, but food production almost tripled, on only 11 per cent more land (UN ESA, 2010). As a result, average daily calorie consumption increased by more than 20 per cent (Evans, 2010). But this did not deliver an end to entrenched hunger. Many of the world's population eat better today than they did half a century ago, but many eat worse, despite the availability of more food.

In a world where there is enough food but 1 billion people are hungry and another billion are malnourished, it is far from clear that the current model can do better next time. More of the same will create more of the same: hunger amid plenty. Does it make sense to feed the world by annexing and incorporating the farmland owned and tended by a billion of the world's poorest, most food-insecure people?

A drive for more commercially grown food, and more international trade in food, may be the last thing we need. It may entrench and extend commercial farming, while depriving the billion rural poor of the rights to resources they need to feed themselves. It may fill warehouses but leave the poor with empty stomachs. It may exacerbate price fluctuations and undermine support for smallholders and their families.

Blind devotion to the idea of more 'efficient' farmers risks losing sight of what efficiency improvements might be most useful. Are we talking about efficient use of capital or labour? Or about efficient delivery of food to markets or the poor? In an age when smallholder farms are being converted to growing biofuels and some of the least well-nourished nations on earth are converting their best land to grow cotton and sugar cane, these questions matter.

Markets are rarely perfect. The evidence of the 2007–2008 food price spike is that speculators intervene during times of shortages, exacerbating price volatility. A world exposed to such forces is not necessarily a world better able to withstand variable harvests. Food runs the risk of succumbing to Wall Street bubbles of the kind that undermined the banking system in 2008. The result might be even more starvation (Kaufman, 2010).

Pretty asks: "Who will be farming in 2050?" It is an important question. Will it be primarily agribusiness companies with their large, capital- and input-intensive farms? Or will it be smallholders engaged in the kind of mixed farming that dominates most of the

world's agricultural land today? Do we want a rural world in which most inhabitants are employees and labourers rather than entrepreneurs? (Pretty et al., 2011.)

"There is much that is working well in Africa, and working much better than many appreciate," says Pretty. "We need to celebrate the genuinely novel and sometimes world leading things that are happening there." If so, then smallholders are the key to unlocking both food production and its equitable distribution. In Africa in particular, they are the efficient means of managing available resources.

The main things standing in the way of making this happen are the right policy provisions from government: basic research; ensuring access to financial resources like credit and insurance; providing infrastructure to get timely supplies of inputs to farmers and ensure timely distribution of product; improved social protection; and underpinning all this by ensuring that farmers have rights to their land.

Chapter 4 was written by Fred Pearce, environment and development consultant for New Scientist magazine. He is the author of The Land Grabbers: The new fight over who owns the planet, to be published in early 2012. He also wrote Boxes 4.3 and 4.4. Box 4.1 was written by Simon Levine, Research Fellow, Humanitarian Policy Group, Overseas Development Institute, London. Box 4.2 was written by Adam Barclay, a science writer who specializes in international agricultural research. Box 4.4 was written by Niels Balzar, Policy Officer with the World Food Programme. Box 4.5 was written by Swenja Surminski, Senior Research Fellow at the London School of Economics and Political Science's Centre for Climate Change Economics and Policy.

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Responding to food insecurity and malnutrition in crises

This chapter briefly reviews the changing nature of the humanitarian response to food security and nutrition crises. Major effort has been invested in improving analysis and the range of response options is now much broader than it was only ten years ago. Mortality in acute food security and nutrition crises has been reduced, which is a significant achievement. But less progress has been made in recovery from crises. In the food security sector – as in other sectors of response – the challenges of addressing underlying causes in protracted crises have become more apparent. And new constraints have emerged as well.

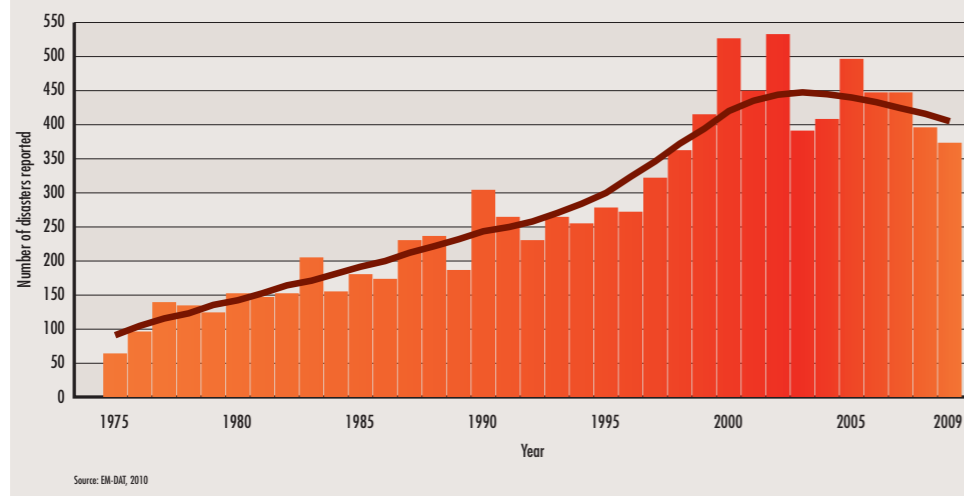
The past decade has brought considerable change in the context of food security and nutrition crises. Firstly, after a lengthy period of stability and slowly declining real prices, the cost of food spiked dramatically in 2007–2008. The period since has seen great volatility in food prices, with the price of some basic food commodities as high in early 2011 as they were in 2008 (see Chapter 3).

The price of food is important in explaining humanitarian crises because it is a hazard in its own right: it puts vulnerable populations everywhere at greater risk and allows smaller shocks to push them over the brink of survival. It also makes recovery after crisis much more difficult. Increasing globalization means that price changes are more rapidly transferred to local markets and individual households.

Secondly, other causal factors have changed. While the bulk of crises continue to be in conflict-related and complex emergencies (UN ESC/ECA, 2009), the number of disasters triggered primarily by climatic or environmental factors has increased (see Figure 5.1). This trend is likely to continue as the impact of climate change drives greater volatility in weather-related hazards, contributing to the sharply rising number of natural disasters. Across the board, crises characterized by extreme levels of acute food insecurity and malnutrition are the result of multiple causes – both ‘human-made’ and ‘natural’. The high rates of mortality caused by a widespread scurvy (vitamin C deficiency) epidemic seen in Afghanistan in 2002 are a good illustration. Scurvy is a rare deficiency in stable populations, but a particularly severe winter combined with the ongoing conflict and reduced humanitarian access meant that large numbers of Afghans were cut off from sources of vitamin C (fresh produce and animal products) for very prolonged periods.

Photo opposite page:
Helima Begum from Bangladesh searches for grains of rice in the dirt outside her home which was severely damaged during Cyclone Sidr in 2007. “It took us years to build our lives and home,” she said. “Now everything is simply gone.” She knows that eating spoiled rice could make her sick. “But it is still better than dying of hunger,” she said.

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Figure 5.1 Natural disasters reported 1975–2009

Thirdly, crises are increasingly protracted. In 2010, 19 countries in Africa alone reported food security crises in at least eight out of the ten previous years – and in 15 of these countries, for eight or more consecutive years. In 1990, only five countries reported this kind of protracted crisis (and only one of those five – Mozambique – had emerged from protracted crisis). The more protracted or long-lasting a crisis is, the greater the prevalence of food insecurity (FAO and WFP, 2010). In many such contexts, the prevalence of acute malnutrition remains above the levels defined by the World Health Organization (WHO) as signifying a nutritional emergency for years, if not decades (Nielsen et al., 2011).

Lastly, although food security crises remain predominantly a rural phenomenon, there is increasing evidence that the locus of crisis is slowly shifting towards urban areas, as vulnerable populations are forced out of rural livelihoods (Pantuliano et al., 2011).

Box 5.1 Somalia: the changing nature of conflict and the changing humanitarian response

Somalia has been in a state of protracted conflict since the late 1980s. In 1991, the government of Mohamed Siad Barre was overthrown, but no single faction was powerful enough to dominate and the country has not had a working central government since then. At root, the

conflict in Somalia has been over resources – particularly land and water. Much of the expression of the conflict has been in terms of clan and identity, which remained tied to local politics in the 1990s. However, since 11 September 2001, and particularly in the past

five years, the conflict in Somalia has become politicized on a much more global scale, with an attendant decline in humanitarian access and a worsening humanitarian crisis.

In 1991 and 1992, major conflict in south-central Somalia led to the displacement of civilians and the breakdown of marketing channels. Compounded by back-to-back poor harvests, this resulted in a major famine in 1992. Famine relief efforts were hampered by the conflict and the United Nations (UN) Security Council authorized a peacekeeping mission to Somalia to protect the aid effort. But after UN troops were attacked, the United States (with significant encouragement from some of the humanitarian agencies) intervened to protect aid convoys. The US intervention soon turned into a direct conflict with some of the warlords, culminating in the infamous ‘Black Hawk down’ incident in October 1993, when a number of American soldiers were killed, and the subsequent withdrawal of US forces. After the famine, a second UN effort began in 1994, aimed at national reintegration and economic recovery, but it too met with only limited success.

Northern areas of Somalia formed their own separate governments in Somaliland and Puntland, and these areas attained a degree of stability. But the rest of the country – generally referred to as south-central Somalia – spent the remainder of the 1990s divided into small areas, each dominated by a warlord or local militia. Actual fighting was sporadic and trade among different areas was possible, even if unified government was not. Occasional localized food crises occurred throughout this period, but the major famine of 1992–1993 was not repeated. Two attempts at forming a national government (one in 2000 and another in 2004 – the current Transitional Federal Government or TFG) also failed to unify the country.

Since 2001, the conflict in Somalia has taken a different turn with growing concerns about some of the warlords’ links with jihadist movements. Ethiopia and Eritrea have backed rival factions, jockeying for regional supremacy. In the absence of a strong central security system, there were fears that Somalia could become a haven for groups linked to al-Qaeda. By 2005, the Supreme Council of Islamic Courts Union consolidated control over the capital Mogadishu and by early 2006 controlled much of south-central Somalia. There followed a brief period of calm in areas it controlled. But external concerns over some of the Courts’ international allegiances – and the TFG’s alliance with Ethiopia – led to an invasion by Ethiopia, with the support of the US, in late 2006. The invasion achieved the objective of chasing the Islamic Courts out of the capital, but it also resulted in the most radicalized element of the Courts – the *al-Shabab* (youth) movements – taking over the role of main opposition to the newly reinstalled TFG. Fierce fighting between *al-Shabab* and its allies on one side and the TFG and their Ethiopian – and eventually African Union (AU) – forces on the other, led to a large-scale flight of people displaced from Mogadishu, most of whom took refuge around Afgooye, just north-west of the city.

Conditions in Afgooye were so bad that it has been dubbed the ‘world’s worst humanitarian crisis’. Fighting throughout 2008 and 2009 eventually led to Ethiopian forces pulling back and handing over to AU forces, which remained to protect the fledgling TFG.

Several food aid programmes have operated in south-central Somalia, but food aid has always been a valuable commodity in a resource-constrained environment and has been a source of competition, diversion and manipulation. To prevent losses, food aid transporters were required to pay a deposit equal to the

value of the food in order to ensure its arrival at the intended destination. However, managing and monitoring food aid became increasingly difficult as the security situation deteriorated after 2005. At the same time, the rapidly increasing numbers of internally displaced people – which jumped from 300,000 in 2007 to nearly 1.4 million in 2009 – required more assistance. Fears about the loss or diversion of food aid made donors more wary and access by agencies more difficult.

CARE International, which had been running large-scale food programmes in several areas of south-central Somalia, was forced to pull out in late 2008 because of security threats. A year later, fearing that diverted food aid would fall into the hands of *al-Shabab*, the United States Agency for International Development (USAID) instructed that none of its aid – food or otherwise – be allowed to go into areas controlled by *al-Shabab*. Soon after, the World Food Programme also shut down most of its operations in south-central Somalia. These events coincided with one of the best harvests in recent history, so for a period of time, the aid pull-out did not have obvious, major humanitarian impacts. But the pull-out also coincided with renewed attempts to bolster the fledgling TFG.

Pressure was put on humanitarian agencies to support this effort by redoubling aid efforts in TFG-controlled areas – with the potential consequence of further polarizing humanitarian aid, making it even more difficult to access *al-Shabab*-controlled areas.

Inevitably, the impact of the good harvest in 2009–2010 has worn off. Continued displacement and a drought linked to the La Niña phenomenon have worsened the food security situation. The conflict continues and its impact on polarizing aid makes access very difficult for humanitarian agencies. FAO's Food Security and Nutrition Analysis Unit for Somalia notes that 2.4 million people require food assistance and some of them live in areas that cannot be reached. The drought is worsening the underlying livelihood crisis because pastoralists are losing animals due to the critical shortage of grazing and water and the value of animals is dropping while the price of food is rapidly increasing. The UN's IRIN news agency quoted Mark Bowden, the UN Humanitarian Coordinator for Somalia, calling on the warring parties to allow humanitarian access to support drought-affected Somalis. "I am extremely concerned about the impact of the current drought on the well-being of children, women and the general population of Somalia," he said (IRIN, 2010).

For years, food security responses consisted mainly of food aid or seeds-and-tools support to agricultural recovery in farming areas. Much of the food aid was provided in-kind by donors and was often subject to delays in procurement and transoceanic shipment (Barrett and Maxwell, 2005). The interventions that aimed to address malnutrition in emergencies were limited to supplementary feeding programmes, using fortified blended foods that were based on the same commodities that donors were making available for general distribution and to inpatient therapeutic treatment for the most severe cases. The fortified foods were mostly, but not exclusively, a blend of grain and pulse commodities, such as maize-soya blend, with the addition of a vitamin-mineral mix.

For many years, food security and nutrition as a 'sector' has been the biggest single category of humanitarian response in crises. But despite this, it is still often accused of being

too little, too late – and sometimes inappropriate to the context or the problem (ODI, 2006). This implies a problem of analysis or learning (or both), as well as other constraints.

Nutrition and food security analysis

In the past decade, major investments have been made in the analysis of nutrition and food security in crisis. The key motivation behind this has been to become more precise in terms of problem analysis and in making the case for appropriate, timely and efficient action. This has generated change at a number of levels. Broadly, words like 'starvation' and 'hunger' have been replaced with terms like 'nutrition' or 'food security crisis or emergency' that better distinguish crises driven more by disease, escalating food prices or loss of income and livelihoods than by traditional environmental shocks or conflict.

Major improvements have been made in the assessments of food security. The Strengthening Emergency Needs Assessment Capacities project of the World Food Programme (WFP) led to significantly improved assessment methodology as well as more consistent and transparent reporting – as, for example, in annual detailed needs assessments in Darfur, Sudan beginning in 2005–2006. The Integrated Phase Classification (IPC) tool, developed by the Food and Agriculture Organization of the United Nations (FAO) and its partners in Somalia, has created the analytical tools and common language to compare different crises, enabling at least the possibility of an impartial response. The push to expand IPC analysis led to the improvement of food security indicators, including such innovations as the food consumption score, based on dietary diversity (WFP, 2009) or the coping strategies index, based on behaviours people rely on when they have inadequate food (Maxwell, Caldwell and Langworthy, 2008).

Nutrition indicators have been used to gauge the severity of crisis for nearly half a century. For many years, however, it was often difficult to understand what the proclamations of extreme levels of, for example, 'hunger' or high levels of 'extreme malnutrition' actually meant in terms of the number of people affected by different types and severity of undernutrition. This made it difficult to predict needs and design the most appropriate response. In the past decade, the cases of misuse of terms and misrepresentation of nutrition data have declined as both indicators and the assessment methods used to collect nutrition and food security data have become increasingly standardized across the international community.

Ethiopia is a good example of this. Some ten years ago only 9 per cent of 125 nutrition assessments conducted in the country were found to use standard indicators and approaches and to be reliable (Spiegel et al., 2004). Today, Isaack Manyama, who heads the Ethiopian Nutrition Coordination Unit (ENCUC), says: "There has been a significant improvement in the quality of such assessments." He went on to explain that last year only two out of 65 reports that he reviewed did *not* meet the criteria set by his unit for quality and reliability (interview with Manyama, March 2011).

Box 5.2 The Pakistan floods: chronic malnutrition exposed

In the summer of 2010, giant floods devastated parts of Pakistan, affecting more than 20 million people. The flooding started on 22 July in the province of Balochistan, next reaching Khyber Pakhtunkhwa and then flowing down to Punjab, the Pakistan 'breadbasket'. The floods eventually reached Sindh, where planned evacuations by the government of Pakistan saved millions of people.

However, severe damage to habitat and infrastructure could not be avoided and, by 14 August, the World Bank estimated that crops worth US\$ 1 billion had been destroyed, threatening to halve the country's growth (Batty and Shah, 2010). The floods submerged some 7 million hectares (17 million acres) of Pakistan's most fertile croplands – in a country where farming is key to the economy. The waters also killed more than 200,000 head of livestock and swept away large quantities of stored commodities that usually fed millions of people throughout the year.

In the immediate aftermath of the floods, malnutrition was identified as one of the key problems and infant feeding practices, for instance, were assessed as having suffered directly from the catastrophe. At the end of August 2010, "approximately 50 per cent of nursing mothers report[ed] [...] that they ha[d] reduced breast feeding and around 15 per cent ha[d] stopped breast feeding since the floods. Women report[ed] that they d[id] not have sufficient privacy to breast feed" (United Nations, 2010).

Six months after the floods, several agencies commented on the issue of malnutrition in Pakistan. "I haven't seen malnutrition this bad since the worst of the famine in Ethiopia, Darfur and Chad. It's shockingly bad," said Karen

Allen, deputy head of the UN Children's Fund (UNICEF) in Pakistan (Walsh, 2011). Yet interestingly, despite such alarming statements, the results of the Flood Affected Nutrition Surveys (FANS) of Sindh and Punjab, conducted in October–November 2010, showed similar global acute malnutrition and severe acute malnutrition (SAM) rates to those of 1991 and 2001 (WHO, 2010), indicating that the floods may not have radically changed the overall malnutrition phenomenon in Pakistan (see Box 2.1 for definitions).

Such apparent contradictory findings raise the question of whether the 2010 floods really were a tipping point into malnutrition for Pakistan, as many suggested.

Undoubtedly there was an increase in disease in the affected provinces due to the sudden and protracted displacement of large numbers of people, so many that neither the Pakistani authorities nor humanitarian organizations could meet people's basic needs. There was a significant rise in measles and in water-borne diseases, related to a lack of access to drinking water and sanitation (Chamberlain and Shah, 2010). These factors, plus lack of access to a diet with enough micronutrients, suggest the floods, especially shortly after their occurrence, were a strong aggravating cause for SAM, as has also been the case in studies on malnutrition and its aggravating factors (Bradol and Jezequel, 2009; Collins and Yates, 2003).

Despite all of this, approximately two months following the disaster, the FANS statistics did not show a dramatic increase in SAM rates compared to 2001 statistics. On average, Punjab had 4.9 per cent of SAM in 2001 and 3.5 per cent in 2010, while Sindh had 9.7

per cent of SAM in 2001 (and 3.7 per cent in 1991) and 6.1 per cent in 2010 (WHO, 2010; Punjab Department of Health, 2011; Sindh Department of Health, 2011).

It seems, therefore, that even if the floods might have impacted the overall issue of severe acute malnutrition in the weeks following the disaster, they did not increase it in the long term from a public health viewpoint. The reason why famine was raised in the media could be perceived as mostly opportunistic, explained Zulfiqar Ahmed Bhutta, a professor in paediatrics at the Aga Khan University in Karachi. "There is no acute famine in Pakistan and much of the so-called 'global acute malnutrition' uncovered by the floods represents longstanding undernutrition and stunting among the poorest of the poor," he said. "Many international agencies and relief organizations are focusing largely on distribution of nutrition commodities rather than addressing more labour-intensive activities underlying issues of maternal undernutrition and poor infant and young child feeding strategies. It is easier to demonstrate a high 'burn rate' of relief funds by importing expensive nutrition commodities than the laborious process of influencing behaviour change through community mobilization and support."

Most analysts agree that malnutrition is mainly a *chronic* phenomenon in Pakistan. It has been a major health issue for years, but substantial state investments have not been made to tackle the problem, as only around 2 per cent (WHO, 2009) of Pakistan's gross domestic product is spent on public health. According to Bhutta, "Very little research in India or Pakistan links to the countries' public health needs and policies [...] the Aga Khan University has been the leader in much public health research, but not much gets linked to national programmes (Srinivasan and Bhutta, 2011).

However due to the floods, several nutrition surveys were implemented at the end of 2010 by provincial departments of health in partnership with UN agencies and NGOs (Sindh Department of Health, 2011; Punjab Department of Health, 2011), and a national survey whose data will be comparable with the one carried out in 2001, is due mid-2011.

As stunting is measured by height/age data, it was too early two months after the floods to measure their direct impact. It is, however, interesting to note that between 2001 and 2010 the levels of stunting among young children increased from 37.6 per cent to 50 per cent in Punjab and from 48 per cent to 51.8 per cent in Sindh (WHO, 2010; Sindh Department of Health, 2011; Punjab Department of Health, 2011). Among the main structural causes of stunting are the lack of access to enough nutritious food, to enough clean water and to health facilities. All have been described as problematic in the aftermath of the catastrophe, so there is a strong possibility that the floods will be an aggravating factor for stunting in the long term.

Provincial response plans in Pakistan to the problem of malnutrition have been formulated from the results of the surveys and advocate "the delivery of an integrated response package consisting of life saving intervention [community management of acute malnutrition] linked to essential health services and the interventions promoting better nutrition and preventing malnutrition through appropriate infant and young child feeding practice promotion, micronutrient supplementation, deworming, quality water and sanitation services, food security intervention on the minimum" (Pakistan Nutrition Cluster, 2011). Whether this response can realistically be implemented over the 18-month timeframe scheduled remains unknown, especially as federal and

provincial administrations were still discussing the practicalities of the decentralized health budgets in mid-2011.

The loss of assets, infrastructure and food reserves will undoubtedly weigh for a long

time on the poorest of the poor in Pakistan. However, it would seem that the floods were a tipping point into state awareness of such a major public health issue rather than a tipping point into increased malnutrition.

These improvements have largely come about due to the efforts of WHO, projects such as Sphere (see below) and the recent Standardized Monitoring and Assessment of Relief and Transitions project, the nutrition cluster (see below) and the efforts of national bodies like ENCU in Ethiopia. All of these have promoted the use of standardized approaches in national-level training sessions and in widely available tools and guidelines.

While the standardization of nutrition and food security assessment in emergencies is resulting in more reliable data, challenges remain with interpreting the data and with reaching valid conclusions for decision-making about response. A decade ago, WHO set a level of acute malnutrition in a population (10–15 per cent) that should define an emergency and the need for response (WHO et al., 2000). It is difficult, however, to truly understand the nature of the nutritional risk and therefore the level of resources and most appropriate response required without interpreting these numbers within a context. This is what more recent frameworks attempt to do. The IPC tool, for example, includes a strategic response framework and calls for a specific step of ‘response analysis’ – that is, identifying possible response options to an assessed food insecurity or nutrition problem and then selecting the response that best addresses the need while minimizing potential unintended or negative side effects. Particular tools have been developed that are specific to a given food security programme choice: food aid or cash, for example, in an acute food access crisis (Barrett et al., 2009).

Thus the demands on analysis have grown more complex. Assessment of need has improved significantly, but needs assessment alone is no longer sufficient. The criteria for interpreting assessments have become clearer and include not only the validity and reliability of results (i.e., how accurate and reproducible the results are), but also the timeliness, comparability and programme-relevance of the results. Still, the extent to which improved approaches are actually used is limited. But when these improved tools and approaches are used, questions remain about the extent to which donor flexibility and resource availability, time constraints and simple organizational inertia has limited the ability for improved analysis to inform programmatic response choices.

Food security and nutrition responses

Numerous efforts have been made over the past half-decade to improve the range of programmatic response options to address food security and nutrition crises. In comparison with just a few years ago, there are numerous options to choose from today.

Most of these new response options were summarized by Maxwell et al. (2008) and can be classified into three categories: responses that deal specifically with the symptoms of acute food insecurity (and which attempt to prevent malnutrition); those that deal specifically with malnutrition; and livelihoods interventions that attempt to reduce or prevent food insecurity and malnutrition.

Responses that deal with the symptoms of acute food insecurity: While it has been argued that “preventing malnutrition through general or targeted [in-kind] food distributions... is the *sine qua non* aim of nutrition and food security interventions in crisis” (Checchi et al., 2007), increasingly there is a much broader range of interventions than just in-kind food aid to meet people’s short-term food needs. The most obvious change is the much greater use of cash transfers (direct and conditional transfers, vouchers, etc.) instead of, or in addition to, in-kind food aid distribution. Providing cash transfers to acutely food insecure populations not only increases the speed of delivery of aid (cash does not have to be shipped across an ocean), but it also allows affected populations to prioritize actual assistance according to their own needs. For years, it was observed that disaster-affected recipients sold a proportion of food aid, in large part because it was the only form of assistance they got, but they had needs other than just food consumption. However, the evidence is that most of cash transfers are spent on immediate needs (Harvey, 2007).

The second change is greater reliance on local and regional purchase of food aid, which has to some extent offset the heavy reliance on in-kind food aid shipped from donor countries. Despite the revolution in cash-transfer programming, there are times when in-kind food is still the preferred response – particularly when market disruptions or inefficiencies would cause cash transfers to lead to significant local food price inflation. But local and regional purchase of food is generally a more cost-efficient and timely way of getting food to affected populations (Barrett and Maxwell, 2005; GAO, 2009). Whereas a decade ago, local and regional purchase of food aid accounted for only about 13 per cent of total global food aid flows, it was almost half of the total in 2009 (WFP, 2010).

Responses that deal specifically with malnutrition: Until quite recently, treatment of severe acute malnutrition in emergencies was restricted to inpatient management in therapeutic feeding centres or hospital units. This approach could rarely treat all those in need of care and ignored the many barriers to accessing treatment that exist for poor people in the developing world (see Chapter 2 and Collins, 2001). As a result, such programmes were associated with poor coverage, late presentation of individuals with severe malnutrition and little overall impact on mortality.

New approaches, now known as community-based management of severe acute malnutrition (CMAM), focus on improving coverage and on finding and treating SAM early in the progression of the condition. To achieve this, treatment services are located close to where the target population lives and, where possible, provided as outpatient

treatment in the form of ready-to-use therapeutic food (see Chapter 2). Good-quality programmes also ensure that target communities understand the services available to them and participate in the design and implementation of programmes.

Evidence published since 2000 has shown that, by reducing barriers to access and supporting earlier presentation, large numbers of children with severe acute malnutrition (often more than 85 per cent of all cases) can be treated successfully as outpatients without ever being admitted to inpatient units (Collins et al., 2006). By 2007, CMAM had been formally ratified by the international community as the most appropriate strategy for the treatment of SAM in emergencies and beyond (WHO et al., 2007). This relatively rapid change in practice and policy in emergencies (see Box 5.3) has led the way for the same change in longer-term programming and the CMAM intervention is now being integrated into the national policy and guidelines of many countries (Ethiopia, Nigeria and Pakistan are just three examples) with a high burden of acute malnutrition.

Box 5.3 Changing policy on the treatment of severe acute malnutrition

From 1999 to 2000, Ethiopia once again suffered a wide-scale humanitarian crisis. After three consecutive years of drought, rates of acute malnutrition in many regions in the country rose and exceeded emergency thresholds. In one of these regions, Concern Worldwide, an Irish NGO, established a network of decentralized supplementary feeding programmes in order to treat the large numbers of children who needed care.

It soon became obvious that many of these children were suffering from severe acute malnutrition and needed more than the ration of fortified flour being provided. Despite the one district hospital's limited capacity to care for these children and considerable opposition from local administration to setting up new 'therapeutic feeding centres' run in parallel, the first community-based therapeutic care programme was implemented. All the children with severe acute malnutrition were given a ration

of ready-to-use therapeutic food as a take-home treatment. The programme was carefully monitored and the results – very high recovery rates and low mortality rates – surprised the international nutrition community which had assumed the only place to treat severe acute malnutrition successfully during emergencies was in inpatient centres.

The programme's success encouraged Concern and other agencies to replicate the approach in other countries where crisis dictated the need for an innovative programme to address very high levels of SAM among large numbers of children. From south Sudan to Darfur and Malawi to Ethiopia, results from similar programmes were documented. Such reports became an important mechanism for demonstrating effectiveness.

Wide and timely dissemination of results through international research meetings, UN and INGO presentations plus a variety of

peer-reviewed and practitioner journals encouraged ongoing debate and opinion on the approach. Other organizations were encouraged to adopt the treatment model when they were ready and thus to add to the effectiveness data available. It took six years from establishing the first community therapeutic care programme in Ethiopia in September 2000 to the release of the UN joint statement supporting CMAM at the beginning of 2007 – rapid progress for international policy change. It was achieved by exploiting the opportunities for innovation presented by crisis, without the need for expensive and complicated research designs such as randomized control trials.

This significant change in treating SAM has meant the difference between life and death for children like 9-month-old Shoma, living in a chronically vulnerable, cyclone-affected area of southern Bangladesh. After a long episode of diarrhoea, Shoma became very thin but her parents could not afford to seek treatment for

her at the district hospital. Also, local people felt the hospital provided poor-quality care. Her mother preferred to use traditional medicine – amulets thought to provide protection from infection and ward off evil spirits. Shoma's luck changed for the better with the arrival of a CMAM programme, supported by the Bangladeshi Institute of Public Health Nutrition and based on results from African programmes.

After seven weeks, she had gained 2kg in weight and is today a healthy little girl. The community health worker who treated her feels empowered by the effects of the programme: "I am very happy to have this programme. We can treat the SAM children. Before this we had no idea. We used to go to the health assistant but he also had no proper idea. We all thought it was a strange disease. No knowledge. No prevention. No treatment. Now we prevent SAM and now we treat SAM" (interview with a community health worker, Burhanaddin, Bangladesh, October 2010).

Therapeutic care of severe acute malnutrition is often essential to save lives in emergencies. But many contemporary crises have been going on for years. There is now a realization, particularly in protracted crises, that more attention to treating less severe cases of malnutrition, addressing micronutrient deficiency diseases and preventing undernutrition is key to reducing mortality risks. Here the record of success is less well documented, but it is the focus of much of the debate and attention of the 'nutrition in emergencies' sector today.

Supplementary feeding programmes, which typically deliver a dry take-home ration of fortified blended flour, oil and sugar to nutritionally vulnerable groups, have been a standard response strategy in nutritional crises since the 1970s. Yet doubts about their impact have been raised repeatedly for more than 25 years. Much of the attention today focuses on the effectiveness of the food supplement itself, with some recent studies and programmes suggesting that the use of new, ready-to-use, therapeutic food-like commodities might improve recovery rates in these programmes (Matilsky et al., 2009). These 'new' foods (often broadly referred to as 'ready-to-use foods') have now crossed over into the realm of 'prevention' of malnutrition (a much debated issue that is covered in Chapter 2) and into interventions that aim specifically to control micronutrient deficiency diseases, such as vitamin B deficiencies and vitamin C deficiency which are of particular risk in populations affected by emergencies.

Recently, the replacement or ‘enhancement’ of nutrients has also gained prominence in the food aid arena as donors and agencies have acknowledged the importance of not simply delivering food, but supplying foods that can explicitly contribute to a nutrition agenda (Food Aid Quality Review, 2011). The prevention of micronutrient deficiencies and their control in crisis is of special concern to international agencies such as WFP. They have signed up to policy and standards that specifically state the need to ensure access to all the nutrients (not just energy) required for health. Again, the use of the new ‘ready-to-use’ foods seems to be rising up the agenda – for example, it has recently been suggested that a small dose of one of these foods be added to the general ration food basket to help meet the nutritional (particularly micronutrient) requirements of vulnerable groups such as young children (Chaparro and Dewey, 2010).

But it is important that these ‘technologized’ solutions remain one tool among many in the ‘toolbox’ of interventions and strategies for addressing malnutrition in crisis. Other commodities (such as improved fortified blended flours and nutrient-dense foods) and alternative programme designs (such as the cash and vouchers described above) will remain valid choices where the context is right and the evidence says that they work. In addition, the use of such foods should not override all the important work to date on the causal analysis of malnutrition – i.e., that the health environment (to treat and prevent disease) and caring practice (such as infant feeding) are equally important to ensure that malnutrition in crisis is addressed.

While it was the development of ready-to-use therapeutic food that made the safe treatment of severely malnourished patients at home feasible, it is the design of CMAM programmes more generally, i.e., *how* populations are supported to access the right care and treatment, which ultimately ensures programme success. This is an important issue to keep in mind as we debate new approaches and design new interventions for tackling undernutrition in crisis and beyond.

Responses that deal with supporting underlying livelihoods: There is now a broader perspective on food security and nutrition responses that takes into much greater account support to livelihoods, rather than a narrower focus only on direct food assistance or feeding programmes. Cash transfers not only support direct consumption, they can also be a source of livelihood support, depending on objectives and usage. Food transfers can support people’s livelihoods by freeing up household resources for other uses and by protecting against the distress sales of assets.

Programmes aimed at bolstering agricultural production to support food security in crises have long been incorporated into humanitarian response (Longley et al., 2006). WFP’s Purchase for Progress programme procures food aid locally, which supports smallholder production and marketing. Tools have recently been developed for market responses to food insecurity (Albu, 2010), for livestock-specific responses (LEGS,

2010) and for approaches based on microfinance services that are broadly applicable across different livelihood systems.

Of perhaps greater importance is understanding the way in which livelihood systems themselves are adapting to deal with the changing nature of crisis – in other words, not the international institutional response to food insecurity, but the complex series of local adaptation to changing risks and changing opportunities. Once captured by the notion of ‘coping strategies’, this agenda is now much more about understanding the nature of livelihood change over time and particularly about what can be done to support changes that make at-risk populations more resilient and better able to manage multiple hazards without undermining their own natural resource base or livelihood system. Much of this falls under the rubric of disaster risk reduction and adaptation to climate change (Thomalla et al., 2006), but there are similar efforts to strengthen livelihood resilience in conflict situations (Alinovi et al., 2008).

The impact of programmes

Impact has to be measured at several levels: firstly, the way in which these changes in response have manifested themselves in terms of the allocation of resources and, secondly, their impact on reducing food insecurity and malnutrition on the ground. There are isolated cases where this has been widely documented and has led to reallocation

Somali pastoralists at a water point near Wajid.

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of resources and policy change (CMAM being the obvious example here), but surprisingly little of this has been aggregated to tell an overall story.

Roughly three-quarters of all food aid is now for humanitarian response. But tracking the aggregate budgets for these other categories of response is difficult. The 2010 CAP (Consolidated Appeals Process) appeal summarizes totals by sector or cluster at the country level, but the clusters are not the same across countries. Globally, cash transfers and livelihoods responses are not accounted in the same way that food aid is. Cash responses made up only a small, but growing, proportion of WFP's total 2009 programme expenditure (WFP, 2010). Other agencies have been emphasizing cash responses as well. While cash transfers have received the attention, it is not clear that this mode of programming has come to represent an equally large share of the response. Livelihoods and multi-sectoral programmes constitute a larger share of budgets today than five years ago, but are equally difficult to track across different responses in different countries. In aggregate budgets by agency, WFP still dominates the CAP appeal – with more than one-third of the total being devoted to WFP's budget. However, as noted, this is no longer exclusively food aid; and more than half of the food aid budget is in the form of cash for local and regional purchase.

Major effort has gone into impact assessment of food security and nutrition interventions on the ground. Many tools have been developed to assess impact – the Sphere Project's 'key indicators' and the 'Household Hunger Scale', recently developed by the Food and Nutrition Technical Assistance project and USAID, are two examples of this. There is considerable evidence that, at the project level, more and more programmes are being evaluated. However, according to a paper in *The Lancet*, "There is little published information on the effect of humanitarian response on nutrition outcomes or, more specifically, on the effect of nutrition interventions in emergencies" (Morris et al., 2008). Likewise, despite improvements in monitoring and evaluation, there has yet to be a sector-wide review of the impact of programmes.

Instead, overall impact has to be found in figures on changes in the overall prevalence of malnutrition or overall numbers of the food insecure. However, these numbers often paint a mixed picture, even in the short term. Mortality has clearly declined in most crises (though the Democratic Republic of the Congo is one major crisis that defies this trend). But beyond this, the number of people caught in protracted crises is increasing; this means that gains in controlling acute food insecurity and wasting in crises are probably not being matched with longer-term gains. This is a matter that requires significantly more investigation, but goes beyond the effectiveness of food assistance or nutrition programmes and touches on issues of governance, rights abuses and continuing conflict.

Additional data requirements for assessing food security and nutrition interventions relate to cost-effectiveness. Again, according to Morris et al. (2008), "What is often

lacking is a clear analysis of the cost-effectiveness of different interventions to enable recommendations to be made on the optimum ration composition, targeting and exit criteria, and the appropriate mix of complementary activities to improve health and nutrition outcomes." The high price tag linked to the use of the new ready-to-use foods has helped to push the neglected issue of cost-effectiveness almost to the top of the international nutrition agenda (Webb, 2010).

Constraints and opportunities

A number of factors either constrain or enable further improvements in addressing food insecurity and malnutrition in crises. This includes changed donor practices, coordination and accountability mechanisms, information constraints and changes in the operating contexts.

Donor practices in food security response: Since the mid-2000s, several donor practices have come up for review. A major reform came about when many donor countries untied their entire contribution of assistance in food aid from source markets within their countries. This enabled much greater use of local and regional purchase. Others, including the United States – the largest single donor – have untied aid only to a limited extent, but nevertheless now have some experience with cash transfers and local purchase of food aid to draw from in future operations. Real-time evaluations to learn from ongoing programmes are increasingly a practice of donors and implementing agencies. A recent review of the United Kingdom's Department for International Development programmes stresses greater preparedness and anticipation of crises, increased innovation and accountability and, above all, more capable leadership in humanitarian organizations – certainly all important elements of response to food security crises as well (DFID, 2011).

Other practices have been less positive. Contracting processes and compliance issues have become increasingly complex. The time required to comply with donor regulations regarding both security concerns and demands for greater financial accountability to taxpayers has come to constitute a significant constraint on learning from or even just implementing programmes (Natsios, 2010). While this affects much of aid programming generally, it is particularly a problem where rapid responses are concerned. Anecdotally, one NGO country director recently recounted having to go back over five years of personnel records to account for staff time allocations to different donors – during a major food security crisis and response that was being funded by the same donors (interview, July 2009).

The decade of the 2000s saw the increasing 'securitization of aid' – meaning that assistance was explicitly tied to donor objectives related to political and security criteria in addition to, or even instead of, hunger and poverty criteria or objectives. National governments have also become more adept at manipulating aid to serve political ends. In

practice, this trend is broader than just food security and malnutrition programming and has been evident for some time. But several recent official policy statements have made it more explicit. How much this has undermined the ability to provide for impartial humanitarian responses is not clear, but it is a significant factor in counter-insurgency conflicts such as Afghanistan and Darfur, and it has effectively shut most food assistance out of the most severely affected areas of south-central Somalia (see Box 5.1).

Coordination and accountability: The end of the 1990s saw a professionalization of humanitarian action marked primarily by the launch of the IFRC- and NGO-led Sphere Project's *Humanitarian Charter and Minimum Standards in Disaster Relief* (Sphere Project, 2011). This important inter-agency initiative mobilized the international community to develop a set of minimum standards and related key indicators for different sectors including food security, nutrition and food aid. The cornerstone of the project is the Humanitarian Charter, which, based on the principles and provisions of international humanitarian law, reasserts the rights of emergency-affected populations to life with dignity.

The resulting consensus benchmarks for assessing the need for action in each technical sector and for measuring effectiveness of action thus established a mechanism for better transparency and accountability. As a result, 'results-based monitoring' is increasingly reflected in donor and agency policies and guidelines. Efforts to improve accountability have been the hallmark of humanitarian programming of nearly every sector, including accountability to donors, but especially to recipients. This accountability and commitment to nutrition and food security is also reflected in important agency policy such as UNICEF's recently revised *Core Commitments for Children in Humanitarian Action* (UNICEF, 2010) which refers to their commitment to facilitate coordination mechanisms, rapid assessments, the provision of vitamin A, improved infant and young child feeding and treatment for severe acute malnutrition. Similarly, WFP has reaffirmed the role of nutrition within their food assistance responses, including fortifying food to address micronutrient deficiencies.

Although discussion around the need for improved coordination and more harmonized humanitarian action on the ground also began in the 1990s, it was not until 2005 that a new impetus for humanitarian reform was put in motion. A high-level humanitarian response review was initiated to better understand the response capabilities of the UN, the Red Cross Red Crescent Movement, the International Organization for Migration and NGOs. The review's report recommended further strengthening operational coordination, increasing predictability in the level and effective disbursement of needed resources, and strengthening needs and impact assessments (UN, 2005). Importantly, it also argued that "the information presented on... nutrition... reveals an unclear mix of capacity and a lack of clearly defined approaches to the utilization of the established service resources. This translates into shortfalls in the provision of assistance and the treatment of the sector, in primarily responsive terms, on the part of the smaller agencies."

This report underpinned the creation in 2005 of a nutrition cluster (at global or national level, as appropriate) aimed at improving "the predictability, timeliness, and effectiveness of the comprehensive nutrition response to humanitarian crises". Led by UNICEF, the nutrition cluster is meant to consolidate and strengthen the emergency nutrition sector. For example, it has undertaken activities aimed at improving nutritional assessment and in-country coordination, improving timeliness and deployment of skilled professionals, merging guidelines and supporting a longer-term approach to capacity development. A review of the early accomplishments of the nutrition cluster reported some positive gains in these areas (Save the Children, 2007). More recent examples, such as the well-coordinated response to issues of infant and young child feeding immediately after the earthquake in Haiti in 2010, are seen largely as a success of the nutrition cluster mechanism. There remains, however, a huge amount of work to be done. As one example, the promotion of professional leadership and the building of national capacity for nutrition in countries commonly affected by crisis is still at an early stage.

In 2010 a new global food security cluster was launched. Previously, there were national teams in some countries that functionally played the role of a food security cluster. However, these had very mixed mandates (some on food and nutrition, some on food and agriculture, some on livelihoods, etc.) and were led by different agencies and mandates. The global food security cluster functions at a technical level. At a more political level, the Committee on Food Security has recently been reformulated and strengthened. One of its first areas of investigation was protracted crises and consideration of food security response in such crises – some of which have now lasted 30 years or longer (FAO and WFP, 2010).

Short-term responses in long-term, protracted crises: Protracted crises are defined in terms of both duration and magnitude – some have lasted as long as 30 years and are characterized by extreme levels of food insecurity. They are caused by multiple factors including conflict, but also climatic, environmental, economic or governance factors – indeed, they often occur in 'fragile states', where governance (or more specifically its absence) is a constraint to both prevention and response.

In terms of food security outcomes, FAO and WFP (2010) report 22 countries in protracted crisis in 2010, with a combined population of some 450 million people. Of this, 160 million were undernourished in 2005–2007 or almost one-sixth of the total global number of food insecure people. Further research has shown that the longer the crisis, the worse the prevalence of food insecurity (FAO and WFP, 2010).

While some of these crises attract considerable funding, donors are often reluctant to make significant investments in recovery. Private sector actors are also reluctant to invest or are limited to informal or illegal economic activities. Response in protracted crises often falls to humanitarian agencies. But the constraints to working in protracted crises can be significant. Much of the international apparatus for food security and

nutrition response in crisis is predicated on the assumption that crises are acute and short-lived. Significant changes in the architecture of response will be required for working in – and overcoming – protracted crises in the future. Institutionally, donor funding and the capacities of many NGOs are divided between ‘development’ and ‘emergency response’. Greater attention is being paid to activities (such as capacity building, which aims to move towards prevention and preparedness) that are now the focus of international response mechanisms. But funding remains scarce. Resources allocated to activities including risk reduction and mitigation, transition and recovery, and particularly social protection in protracted crises are often only a tiny part of the total (Development Initiatives, 2010).

Programmatically, the ‘relief-to-development continuum’ has been dropped as an analytical tool, but often remains the programmatic framework. This tends to split programmatic responses and to conflate ‘relief’ with a short-term emphasis on addressing symptoms and ‘development’ with a long-term emphasis on addressing causes. There is also little agreement on operating principles in protracted crises – humanitarian agencies are often the most actively present on the ground, but are at times forced to work outside accepted humanitarian principles (Maxwell et al., forthcoming).

Summary: the way forward

Although fewer people are dying in crises as a result of food insecurity and malnutrition, the responses of humanitarian emergencies have not improved as much as might be expected. A full assessment of progress is overdue for the sector as a whole.

The lack of progress towards more equitable development and more sustainable livelihoods for the most vulnerable groups is the big obstacle to overcome. Since the 2009 G8 summit in Italy, there has been a growing consensus on the need to significantly increase international assistance to address hunger and food security issues globally – reflected in the G20 meetings in 2010, for example. This is a much-welcomed response to a problem that has been largely neglected for a number of years. But while there is mention of ongoing food security crises, the main objective of recent initiatives, such as the US Feed the Future programme, is on agricultural technology and marketing to address production constraints and improve food availability. While a comprehensive strategy for addressing hunger has to take into account the issues of production and food availability, it also must address the short-term (and, increasingly, longer-term) crises of food access.

So far, these two goals of an overarching strategy to reduce food insecurity and malnutrition still seem to be separated by a deep gulf. Of 22 countries noted by FAO and WFP in 2010 as being in protracted crisis, only six are on the list of countries (20 in total) targeted by the Feed the Future programme – the US’s flagship food security and agriculture initiative. The implication is that, for the time being at least, humanitarian

aid or other short-term forms of assistance will have to suffice as the major response to food insecurity in countries in protracted crisis. Until governments, donors, humanitarian agencies and civil society agree to link humanitarian response in crises to the efforts to address the more underlying technological, environmental and institutional constraints to sustainable food security – and financial commitment is secured to make this work – food insecurity and malnutrition in crises are likely to remain a problem. Developing this consensus – and creating the appropriate strategy to address both the symptoms and the causes of food insecurity – remains a pressing challenge.

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Getting it right – united against hunger: a manifesto for change

What policies and partnerships are needed from governments, donors and global institutions to strengthen the world food system and eradicate hunger and malnutrition? At the outset, a key issue is to involve marginalized people, especially small farmers, in shaping policies. Too much decision-making aimed at eradicating hunger and malnutrition is simply top-down. As a result, agricultural development often focuses narrowly on increasing productivity rather than on the broader food and nutritional security of people.

Aid donors from high-income countries are often little better than low- and middle-income country governments in their policies on aid provision; many aid projects ensure greater accountability to the donor than to actual beneficiaries. Yet such aid is critical – it amounts to one-third to one-half of the agricultural budgets of many of the poorest countries, and thus has a huge influence on those countries' government policies. A 2008 report by the Global Donor Platform for Rural Development states bluntly that “farmers and rural communities have been largely excluded from agricultural policy processes” such as donor joint assistance strategies and sector-wide approaches (which bring together governments and donors in promoting an agricultural sector strategy). Governments, donors and global institutions need to stop paying lip service to peoples' participation and actually promote it instead. Agriculture policy-making needs to be a genuinely multi-stakeholder, and transparent, process.

What should low- and middle-income country governments do?

Invest more in agriculture and social protection

First, most countries need to spend much more on both agriculture and social protection. As noted in Chapter 4, despite African governments' commitment in 2003 to allocate 10 per cent of their national budgets to agriculture, fewer than 10 out of 53 are doing so. At the same time, inadequate government policies have resulted in only 20 per cent of the world's population having access to formal social protection (FAO, 2010).

Many policy-makers need reminding (tragically) that not only is ending hunger a moral imperative, but investing in agriculture and social protection also makes good economic sense. Of the seven African countries that spent more than 10 per cent of their budgets on agriculture during 2004–2007, all achieved reductions in the proportion of hungry people over the previous decade; for example, in Ethiopia, the

Photo opposite page: In 2009, the number of hungry people in the world exceeded 1 billion – one-sixth of humanity – for the first time in history. Activists from La Via Campesina took part in a demonstration outside the Rome headquarters of the UN's Food and Agriculture Organization during the World Food Summit.

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proportion dropped from 63 to 46 per cent and, in Malawi, from 45 to 29 per cent. Conversely, of the 18 countries spending less than 5 per cent, seven saw *increases* in the proportion of the population that is undernourished, while seven saw reductions (one experienced no change, while hunger figures are not available for the other three). What hinders sufficient investment is not so much lack of financial resources as the absence of political will. Policy-makers at all levels need to be pushed or encouraged to invest adequately in programmes to combat hunger (see Box 6.1).

Box 6.1 National Societies' work to improve food security

Food security is a key issue for Red Cross and Red Crescent National Societies in many parts of the world. The Red Cross Red Crescent's food security activities are related to vulnerability reduction, disaster response and recovery, and risk reduction is central to these activities.

Across Africa, a large number of National Societies are engaged in initiatives to improve food insecurity. Around half of the sub-Saharan African National Societies have so far implemented food security programmes, designed to improve the availability, access and utilization of food in communities.

In 2009 and 2010, small-, medium- and large-scale food security programmes and projects with a focus on building resilience were implemented by National Societies in 18 African countries.

Ethiopia is one of the poorest countries in the world. Each year, on average, more than 10 million people – out of a population of almost 83 million – have problems in getting enough food for themselves and their families. In Tigray, the country's northern-most state, the Ethiopian Red Cross Society, in cooperation with the IFRC and the Swedish Red Cross, has set up a programme to enhance the food security of 2,259 vulnerable households, with a focus on improving alternative agricultural production and reducing vulnerability in the four years from 2009 to 2012.

The programme's activities include supplying funding and technical training in, for example, dairy farming, cattle-fattening and bee-keeping. After training, people can join a saving and credit scheme and are given some money to purchase livestock, for example. Amina Haji, a divorced woman with five children, is a beneficiary of the project. The Red Cross trained her to manage cattle-fattening, the feeding and marketing of animals. She has also benefited from becoming a member of the project's saving and credit cooperative. She has found that cattle-fattening is a "profitable activity" and her annual income has almost doubled. The result: she saves money on a monthly basis, sends all of her school-age children to school and is able to feed her family three times a day. "Being a beneficiary of the project has changed my life completely," she says.

The Malawi Red Cross Society is implementing an integrated food security project in a number of villages, with funding from the Finnish Red Cross. A group of ten farmers have benefited from the sales of their surplus crops. Originally the group did not produce enough crops to meet their food needs but, with technical assistance from the Red Cross food security officer and agricultural extension officers, they were able to make major improvements. These included irrigating a large area of land, using the seeds and tread pumps they were given.

They have managed to achieve bumper yields. "Irrigation farming has really helped me and my family, I am now able to feed them three meals a day," says Jenipher Frank, one of the farmers.

National Society food security activities often combine providing food following an emergency with programmes to build communities' capacity and promote long-term food security through, for example, financial and technical support to farmers. In March 2010, the Qatar Red Crescent Society and the Islamic Development Bank signed an agreement with the government of Niger to provide emergency aid to victims of the food crisis following a year of shortfall in agricultural products and animal fodder. Grain was distributed to the most vulnerable households (some 115,000 people) and, in June 2010, food baskets were given to people affected by the floods in the capital Niamey. The project also provides seeds, agricultural equipment, pesticides, fertilizers and structural support such as pumps and irrigation systems to 100 vulnerable farmers.

There is also a nutrition component to the programme. Following the severe drought in 2005–2006, the Niger Red Cross and Qatar Red Crescent set up two therapeutic feeding centres and 31 supplementary feeding centres. They provide supplementary food items and healthcare services to malnourished children and pregnant and lactating mothers, and have trained Niger Red Cross volunteers in running nutrition and malaria programmes. The French Red Cross also provides support in three regions of the country.

Through its integrated primary healthcare programmes, the Somali Red Crescent Society aims to promote growth and prevent acute malnutrition among infants and young children. It does this through providing children aged between six and 36 months with Plumpy'nut doses (ready-to-use therapeutic food); treating children

with severe malnutrition; providing supplementary feeding to children and mothers; and promoting breastfeeding. Staff and volunteers are trained in providing these programmes and promoting good nutrition practices.

But it is not only in Africa where National Societies are promoting food security. Small-scale food security programmes are operating in six countries in the Americas (Bolivia, El Salvador, Guatemala, Honduras, Nicaragua and Paraguay) where high rates of poverty have caused hunger and severe malnutrition among the populations. Currently the IFRC's Americas office is developing a food security and livelihoods strategic plan to further explore possibilities of scaling up National Society programming efforts.

And in Jamaica, the Jamaica Red Cross 'meals-on-wheels' project, which was established in the early 1950s, continues to provide a valuable service, mainly for elderly and infirm people but also for others made vulnerable by the effects of the global recession. Red Cross branches across the island have developed some version of the feeding programme, providing meals or groceries. Many of the beneficiaries say they would not be alive today without the daily meal they receive. A nurse at a care home for elderly people said the meals are "definitely a benefit because we need so much help to make sure the residents receive all the nutrients they need each day."

Food insecurity is not unknown in the richer world. It is estimated that some 43 million people in the European Union (EU) – or about 9 per cent of the whole population – are at risk of food poverty (EU website). A number of European National Societies, through their thousands of volunteers and with the support of the EU, are involved in providing food aid, notably in Belgium, Bulgaria, Estonia, France, Latvia, Lithuania, Romania and Slovenia, to around 1–2 million people.

Globally, the world needs to find more financial resources – Oxfam estimates that an annual increase of US\$ 75 billion is needed to invest in agriculture and social protection to achieve the Millennium Development Goal (MDG) target of halving hunger (Oxfam, 2010). Save the Children says that the costs of a package to address undernutrition for the eight countries where half the world's malnourished children live comes to just US\$ 8.8 billion (Save the Children, 2009). A 2008 meeting convened by the African Union recommended that states commit to spending at least 2 per cent of their gross domestic product (GDP) on social protection (FAO, 2010).

All governments should commit to developing well-costed, national action plans to address hunger and undernutrition. Yet many governments still need to commit to even promoting social protection programmes, which is especially vital in the 20 countries of the world where 80 per cent of stunted children live. It is often forgotten that social protection is a right enshrined in the Universal Declaration of Human Rights.

Countries that have successfully reduced hunger have tended to do so by combining the promotion of equitable economic growth with social protection schemes (see Chapter 4). There are about 20 social protection programmes operating around the world that attach conditions (such as attending health centres or schools) to those people receiving support, and many others that are unconditional. Employment guarantee schemes can also be successful. India's Mahatma Gandhi National Rural Employment Guarantee programme, which was passed into law in 2005 and guarantees 100 days' work to each rural household, was the first national social security legislation explicitly to protect the legal entitlement to work. Although the programme is not without its problems, by 2009–2010 it was providing work to one-third of India's rural population, half of whom belong to the most impoverished communities such as Scheduled Castes and Scheduled Tribes (IFSN, 2011).

Gradually, more and more countries are realizing that social protection is not so much a cost as an investment – not only in peoples' welfare but also in economic growth and reducing the likelihood of social conflict – and that it tends to be cost-effective. The annual budget for India's employment guarantee scheme of around US\$ 9 billion represents less than 0.75 per cent of GDP and 4 per cent of the 2009–2010 national budget, even though it covers the whole country. Brazil's Zero Hunger programme, which has strikingly reduced hunger levels, amounts to just 1 per cent of the national budget.

Governments need to learn the lessons from other countries' programmes. Social protection tends to be successful when governments demonstrate strong political will for them to succeed, often after civil society groups exert pressure on them to introduce and sustain those programmes – and even more when such groups participate in them, as in Brazil.

Decentralized implementation, and democracy, can also be important. India's experience is that a functional democracy helps ensure that legal entitlements, which might

only exist on paper, translate into actual employment guarantees. The technical details of programmes are also crucial, either to better target beneficiaries and/or to ensure programmes are implemented with few delays and bureaucracy (common problems in such schemes). Further evidence suggests that cash transfer programmes work best when such transfers are guaranteed, predictable and regular, thus performing an effective insurance function.

It is important to recognize the limits to social protection programmes. By themselves, few are magic bullets to ending hunger and they must be complemented by broader policy changes. In Brazil, for example, truly eradicating hunger requires reducing the country's vast inequalities in income distribution and land ownership that successive governments have repeatedly refused to address seriously.

In Malawi, the government's inputs subsidy programme has massively boosted food production. Yet unequal land tenure remains unaddressed while farmers may be building a dependence on chemical fertilizers in the absence of good extension or credit services that would help them in the long term. Corruption and weak local governance, which stalk many social protection programmes and hinder their effectiveness, must also be addressed (IFSN, 2011).

Various debates prevail on social protection, such as whether programmes should be universal or targeted (and, if so, at whom – the poorest or the slightly less poor?), whether food aid should be in the form of cash or kind (and whether sourced locally or imported) and whether programmes should be conditional or unconditional. Recent evidence suggests that targeted programmes tend to perform better than untargeted subsidies. It also shows that who is targeted is critical; many public health subsidy programmes, for example, end up benefiting the relatively well-off and are biased towards inpatient hospital care (Sabates-Wheeler et al., 2009).

Moving from food aid to locally sourced food and cash

As regards food aid, evidence is strong that locally sourced food creates positive ripple effects in the local economy whereas imported food can undermine local producers. Cash transfers are likely to have more positive multiplier effects than food aid. The money received is spent on purchasing goods and services which, in turn, creates employment and income for the providers of those services. The evidence on conditionality is more mixed, but there are strong arguments that compulsory attendance at health facilities, for example, should be avoided in low-income countries where the supply of services is often weak and where evidence proving the beneficial impact of imposing such conditions is absent (Save the Children, 2009).

When it comes to nutrition, cash transfers should aim to reach children early, prioritizing children under the age of 5 and pregnant women in the form of child and maternity benefit. A major problem is lack of basic information about hunger. Governments

need to ensure that families receive good education about nutrition, including on how to prepare food and feed their families safely. Indeed, such nutrition messages need to be incorporated into agriculture policy since increasing food production by itself does not guarantee adequate family nutrition.

Farmers need cheap loans to invest in future production, savings to respond to external shocks and, ideally, access to insurance services. Yet if there is a credit crunch in high-income nations, there exists a full-blown credit crisis in rural areas of low- and middle-income countries. Under pressure from donors over the past two decades, many governments have largely withdrawn from providing or underwriting financial services, seeing the private sector as the legitimate actor or relying on often patchy micro-finance initiatives. Yet private banks tend to regard small farmers as too risky and make few loans to agriculture.

The same governments that say they are promoting 'farming as a business' deny farmers access to capital to extend their businesses, thus locking them into a poverty trap. Governments need to revisit the notion that credit is simply a 'private good' to be supplied by the private sector; they should increase their support for loan guarantee schemes, subsidized credit or the provision of capital for banks with a government shareholding.

Reforming agricultural policy and institutions

Often, simply increasing resources is not sufficient and this is particularly true in agricultural policy. Ministries of agriculture are sometimes so inefficient that increased funds can easily go to waste or are just not spent. In Uganda, for example, around one-third of the agriculture budget is left unspent every year. In other countries, so much of the budget is allocated to salaries that little money remains for capital or investment projects. Institutional reform is vital, especially to engender a more results-oriented (rather than outputs-oriented) culture among officials, to empower marginalized women officials and gender units and – returning to the issue highlighted at the outset – to set up processes that entail really listening to farmers in shaping policies.

Corruption is also a major problem in agriculture spending; the author's research suggests that up to one-third of agriculture budgets simply go missing in some countries.

Box 6.2 Monitoring with new technology

A nutrition information system (NIS) is devoted to the continuous monitoring of a nutritional situation, to early warning or to programme management. One system can support all

three. The system is designed to use different sources of information such as nutrition surveys, sentinel sites or feeding or health centre databases.

Nutrition information systems are built as chains through which information is transferred. At one end of the chain, field workers collect the relevant data in their village or in the health or feeding centre they are supervising. They then analyse the data to make decisions about their own programme. At the other end, decision-makers analyse the data provided and adjust their decisions accordingly, often on a larger scale.

Data can inform programmatic decisions such as whether to increase or reduce the amounts of therapeutic nutritional supplies required for feeding centres or whether to adjust the support to infants in vulnerable areas. An NIS can inform the analysis of global trends of the various forms of malnutrition, allowing for an expanded response where necessary and highlighting possible preventive steps. In the case of early warning, if the system integrates food security information, it will support the timely identification of a crisis and therefore allow for a rapid response to be provided to the population in danger.

In all cases, information systems require the same set of core features: data should be of good quality, easily collected and accessed in a timely fashion.

Strong capacity building at the level of local teams ensures the quality of data. Rapid staff turnover and overly complex questionnaires can cause inconsistency in the quality of the data collected. Once an NIS is in place, it is always tempting to add additional questions, thereby lengthening the questionnaire, adding to data collection time and often adversely affecting quality.

The issue of time is closely linked to that of access. In many cases, data may be collected on the ground but never reach the other end of the information chain. Between the field worker writing answers on a clipboard

and the information manager receiving the reports in the capital city (sometimes hundreds of kilometres away), there are typically various intermediate steps. Whether they are logistic (transport of the questionnaires or reports) or supervisory (local office to district, province, etc.), at each step there is a risk that data are lost or stay on someone's desk. In consequence, the information system ends up providing a late and incomplete picture of the nutritional situation of the targeted area. Decision-making processes are thus also delayed. The risks of taking the wrong decision increase proportionally with the quantity of data lost on the way through the information chain.

Things are changing, however, thanks to the development of information technologies. Most malnourished children live in low- and middle-income countries that are now covered by mobile phone networks. Even the most remote area of these countries quickly gets coverage.

In order to use the benefits of new technology fully, the United Nations Children's Fund (UNICEF) has linked up with entrepreneurs from the private sector, academics, international and national non-governmental organizations (NGOs) and various ministries in several countries to launch a pilot NIS scheme based on the use of SMS (short message service) technology. No more clipboards, no more handwriting and no more chain of information.

The NIS questionnaires, in their most advanced design, are already in mobile phones provided to field workers, who simply need to enter the data required in the right cells. They then send the questionnaires in the form of an SMS directly to a server, usually in the capital city. The server will immediately determine whether the questionnaire or report has been completed properly and send a message to field staff notifying them that the data have

been received and requesting that any mistakes be corrected.

The use of SMS helps improve the quality of the data collected and considerably reduces the time for the data to reach their final destination. Projects are under way in several countries, including Malawi and Uganda, and evaluations to date show that the use of SMS technology for an NIS has great potential.

Depending on the type of information system implemented, data can be collected directly in the communities or in health or nutrition facilities. Data can be as simple as the number of admissions to feeding centres and/or also consist of the age, sex, weight and height of children attending health facilities or randomly selected in communities. Such measures allow for the monitoring of the nutritional situation in the selected areas, as the server automatically calculates the most important indicators of the nutritional status of each child. Field workers also benefit directly from the system as such calculations can be sent

back to them, allowing them to make immediate decisions about the referral of a child to seek health and nutrition care.

The successful use of new technologies offers great hope for the improvement and scaling-up of NIS in many areas where undernutrition is still not as well monitored as it should be. Access to data remains a major challenge in regions known for having the highest number of undernourished children. Global and national figures are often available only at intervals of three-to-five years, but decision-makers and practitioners need detailed data to be available more regularly, preferably at a suitably disaggregated level to reach the most vulnerable children. The main problem is that financial resources are wholly insufficient for NIS, as efforts are mainly geared toward reactive, life-saving activities. In order for life-saving resources to be provided, undernourished children must first be located. Only representative and effective information systems can do this.

Despite a trend over the past decade to decentralize government spending in many countries, excessive agriculture expenditure often still takes place at headquarters – more than 85 per cent in Malawi and Zambia, for example – leaving little to be spent at field level.

Agriculture spending must be refocused towards the services that really matter to the small farmers who constitute half of the world's hungry people. Both governments and donors have failed to invest sufficiently, for example, in extension services and the provision of rural credit. Public extension services have, mainly because of massive underinvestment, virtually collapsed in many countries; it is now common to find less than one in five farming households that has ever seen an extension agent.

Investing in agricultural research

There is a broad consensus around the world that governments should invest more in agricultural research to improve crop varieties that increase yield (among other things). All but forgotten, however, is that the Comprehensive Africa Agriculture Development Programme, established in 2003, committed African countries to *doubling* their annual spending on agricultural research within ten years. Although there are no figures assessing overall progress towards this goal (it appears not even to have been

monitored), country analysis suggests it is simply being ignored. Rather, agriculture research spending is falling as a proportion of agriculture budgets, in countries such as Kenya and Uganda, for example. Numerous studies show that such spending provides good returns. The International Food Policy Research Institute notes that in Kenya, for every million shillings spent on agricultural research, an additional 103 people can be lifted above the poverty line (Thurlow et al., 2007).

Box 6.3 La Via Campesina and food sovereignty

La Via Campesina (LVC) – which means, literally, 'the peasant road' – currently has more than 200 million members in 70 countries across nine regions of Africa, the Americas, Asia and Europe.

From its humble beginnings at the 1992 congress of Nicaraguan National Union of Farmers and Ranchers (UNAG), where its Managua Declaration called for 'economic democracy' (Blokland, 1993), LVC has become a serious actor on the international scene. It regularly engages with the Food and Agriculture Organization of the United Nations (FAO) and the United Nations (UN) Human Rights Council. Its local chapters have helped to mastermind the annual World Social Forum and other global civil society events.

Members of LVC range from subsistence farmers to migrant labourers, from organizations of indigenous peoples to landless peasants, from producer cooperatives, pastoralist or range farming and fishing communities to food-rights and consumer activists. They are united by their own experience that the neoliberal global economy depends on trade rules that protect United States and European Union (EU) agricultural subsidies and agribusiness at the expense of food sovereignty. LVC holds that the interests of corporate shareholders and subsidized agro-industry are inherently incompatible with the universal right to food, the rights of small producers, the capacity of

governments to protect national food sovereignty and the global imperative to preserve the ecosystem and biodiversity as common goods.

At the 1996 World Food Summit, therefore, LVC called for 'food sovereignty' to be at the heart of global governance. In its own words:

"Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems. It develops a model of small-scale sustainable production benefiting communities and their environment. It puts the aspirations, needs and livelihoods of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations.

Food sovereignty prioritises local food production and consumption. It gives a country the right to protect its local producers from cheap imports and to control production. It ensures that the rights to use and manage lands, territories, water, seeds, livestock and biodiversity are in the hands of those who produce food and not of the corporate sector. Therefore the implementation of genuine agrarian reform is one of the top priorities of the farmer's movement" (LVC, 2006).

Addressing the parallel 'Land, Territory and Dignity Forum', LVC general coordinator, Henry Saragih, himself an Indonesian small farmer, underlined that comprehensive agrarian reform is the only way to eradicate hunger and misery in the rural areas:

"...peasant-based food production, artisanal fisheries, pastoralism and the management of natural resources by communities and indigenous people are also severely threatened by the expansion of corporate-based development and the neo-liberal policies of the World Bank, IMF [International Monetary Fund] and WTO [World Trade Organization]. Therefore it is crucial to maintain and strengthen the control by communities over these resources based on the principle of food sovereignty... FAO's mission is to eradicate hunger and poverty in the rural areas. Therefore we expect a strong commitment of FAO on this issue" (LVC, 2006).

Today, the global response to that urgent call for action back in 1996 seems further away and yet more pressing than ever. To take just one example, some 150,000 small farmers in India committed suicide between 1999 and 2009, unable to struggle with the toxic combination of the increased cost of chemical inputs, poor yields, low market prices and rising debt. Many of these farmers died by drinking the now useless pesticides (Paul, 2011).

The vulnerability of farmers and consumers to forces beyond their control is illustrated by the case of southern Mexico, where small producers supply organic, bio-friendly and fair-trade coffee to specialty outlets. But decisions made far away on the international stock exchanges and commodity markets mean that they sometimes sell at below production cost (Pérez-Grovas et al., 2001). Although consumers value their product, such volatility is likely to push some farmers out of business.

Short-sighted policy decisions, unjust trade regimes and poorly regulated corporate interests can ruin local food production, farming communities, dietary habits and cultural traditions that have sustained peoples and ways of life for generations. The figures speak for themselves. In a statement prepared for the March 2011 session of Human Rights Council, the LVC-FIAN (FoodFirst Information and Action Network) spokesperson pointed out that:

- 1 billion people are undernourished worldwide
- 75 per cent of these people are peasant farmers, smallholders, landless and rural workers, who depend mainly on agriculture for their livelihoods, yet lack sufficient access to productive resources
- peasant farmers and rural workers need to be at the very core of efforts to ensure the universal right to food (LVC, 2011).

Drawing the links between hunger and sovereignty, the World Food Programme (WFP) representative in Honduras stated in February 2011: "A country in which 27 per cent of its children suffer chronic malnutrition is not only a problem of development but also of security" (*Honduras Weekly*, 2011).

The coordinator of the Land Research Action Network underlines that small farmers not only produce most of the world's food, but that, contrary to popular myth, they are also efficient. With only 30 per cent of the cultivated area and 25 per cent of farm credit, family farms in Brazil produce 40 per cent of the total national value of production and generate 77 per cent of the nation's agricultural jobs, thus ensuring employment in rural areas (Rosset, 2011).

Food sovereignty depends on equitable access to productive resources. Yet many countries, from Brazil to Bangladesh, have criminalized the struggle for agrarian reform. Challenging powerful interests can be a dangerous matter. Faustino Torres, who works on

the LVC Global Campaign for Agrarian Reform, reports that in 2010 two Guatemalan community leaders, one of them a teacher, were shot dead during a demonstration against foreign companies prospecting on their land, and a Mayan Indian defence lawyer was assassinated (Torres, 2011).

How does the choice get made to privilege luxury export crops over national food sovereignty? How do the resources of land, water and energy that are used, for instance, to supply asparagus and strawberries to the

supermarkets of London or Paris in December affect local food producers in Chile or Mexico? Do Kenyan and Ecuadorean workers in the cut-flower industry enjoy decent and secure employment? When the market collapses, unemployed labourers can perhaps survive for a while on unsold grapes or avocados, but they cannot eat roses.

Food sovereignty is grounded in rights. La Via Campesina believes that only a rights-based approach can address the complex food, poverty and climate crises now confronting humanity.

Respecting the importance of gender

The issue of gender is fundamental, and nothing less than policy transformations are required. Although women constitute most of the hungry and, indeed, in Africa most farmers, you would never guess this by looking at low- and middle-income countries' agricultural budgets or policies, which usually assume that farmers are men. Nowhere in Zambia's agriculture budget – all 5,000 lines of it – are women included as an explicit focus of spending, to give just one example. Donors are little better: women receive just 7 per cent of all aid to agriculture (Oxfam, 2010). Research suggests that if African women farmers had the same control over resources such as land, seed and fertilizer as men, farm productivity could increase by up to 20 per cent (IFAD et al., 2009). Eradicating gender discrimination, therefore, would increase the supply of food on small farms, especially in Africa.

Much (but not all) agricultural policy needs to be different to support women. Governments must consider improving the public financing of childcare services to address the huge amount of time women farmers (and agricultural labourers) spend looking after children. Improved investments in infrastructure are needed to address the long hours women spend collecting water and fuel as well as to increase access to simple labour-saving technologies to improve farm productivity and processing activities. Agricultural research must be refocused on developing improved varieties of the crops grown by women and extension services need to be retargeted specifically to reach women (untargeted services will benefit men). There are also strong reasons to target input subsidy programmes at women farmers.

Investments in nutrition, education and health programmes directed at women can also bring enormous returns in terms of family well-being. Considerable evidence suggests that targeting women in cash transfer programmes produces larger benefits; men

have a higher propensity to spend incremental income on themselves, while women tend to allocate food or cash to their families, especially their children.

Addressing climate change and sustainability

Climate change and sustainable agriculture are further issues to which governments pay much lip service. But the reality is that in most countries, ‘high-input’ agriculture, based on increasing use of chemical fertilizer and pesticides, is still seen as the solution to increasing food production. Similarly with donors – for example, the much-vaunted Alliance for a Green Revolution for Africa, backed by the Bill & Melinda Gates Foundation, the United States Agency for International Development and the United Kingdom’s Department for International Development, represents a new big push to get ever more chemicals to farmers, notably through rural agro-dealer networks.

The author’s experience is that farmers often say they want chemicals, which can certainly increase yields, so any ideological opposition to chemical fertilizer or pesticide would be wrong. Yet, as the report by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) notes, “technologies such as high-yielding crop varieties, agro-chemicals and mechanisation have primarily benefitted the better resourced groups in society and transnational corporations, rather than the most vulnerable ones” (IAASTD, 2008). And to promote high-input farming as the dominant model of agriculture is hugely costly in environmental terms.

Agriculture’s most important contribution to greenhouse gas emissions is through the production and application of nitrogen fertilizers. A major World Bank-sponsored sourcebook states that “the use of agricultural methods that rely heavily on external inputs has caused 38 per cent of agricultural land to be lost to soil erosion and depletion” (IFAD et al., 2009). At the same time, the excessive use of chemical pesticides has often led to water pollution, thousands of farmers being poisoned and beneficial insects – ‘natural’ pesticides – being killed along with pests.

As the UK government-sponsored Foresight Project concludes: “Nothing less is required than a redesign of the whole food system to bring sustainability to the fore” (Foresight Project, 2011). Tackling global warming requires prioritizing ‘low-input’ agriculture, involving techniques such as no-till farming, water harvesting and recycling, organic farming and agro-forestry, which can help avoid land degradation and sustain ecosystems and livelihoods. Ways to reduce emissions in the food system include creating market incentives to reduce reductions through grants, subsidies or carbon taxes and introducing mandatory emissions standards or limits by direct regulation. Most importantly, the big push to use chemicals – backed by a global industry of transnational corporation manufacturers and marketers of fertilizers and pesticides – must be ended.

Most governments still spend very little on addressing climate change. Few have made significant policy shifts towards sustainable agriculture and even fewer have active strategies to promote organic farming. Many farmers do, of course, practise *de facto* low-input farming because they cannot afford expensive external inputs. Yet most need advice and information on improved techniques to maximize yield, which are likely to come from (currently underfunded and often poor-quality) extension services. For farmers already using chemical inputs, the shift to low-input farming may not be an easy one to make. Again, greatly improved extension services are critical to impart new knowledge, while governments also need to ensure that farmers have more secure land tenure, otherwise they will not invest in new techniques that provide dividends over the longer term.

How should aid donors reform?

In recent years, mainly as a result of the food price crisis of 2008, donors have refocused their attention on agriculture after two decades in which the sector was not only massively underfunded but, moreover, undermined by extensive liberalization and privatization policies. These left numerous countries worse off and also marginalized small farmers. The UN Special Rapporteur on the Right to Food noted in 2005, for example, that: “Far from improving food security for the most vulnerable populations, these programmes [i.e., liberalization reforms] have often resulted in a deterioration of food security among the poorest” (Ziegler, 2006).

Sapna Rani Roy serves primary-school children in Lakhichap, Bangladesh. She is a member of a collective of 26 mothers who run the school and take turns to prepare the children’s midday meal. The collective also leases land to cultivate rice.

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Bill & Melinda Gates
Foundation



Most donors have now withdrawn their previous blanket opposition, for example, to input subsidy schemes, stressing instead the need to promote the correct *sequencing* of liberalization reforms. Yet, although donors now recognize the ‘enabling’ role of the state, they still eschew a much greater interventionist role for it. This is despite evidence that where agricultural reforms have led to widespread growth, as in much of Asia during the 1970s and 1980s, such reforms have tended to involve substantial state-led investment not only in infrastructure and research (with which donors would currently agree) but also in extension systems, price stabilization and financial services (which donors continue to largely oppose).

Despite years of lobbying and numerous reports by NGOs on the shortfalls of market-led agriculture policy, and despite some encouraging nuancing of donor policy in recent years, the fundamental belief of donors that the private sector is the key to rural development appears unshakeable. Added to such a belief is the sheer hypocrisy of ongoing massive state intervention by the European Union, the United States and Japan in providing huge domestic agricultural subsidies to their own farmers that keep poorer producers out of global markets.

Numerous other problems remain with donor policies. As the UN’s International Fund for Agricultural Development (IFAD) notes: “The current global aid architecture in general, and the aid effectiveness agenda specifically, have not yet shown great success in the agricultural sector or in reducing poverty” (IFAD, 2011). One reason for this lack of success is that, although joint government–donor ‘aid harmonization’ groups have been established in several countries, agricultural aid is often still poorly coordinated among donors with too many individual projects. In Kenya, for example, donors are funding more than 30 separate agriculture projects, in Zambia more than 60. The Rome Principles for Sustainable Global Food Security, which are designed to ensure developing country leadership, coordination and predictable funding from donors, are far from being implemented in the field. Donors have hardly changed the way they work since the Rome Principles were established in 2009 and many aid agencies remain reluctant to join national and regional plans set by governments (Oxfam, 2010).

Actual donor spending on agriculture and food security has been increasing since 2006 but is often less than trumpeted. At the 2009 G8 meeting in Italy, donors pledged to provide US\$ 22 billion but by late 2010 this had translated into just US\$ 4 billion of new funds (Oxfam, 2010). Oxfam has called on donors to increase spending on agriculture and social protection by US\$ 37.5 billion a year – half the total required amount of US\$ 75 billion (Oxfam, 2010).

More encouraging is that in the past decade, donors have begun to contribute funding to cash transfer social protection programmes that previously were largely anathema to them. However, donor funding for direct nutrition interventions remains low and,

as noted by the updated Comprehensive Framework for Action, is not well targeted towards countries with the highest rates of malnutrition (UN, 2010c).

Some donor-funded social protection programmes have flown in the face of national or community preferences, notably those encouraging private health insurance; these have been unpopular and unfeasible in low-income countries. Donors must ensure their aid is consistent with the Paris Declaration on Aid Effectiveness (OECD, 2005), that it is aligned with country objectives and provides long-term, predictable funding enabling countries to build effective social protection systems. Country ownership and leadership are vital, otherwise there is a danger that aid-funded social protection can make safety nets dependent on the largesse of donors rather than being a right of citizenship.

Corporate power in the food system

Excessive corporate power in the global food system, mentioned in several chapters of this report, is regularly discussed in NGO and academic circles but remains virtually taboo among donors. Past years have witnessed the increasing domination of a small number of very large transnational corporations (TNCs) in agribusiness, food processing and retail. At present, three companies process 40 per cent of the world’s cocoa while six firms account for two-thirds of the world sugar trade. The small-scale growers of those commodities earn a fraction of the retail price, yet some cash-crop farmers are among the world’s hungry people. Supermarkets, which account for over half of retail sales in many countries, usually source from large firms or farms rather than small farmers (although there are exceptions). Small farmers often cannot meet supermarkets’ exacting standards, notably for consistency of supply and volume. At the same time, powerful marketing by TNCs can hinder nutrition by, for example, contributing to lowering breastfeeding rates or by advertising foods contributing to obesity. The dominant role played by agribusiness in the global food system needs to be finally addressed rather than ignored by policy-makers (see Chapter 1 for a fuller discussion).

The private sector could play a positive role in supporting staple food fortification and developing nutrient-rich products that prevent undernutrition and ensure these reach the poorest people. They could also promote affordable, indexed weather insurance and agricultural training – including for women farmers. Companies could do much more to apply fair-trade practices to all their trade with producers in low- and middle-income countries and widen their supply bases to include more small farmers. Improved public–private partnerships – with governments playing a better coordination role – should be developed to bring infrastructure into more remote areas along with improved services such as finance for farmers (see Box 6.4).

But for private companies to play a transformative role in the world food system, a significant policy leap is needed from decision-makers, especially those in TNCs’ home countries – moving from relying on voluntary corporate social responsibility (CSR)

by companies to formally regulating them to work much more in the public interest. Currently, the domestic legal framework in high-income countries makes it rare for companies based there to be held liable for violations of human rights, environmental, labour or other standards committed abroad by their foreign subsidiaries. Stronger legal enforcement mechanisms need to be developed. Equally, companies need to be obliged under the law to ensure that actors in their supply chains – even those not formally part of the company group – promote human rights, environmental and other standards.

As noted elsewhere in this report, a new approach to food security is needed that emphasizes local control of food systems, building on the knowledge of the world's main food providers – small farmers – and that defends and enhances their production systems and the environment in which they work.

Global and national policy-makers need to ensure that more effective competition policies are established and implemented to manage anti-competitive practices. Governments also need to do more to enforce existing national regulations to ensure that agribusinesses do not flout environmental or social legislation. At the same time, governments in high-income countries need to strengthen legislation to hold companies legally liable for their activities abroad. Low- and middle-income countries also need to find a better balance between providing an attractive climate for foreign investment and implementing policies to regulate those investments, to ensure foreign firms do not occupy monopolistic market positions and undermine national companies that could contribute more to development. In turn, this requires rich countries to stop limiting the 'policy space' that low- and middle-income countries need to promote national development objectives.

Box 6.4 The role of the private sector in preventing hunger and malnutrition

The concept of corporate social responsibility emerged several decades ago as businesses sought to build public interest or environmental sustainability into their decision-making. However, CSR has always had its critics and was often viewed as little more than public relations spin designed to shine a favourable light on organizations that prioritize profit at the expense of everything else. Increasingly, though, there are signs that this is changing and that

companies are making CSR principles part of the way they operate – not because they want to look good, but because doing so is simply better for business.

More and more businesses recognize that a long-term outlook is crucial and that outmoded thinking about the poor sectors of society must change if companies are to survive and thrive. For example, Oxfam argues that the long-held belief that smallholder farmers do not

respond to market opportunities is unfounded. Although the main priority for many poor farmers is feeding their families, they remain motivated to produce and market surplus crops. Oxfam has a successful history of working with the private sector to bring smallholders into markets. One example is collaboration with a Sri Lankan company, Plenty Foods, which is integrating 1,500 farmers into its supply chain. The company estimates that sourcing supplies from smallholders has been a key factor in its annual growth of 30 per cent for the past four years. At the same time, the farmers have better access to land, credit and technical support – as well as markets – and their incomes have increased accordingly (Bailey, 2011).

Another success in this area comes from a partnership between the Bangladeshi microfinance institution Grameen Bank and Groupe Danone, a French food company. In 2006, the two organizations formed a new company, Grameen Danone Foods Ltd. Two years later, Grameen Danone had developed and began selling a nutritionally fortified yoghurt product named *Shokti Doi* (energy yoghurt). At the equivalent price of US\$ 0.08, a 60-gram tub costs substantially less than comparable products and contains up to 30 per cent of a child's daily nutrient requirements.

A local supply chain helped to keep costs low and promote local employment. Working with NGOs to train farmers, Grameen Danone set up small dairy farms and a milk-processing factory that favoured human labour over technology. The company also emphasized environmental sustainability, with the yoghurt cups manufactured from biodegradable corn-flour, the milk collected locally and the factory exploiting rainwater, solar power and biogas. Grameen Danone also trained so-called 'Grameen ladies' to sell *Shokti Doi* door-to-

door, with around 1,600 women currently earning a living in this way (WEF, 2009).

The 'golden rice' project, which began in the 1980s as a Rockefeller Foundation initiative, provides an example of a different role for the private sector in preventing hunger and malnutrition. Golden rice has been genetically modified to carry the beta-carotene – which occurs naturally in some plant species, but is absent in white rice – that the human body uses to synthesize vitamin A. Some 19 million pregnant women and 190 million children are estimated to suffer from vitamin A deficiency globally (WHO, 2009), many of whom live in South and South-East Asia, where rice is the dominant staple.

After teaming up with golden rice's inventors, Ingo Potrykus and Peter Beyer, the Swiss company Syngenta further developed golden rice for commercialization in high-income countries. After deciding that this market was not worth pursuing, rather than let their proprietary technology languish, the company donated it along with technology, data, patent licences and the most promising golden rice breeding lines to the project, which is guided by the Golden Rice Humanitarian Board. Golden rice varieties, developed at the International Rice Research Institute and fine-tuned for local use by public agricultural research centres in target countries, will be made available free of charge to government institutions. From there, farmers will have access to seed through their own supply and exchange networks, and will be able to grow, save and sell their harvest as usual, ensuring that they are not tied by any contractual obligations. Syngenta continues to support the project by offering expertise in a range of areas including regulatory affairs, biotechnology research, product development, intellectual property management and training (Golden Rice Humanitarian Board, 2009).

Similarly, the food company Mars is collaborating with IBM and the United States Department of Agriculture to sequence and make publicly available the genome of the cacao tree. The rationale is that the benefits that may result from this knowledge will contribute to more sustainable cocoa production and thus help both the smallholder farmers, responsible for most of the world's cocoa, and the private sector (Bailey, 2011).

In another effort to tackle nutrient deficiency, Unilever teamed up with UNICEF and Ghana's health service to develop and market affordable iodine-fortified salt in Ghana. Iodine deficiency affects more than 700 million people worldwide and, untreated, can stunt the physical and mental development of children. Annapurna iodized salt was launched in Ghana in 2001 and, within three years, half of the population had switched to iodized salt, up from just over a quarter before Annapurna entered the market. The initiative has yielded both health and commercial benefits and has been launched in Nigeria with plans for other African countries in the future (UN, 2005).

Through its Creating Shared Value programme, Nestlé seeks to benefit both shareholders and society through initiatives in the areas of nutrition, water, environmental sustainability and rural development. One example is *Nido Dayem*, affordable iron-enriched milk aimed at mothers from low-income families in northern Africa, where one-third of pre-school children suffer from iron deficiency. Working with the paediatric association of Morocco and

the media, the company combined marketing *Nido Dayem* – two glasses of which provide more than half of a child's daily iron requirements – with increasing awareness of iron deficiency and anaemia (Nestlé, 2010).

Given the complexity and scale of the causes of and solutions to hunger and malnutrition, no single entity is capable of overcoming the problem on its own. It is no surprise, then, that many 'win-win' cases are examples of public-private partnerships that involve businesses collaborating with governments, non-governmental and civil society organizations, farmers, consumers and entrepreneurs. In such cases, the private sector catalyses development while government and other organizations tend to take on an enabling role. Successful public-private partnerships will be a key strategy for preventing hunger and malnutrition.

Many initiatives that began as public relations-driven CSR projects a decade or more ago have become part of mainstream business operations. The accelerating interconnectedness of the world is one reason for this. It is harder now than ever before to hide if things go wrong. If a company uses its money and power to divert water from local farms to run its factory, it is much easier for people to find out.

Most compellingly, though, is the concept of 'the next billions'. With the rapid development of so many emerging economies, today's poor represent the middle-class market of tomorrow. Helping them to raise themselves out of poverty and to increase their buying power will help swell bottom lines for decades, even centuries, to come.

What reforms are needed at the global level?

The UN's Committee on World Food Security (CWFS), meeting in October 2010, concluded that: "In spite of good intentions and considerable allocations of money, time, energy and political support, achievements in the fight against hunger and malnutrition have not met stated goals and objectives" (UN, 2010b). The reason is not that the world lacks anti-hunger initiatives but, in part, because some policies

are misplaced and because stakeholders have been working in isolation. A plethora of acronyms has emerged to combat hunger since 2008, when the HLTF (High-Level Task Force on the Global Food Security Crisis) was set up to tackle the food crisis, calling for a CFA (Comprehensive Framework for Action) that proposed, among other things, an increase in annual world spending of US\$ 25–40 billion for agriculture and social protection. In 2009, an HLM (High-Level Meeting on Food Security for All) in Madrid established a GPAFSN (Global Partnership for Agriculture, Food Security and Nutrition), while the G8 meeting in Italy gave rise to the AFSI (L'Aquila Food Security Initiative) that pledged increased aid contributions. The same year saw a lacklustre WFS (World Food Summit) nevertheless agree to reform of the CWFS and to adopting the Five Rome Principles for Sustainable Global Food Security. In early 2010, a new fund, the GAFSP (Global Agriculture and Food Security Programme), was established as an element of the AFSI. This is not to mention the establishment by ECOSOC (UN Economic and Social Council) of the UNSCN (UN Standing Committee on Nutrition), REACH (Renewed Efforts Against Child Hunger) and SUN (the Scaling-Up Nutrition initiative).

The most significant proposal emerged in late 2010 for a Global Strategic Framework for Food Security and Nutrition (GSF). The idea behind this acronym is to enhance the role of a reformed CWFS in catalysing coherent global anti-hunger partnerships. The hope is that the GSF will urgently end the 'silo' approach to combating hunger. Hitherto, there has been duplication or even competition between different institutions promoting policies to address hunger and sometimes differences in perspective between humanitarian actions focused on immediate needs and development policies prioritizing the longer term. Indeed, the CWFS, established in 1974 and based at the FAO in Rome, should be the key forum of global food governance. Its own process of reform, which took place during 2009, has produced a multi-stakeholder structure (involving civil society groups and the private sector alongside governments and international institutions) that should permit it to coordinate a global approach to food security. Its mandate now covers the full spectrum of food security from agriculture to food markets to nutrition to safety nets to emergency action.

Yet, there are concerns about whether the CWFS will meet the bureaucratic challenge of coordinating distinct initiatives and also whether high-income countries such as the United States will give the CWFS sufficient high-level political backing. Traditionally, high-income countries have failed to firmly support the CWFS, seeing it as a one member-one vote institution that is insufficiently pliable. More recently, the signs have been mixed – on the one hand, high-income countries have encouraged low- and middle-income countries to establish their own national anti-hunger plans but, on the other, rich countries have been keen to impose policy conditions and governance mechanisms of their own rather than through the reformed CWFS. The success or otherwise of the CWFS is partly dependent on high-income countries allowing it to work, but also on the CWFS

itself – although its strength is its inclusiveness, which gives it legitimacy, its decision-making processes are often cumbersome, making rapid reaction to global crises difficult.

The nutrition sector has similarly been encumbered by a variety of often disconnected initiatives. Encouragingly, various organizations have recently launched new nutrition strategies, including the Economic Community of West African States, the New Partnership for African Development, the European Commission, the World Bank and several bilateral donors. But for a long time there has been a need for a global mechanism to ensure that nutrition becomes a priority for all governments and that aid is provided in a way that complies with the Paris Declaration on Aid Effectiveness.

The multi-stakeholder SUN initiative has, encouragingly, recently produced a road map to tackle global undernutrition but it remains to be seen how effective it will be. The road map estimates that initiatives in the 36 highest-burden countries will cost around US\$ 12 billion – a relatively small amount to be funded mainly by national governments but also, not encouragingly, from within “existing donor programmes” (UN, 2010e).

The Food Aid Convention (FAC), which is supposed to guarantee predictable disbursements of food aid (see Box 6.5), has been largely ineffective during its four decades of existence. There is no mechanism to ensure that the resources allocated under the FAC are prioritized for the neediest countries or are of the right kind, or that donors meet their commitments. The FAC should be reformed to ensure the provision of long-term, predictable and untied resources to support emergency food assistance and hunger safety net programmes.

Another key need is to promote stronger constituencies for reducing undernutrition and promoting ‘champions’ for an anti-hunger movement. States such as Brazil, whose former president Ignacio Lula da Silva personally campaigned for a broad anti-hunger movement in the country, have shown what can be achieved when political will is present. Some crucial though neglected aspects of the anti-hunger agenda need particular global spotlighting. The UK government-sponsored Foresight Project, for example, calls for an international body to champion the reduction of waste in the global food system (Foresight Project, 2011).

Equally important is the need to strengthen the global effort to promote the right to food. Governments need to be held accountable for failing to eradicate hunger. The 156 states that have ratified the International Covenant on Economic, Social and Cultural Rights are legally bound to respect, protect and fulfil the right to food. According to reports by the UN Special Rapporteur on the Right to Food, this duty to uphold the right to food also applies to private sector corporations (Ziegler, 2006). Despite the fact that some states have recently introduced new legislation, only 23 countries included the right to food in their constitutions as of late 2010. A mere 13 countries recognized the right to food as a directive principle of state policy (FAO, 2010).

Box 6.5 Renegotiating the Food Aid Convention

The Food Aid Convention (FAC) expires in June 2011 and the main OECD (Organisation of Economic Co-operation and Development) donor countries are negotiating under the chairmanship of Canada to hammer out details of a new agreement. Should we care about the outcome of these negotiations on a treaty that few people have heard of and that some argue has outlived its usefulness as a relic of the era of international food aid as surplus disposal?

The FAC is an international treaty dating back to 1967 under which a group of donors and grain exporters (see Table 6.1) pledge a minimum annual amount of food aid, a formal *risk transfer arrangement* in a volatile global economy. Operational agencies – WFP and NGOs – argue that *indirectly* the FAC provides minimum levels of predictable funding to food-based and humanitarian actions. This is because signatories, and especially European aid agencies which are party to the EU’s commitment and responsible for a few thousand tonnes, direct most of these resources to WFP and NGOs in a highly flexible way.

The FAC is a stand-alone agreement housed in the International Grains Council in London and supervised by a committee of signatory donors only. So it is tenuously linked to the Rome-based food security architecture or to humanitarian and development aid more broadly under the OECD and the UN, where other stakeholders are represented.

Last renegotiated in 1999, the FAC has been extended pending the outcome of the Doha Development Round, which would include new rules on food aid. Finally, with the Doha Round stalled and continued food price volatility exposing the inadequacies of the present agreement, the G8 development ministers agreed in

April 2010 that they “believe in a Food Aid Convention for the 21st Century that focuses on providing appropriate and effective *food assistance to vulnerable populations*” (Government of Canada, 2010; emphasis added).

Counting commitments: Currently signatories commit between 4.9 and 5.4 million tonnes of *wheat equivalent food aid*, depending on how cash contributions by the EU are counted. The United States meets about half the total commitment, reflecting its historic role as chief supplier of surplus food as aid. Donors and agencies have provided food assistance in increasingly diverse ways and the FAC, as periodically renegotiated, has sought to accommodate this growing diversity – tied aid in-kind, especially from the US, a wider range of foods including nutritionally fortified products and local and regional food procurement funded especially by European agencies, all according to a complex and arcane formula.

The need to reconsider the whole basis of FAC commitments is underscored by the increasing divergence between food aid deliveries and reporting by donors of their contributions under the convention. During the 2007–2008 food crisis, food aid donations dropped precipitously to post-Second World War lows. In 2008, FAC signatories delivered less than 5.2 million tonnes of food aid, including both cereals and non-cereals, and less than 5 million tonnes in 2009. However, they reported 7.9 million tonnes of food aid and financing for food and its delivery in wheat equivalent between July 2008 and June 2009. But what should replace this opaque and dubious formula?

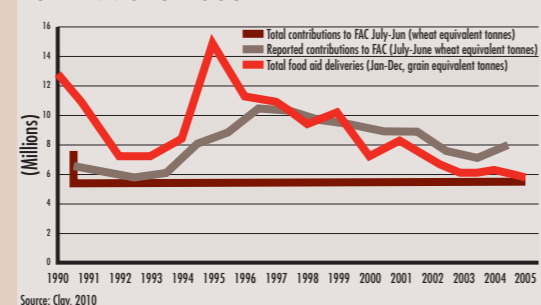
Some would prefer to retain a commodity-based commitment, such as the US makes under domestic legislation to provide 2.5 million

tonnes of domestically sourced food aid every year. Some donors, especially Europeans, are keen to measure their commitments in monetary terms, allowing a greater flexibility in support of both food-based and other forms of food assistance including cash and tokens, livestock support and inputs for recovery of production. This change would both widen the scope of the FAC and shift the 'price risk' from the donor to the recipient unless commitments were explicitly recalculated every year to take account of volatile food and fuel prices and exchange rates.

The Transatlantic Food Assistance Dialogue, an NGO coalition, has instead proposed measuring FAC commitments in terms of assisting a minimum number (20 or 25 million people affected by disasters and other humanitarian crises) to meet their food needs. Such a collective commitment would maintain the minimum floor of assistance, keep the price risk with the donor and, pragmatically, could allow donors to contribute in different ways – commodity aid or cash – to a common overall objective. Should the commitments be limited to providing emergency and recovery assistance?

Governance: Even as a donor agreement and club, the FAC and its supervisory committee are an anachronism. Should the FAC continue as a stand-alone and inevitably weakly administered agreement? Would it be better part of the Paris-based aid institutional architecture or part of the Rome food security arrangements? Fulfilling commitments is voluntary, reporting is declaratory and there is no formal independent monitoring or evaluation. The European Commission technically represents the whole EU because the FAC began life as a trade rather than an aid agreement. In

Figure 6.1 Total food aid in grain equivalent and contributions to FAC in wheat equivalent from 1990 to 2005



consequence, EU bilateral donors do not have either direct commitments or a responsibility to be accountable. But because food aid is only a small part of their humanitarian aid, would they want either greater supervisory involvement in or accountability to the FAC?

Newer donor countries such as China, Republic of Korea, Saudi Arabia and South Africa as a key source of food aid are not signatories. Under what terms would they see it as in their interest and as part of their international responsibility to accede to a new treaty of donors?

Unless these issues are seriously addressed, then are the FAC negotiators merely seeking a face-saving formula for allowing donors to do what they would do anyway? To address these issues is a real challenge and will require imagination and lateral thinking as well as a genuine commitment to succeed. Otherwise, it might be better to allow the convention to lapse and for donors, together with others in the international community, to address assuring the food needs of crisis-affected people and global food insecurity in ways that are more appropriate to today's different and rapidly changing physical environmental, political and economic circumstances.

There are numerous policy areas on which the global community needs to take urgent action, some of which are mentioned above. One further area is that of price volatility and commodity speculation (see Chapter 3), whose effects have been brought into sharp

Table 6.1 FAC contributions and reported food aid in 2008–2009 (thousand tonnes)

Food aid donor	FAC contributions	FAC reported contributions in 2008–2009 (WE)	Food aid deliveries in 2008 (GE)	Food aid deliveries in 2009 (GE)
Australia	250	164	91	81
Canada	420	551	259	238
European Union (Incl. €130 million)	1,320 (1,908)	2,263	1,184	980
Japan	300	556	374	403
Norway	30	89	49	15
Switzerland	40	59	28	19
United States	2,500	4,257	3,216	2,915
Argentina*	35	0	0	0
Total DAC	5,483	7,940	5,200	4,651
Non-FAC donors			1,072	1,071
Total, all donors			6,272	5,722

Source: Clay, 2010, from WFP and International Grains Council data

Note: WE = wheat equivalent; GE = grain equivalent; DAC = members of the OECD's Development Assistance Committee

* Argentina made a contribution to the FAC but never reported providing any food aid

focus in recent years but where global governance (or, rather, the lack of it) remains an anachronism. Financial regulations must be enacted to curb the ability of speculators to exert such market power. Priority should be given to protecting the most vulnerable groups from sharp food price rises by trying to influence market prices nationally and by providing safety nets designed to stabilize incomes. One idea is to establish an emergency food reserve and financing facility for the WFP in order to help low-income countries facing sudden increases in food import bills when price spikes occur.

Finally, it is universally recognized that there is a need for better, more accurate information on, and monitoring of, hunger and malnutrition. Data on the extent of hunger in low- and middle-income countries provided by the FAO give an inaccurate picture and have been described as an "anachronism from the mid 20th century". In some countries, household surveys suggest that FAO's data underestimate the number of hungry people by a factor of three. The world needs a global, open-source database for the analysis of agriculture, the food system and the environment (Foresight Project, 2011). Mobile phone and GPS technologies can also help governments identify who and where the hungry are (see Box 6.2).

It would also be useful to have an internationally recognized global hunger index for measuring governmental commitment to hunger reduction, such as the HungerFREE index recently developed by the international NGO, ActionAid (ActionAid, 2010a). This index lists weighted indicators that measure governments' legal commitments (such as any constitutional guarantees to the right to food) and the extent of social

protection programmes, among other areas, and compares countries against each other. It also compares the performance of high-income countries, measuring their aid to agriculture, their commitment to sustainable agriculture and their performance against global targets related to climate change.

When considering what policies are needed at all levels, it is useful to distinguish between areas of general consensus and areas of contention. For example, there is widespread agreement on the need for greater investments in agriculture and social protection, the urgent need to shape improved and joined-up global institutions, the necessity of finding hunger ‘champions’ and the need to produce more up-to-date data. Implementing these policies is another matter, dependent on political will, although the policies themselves are rarely disputed. These are essentially *technical* matters and should be relatively easy for the world to address.

More problematic are several areas of agricultural policy on which there has never been any global consensus and which can take countries in very different directions. These include some issues mentioned above – notably sustainable agriculture and the role of the state, market and the private sector. But there are many more, such as the debates over biofuels, ‘land grabs’, trade liberalization, large versus small farms, export-led agriculture versus production for domestic markets, genetically modified organisms and biotechnology. These are essentially political rather than technical issues and cannot be avoided in discussions about ending hunger.

Yet too much of the current debate assumes that ending hunger is mainly a technical issue on which there is largely consensus. The global institutions must ensure that their analysis and policy reflect divergent and critical views on these areas of contention from around the world, especially those most affected by them, and do not overly reflect the interests of the developed countries.

In conclusion, various changed policies and deepened partnerships, mentioned throughout these chapters, are needed if governments, donors and global institutions are to end hunger. To ensure this requires, in part, that those in power are held more responsible for their actions and inactions. The areas of agriculture, hunger and nutrition are littered with broken promises and plans that are never implemented, as are other global policy issues.

The world’s decision-makers need to know that their policies and spending related to hunger are being ever more scrutinized. This means increased efforts to do so by civil society organizations, many of whom are stepping up their monitoring of government budgets and establishing national networks to hold governments to greater account for their spending pledges. Community groups (see Box 6.3) are especially well-placed to monitor official policies at village level and need to be funded and supported. Social movements must act as the vanguard for broader change to ensure that the hitherto voiceless and powerless are able to realize an end to the scourge of hunger.

Chapter 6 was written by Mark Curtis who is an independent consultant and author of numerous books and reports on development and foreign policy issues. Box 6.1 was written by Lindsay Knight, Editor of the 2011 World Disasters Report. David Dolodec, who is a specialist in nutrition at the Inter-Agency Standing Committee’s Global Nutrition Cluster, wrote Box 6.2. Deborah Eade, who has worked for 30 years in the international development and humanitarian field, wrote Box 6.3. Box 6.4 was written by Adam Barclay, a science writer who specializes in international agricultural research. Box 6.5 was written by Edward Clay, Senior Research Associate at the Overseas Development Institute, London.

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Facing the humanitarian challenges of the future: threats and opportunities

Three major crises in 2010 and 2011 may lead to significant changes in the humanitarian sector in the foreseeable future: the earthquake in Haiti; massive flooding in Pakistan; and the recent earthquake and tsunami in Japan. All three of these ‘mega-disasters’ – along with the thousands of smaller emergencies throughout the year – illustrate the need for the international community to rethink how it will reduce risk and prepare for and respond to future threats and opportunities.

Haiti’s earthquake in January 2010 displayed systemic weaknesses around development, issues of governance, humanitarian prevention and response, and led to renewed demands for humanitarian reform. Despite three decades of sporadic attempts to strengthen ‘the system’, it seems to have taken the Haitian crisis, which resulted in more than 220,000 deaths, to at last bring home the need for change to a growing number of people with humanitarian roles and responsibilities. One critical aspect of such vitally needed reform is a true commitment to disaster risk reduction (DRR) and preparedness.

Yet, as this chapter will explore, to what extent are DRR and disaster preparedness part of an even more extensive humanitarian agenda that needs to be completed if we are to reduce the impact of the Haitis of the future?

The calls for reform may in part stem from a growing awareness that the types, dimensions and dynamics of humanitarian crises are increasing, in some aspects exponentially. This exponential change in crisis scale and impact was clearly evident in the La Niña-influenced monsoon floods in Pakistan in July 2010. In a matter of days, the floods affected almost 21 million people and resulted in an estimated economic impact of US\$ 235 billion (*The Economist*, 2011). In the context of this chapter, the Pakistan floods pose a major challenge. If such incidents are on the increase, how can humanitarian actors anticipate them and be prepared to deal with them?

In a relatively brief period, the earthquake that struck Japan on 11 March 2011 demonstrated to the international community the connection between natural hazards and human and social vulnerability. It was potentially a major systems collapse – the earthquake triggered a tsunami, a lethal combination that exposed the prospect of a nuclear meltdown with all its consequences. Some commentators saw Japan’s agony in terms of a complex disaster in a “highly sophisticated developed country” (Byrs, 2011). Perhaps the humanitarian sector might also see this truly seminal event in other ways.

Photo opposite page:
Floods destroyed many of the houses on this island in the River Niger. The Red Cross Society of Niger set up a camp, installing tents, building latrines and supplying water, for the island’s inhabitants.

© Julien Goldstein/IFRC

There are many similarities between Japan's catastrophe and threats that do, and increasingly will, affect most other countries – be they high-, middle- or low-income. The interconnected nature of what drives hazards and risk is one lesson. Another similarity is the increasing cross-regional and global impacts of humanitarian crises. With these concerns in mind, this chapter will also look at how the humanitarian sector and indeed the wider international community will have to start preparing for the 'what might be's' – recognizing that efforts to anticipate potential longer-term threats can help prepare for battles as yet unforeseen.

Together, these three cases suggest the need for new approaches in order to identify and deal with potential humanitarian threats, now and in the future. They also point to a number of issues that have framed the humanitarian discourse over the past decade and yet still remain unresolved. These are noted in the section entitled 'An unfinished agenda'. At the same time, the increasing number of 'crisis-drivers' and their changing dimensions and dynamics underline the need for changing mindsets to deal with future crises. From that perspective, the section on an emerging agenda reflects on the political and social transformations that will affect humanitarian action over the next decade as well as broad categories of crises for which preparation will be necessary.

The fourth section – Planning from the future – suggests that the emerging agenda of future humanitarian action will require transformations in the behaviour of most humanitarian organizations. At the same time it also suggests that the emerging agenda will require changes in the ways that the wider international community deals with future humanitarian crises. These insights on planning from the future are more than relevant to the main theme of this year's *World Disasters Report* – hunger and malnutrition – now and in the future.

An unfinished agenda

The past decade has witnessed significant attempts to reform the humanitarian capacity of the United Nations (UN) and the wider system. These include initiatives to expedite funding for emergency operations such as the Central Emergency Response Fund and pooled funds, the cluster system, the revised Consolidated Appeals Process and the creation of Humanitarian Country Teams. There are others that deserve attention, but what is as striking as the completed reforms are the reforms that have *not* taken place.

The unfinished agenda consists of at least seven interlinked core concerns:

Effective engagement with the vulnerable: In the words of one victim of Hurricane Katrina in the United States in 2005, "It don't seem that experts like talkin' to the poor" (MacGregor, 2010). Despite declarations of commitment to community engagement over the years, there remains a seeming paradox, namely, that the more

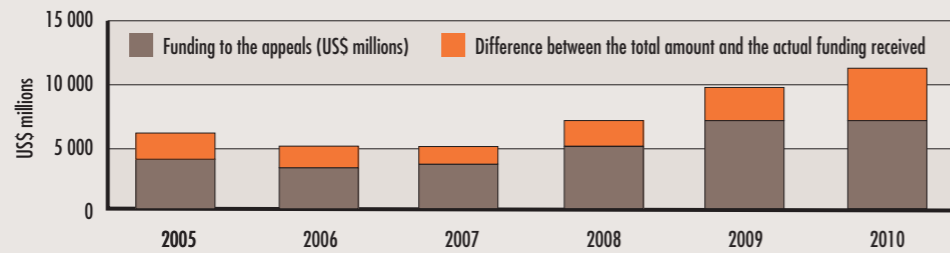
professional humanitarian actors become, the less inclined they appear to be to engage with vulnerable and crisis-affected populations. These people are still too often treated as passive onlookers as the experts determine not only what they should do in times of crises but also what they require in the aftermath (Anderson, 2008).

Needs-based responses: Too often, needs assessments, while technically sound, fail to take into consideration cultural, gender and social concerns of the affected population. They are not undertaken with sufficient reference to the individuals who have clear views on priority needs, i.e., those in need. And too often, aid allocations are driven by political imperatives, media concerns and the all too rigid administrative procedures of donors and humanitarian organizations. This last factor frequently reflects the convenience of standardized, supply-driven approaches, rather than a more nuanced approach driven by the demands of the population (Cosgrove, 2008).

Developing local and national capacities: In the final analysis, national and local authorities are responsible for responding to the needs of their community in a disaster. This accepted fact receives little support in practice. Greater investment needs to be made in national and local capacity development for reasons that are both appropriate and practical: appropriate because not to do so would be to undermine the responsibilities of sovereign states; practical because the international community will not have the capacity to assist in light of the growing number of crises around the world (Ferris, 2009).

Disaster risk reduction: The Madrid-based non-profit organization DARA produces an annual Humanitarian Response Index survey. These surveys confirm donor governments' lack of interest in risk reduction, prevention and preparedness (DARA, 2008, 2009 and 2010a). Yet, there can be little doubt that much greater emphasis has to be given to reducing the sorts of risks that exist now and that may exist in the future. In a financially strapped world, DRR is recognized as a cost-effective alternative to the ever-mounting costs of emergencies (Leonard and Howitt, 2010). One of the critical challenges, as discussed below, will be to focus on reducing risks that result from emerging and new types of crisis-drivers.

Quality and accountability: There have been a number of initiatives to improve quality, accountability and learning in the humanitarian sector, but for the most part, these efforts remain isolated from each other and not well integrated into the mindset of crisis responders. This is further complicated by the exponential increase of actors engaged in humanitarian action. While admirable efforts have been made to align some of the main quality and accountability initiatives in the sector (such as the Sphere Project, Humanitarian Accountability Partnership International, People in Aid and the Emergency Capacity Building Project), the humanitarian sector is far from reaching a shared understanding about what quality and accountability mean (The Sphere Project, 2009; Walker et al., 2010). There is a clear danger that the sector will overly

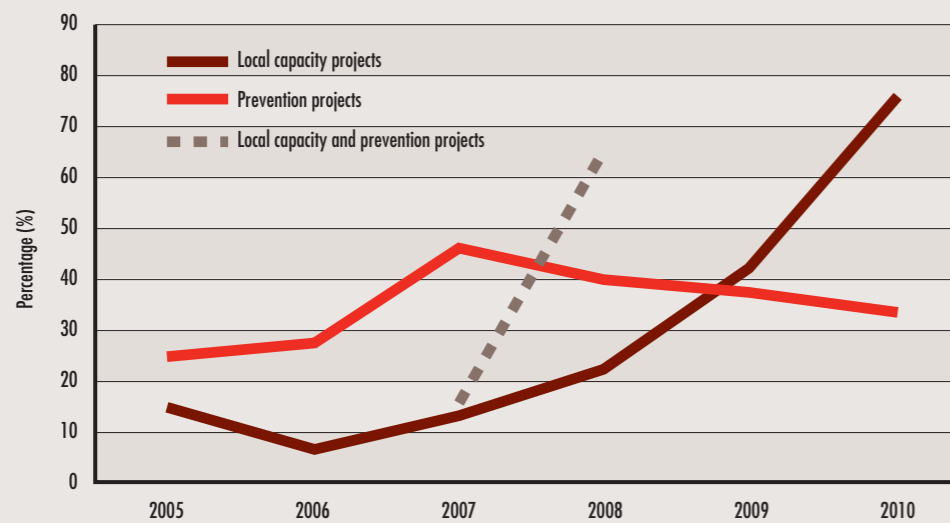
Figure II.1 Investments in local capacity and prevention

Over the past five years, the international community has scaled up investments in local capacity and prevention projects, as illustrated by Figure II.1, which shows significant increases since 2005 in the percentage of funding received compared to what was requested. However, there was a gap of at least 20 per cent in the case of local capacity projects and of more than 60 per cent for prevention projects. But as Figure II.2 below shows, investments in prevention and preparedness are insignificant compared to the costs of emergency response. By some World Bank estimates, every US dollar invested in prevention could save up to US\$ 7 in the response.

Source: DARA, 2011

complicate the debate and lose sight of the simple yet powerful message common to all these initiatives and, indeed, to core humanitarian principles: aid must be driven by the needs of affected people.

Coordination: One of the persistent problems that still haunts humanitarian response is poor coordination. In truth, those who could take significant steps to deal with this

Figure II.2 Coverage of funding requirements by type of project

Note: Data on funding not available prior to 2009
Source: DARA, 2011

continue to fail to do so. This failure to act begins with UN member states which do little to address the baronial system that allows donor and UN agencies to work independently of any agreed preparedness or response strategy or operational plan. It is also reflected in the lack of support the UN receives to initiate a truly effective leadership development programme. But it would be a mistake to assume that the UN system itself is the only available option – or solution – for effective coordination of humanitarian actions. The legitimacy of the UN to take a leading role in coordination has to be earned and, in many recent crises, this has simply not been the case (DARA, 2010a). At the same time, the growing strength and importance of others, such as non-governmental organization (NGO) networks and local and private actors, are changing the dynamics of coordination. In addition, the expanding multiplicity of information and data channels through social networking – including crowd-sourcing and crowd-funding – will increasingly send discrepant and contradictory perspectives into the realm of operational decision-making. This ‘noise’ will inevitably compound the challenges of coordination.

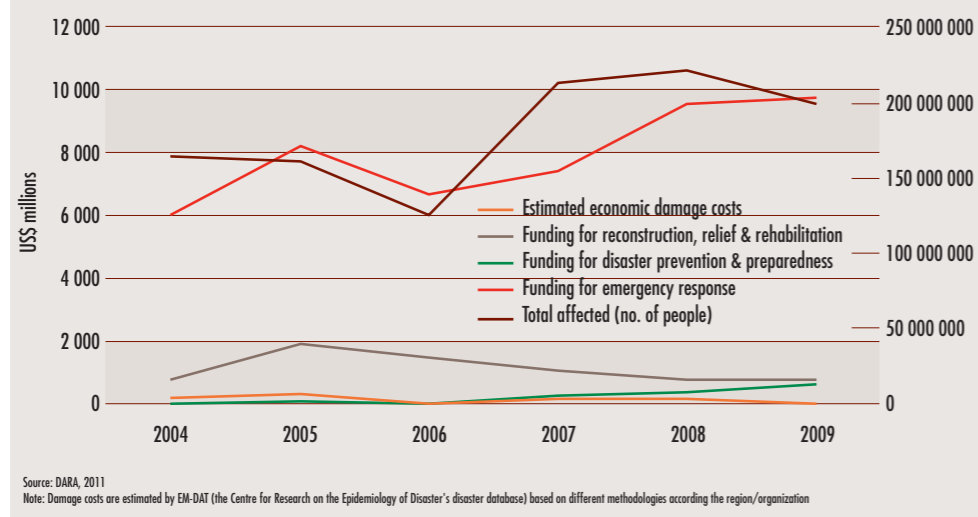
Access and protection: The inability to ensure safe access for humanitarian organizations to affected populations remains an abiding concern, as witnessed by the continued challenges posed by crises in Afghanistan, Colombia, Democratic Republic of the Congo, Occupied Palestinian Territory, Somalia and Sudan. The international community’s uneven record of mobilizing the military for humanitarian operations, whether under the guise of peacekeeping, meeting the ‘humanitarian imperative’ or providing security, transport or logistical support for humanitarian organizations, shows that there is ample room for improvement when dealing with the practicalities and the principles of access and protection.

An emerging agenda

While there is clearly a humanitarian agenda that needs to be completed, there is also an emerging agenda that needs to be developed. This futures agenda will be based upon the increasingly plausible assumption that the nature of humanitarian threats, their impacts and their reach will change dramatically over the coming decade.

The context in which humanitarian crises are emerging is also changing in distinctive ways. While no one can predict the ultimate consequences of such a changing context, it is worth speculating in what ways these plausible contextual factors might define and determine not only future crisis threats, but the boundaries of humanitarian action.

Shifting power dynamics: The traditional, mainly Western-dominated approach to defining the world’s problems and solutions will weaken as new, more fluid configurations of state and non-state actors complicate the process by which collective action will be taken to deal with global issues. The power dynamics of the humanitarian sector – to date, a largely Western construct – will also change as greater capacity and stronger

Figure II.3 Funding for reconstruction, relief and rehabilitation

political clout emerge from other regions. At the same time, the growing primacy of state sovereignty around the world will determine the limits of humanitarian intervention and the approaches that will be tolerated by governments.

Growing centrality of humanitarian crises and risk reduction for governments:

Related to the implications of shifting power dynamics is the fact that humanitarian crises have moved from the periphery of governmental interests to centre stage. Humanitarian crises will increasingly be imbued with high levels of political significance and directly affect the ways that governments are perceived, possibly determining their very survival. An emerging case in point is the political calculations that will have to be made when governments are increasingly confronted with interconnected threats arising out of climate change, infectious diseases and food security (see Figure II.3) (DARA, 2010b). The growing importance of humanitarian crises for governments – and the possible impact that they might have for government survival – means that the humanitarian agenda will be increasingly affected by calculations reflecting *raison d'État* that may not relate to Western concepts of humanitarian principles.

Vulnerability and resilience: Governments may increasingly feel compelled to demonstrate their proactive attention to and involvement in anticipating potential crises. Commensurate with an ever-greater frustration generated by the continuing divide between development and humanitarian action, it is quite likely that the growing attention given to concepts of vulnerability and resilience will generate a new 'security paradigm' (Ogata and Sen, 2003). This will result in a more comprehensive approach to humanitarian actions, incorporating issues of employment and liveli-

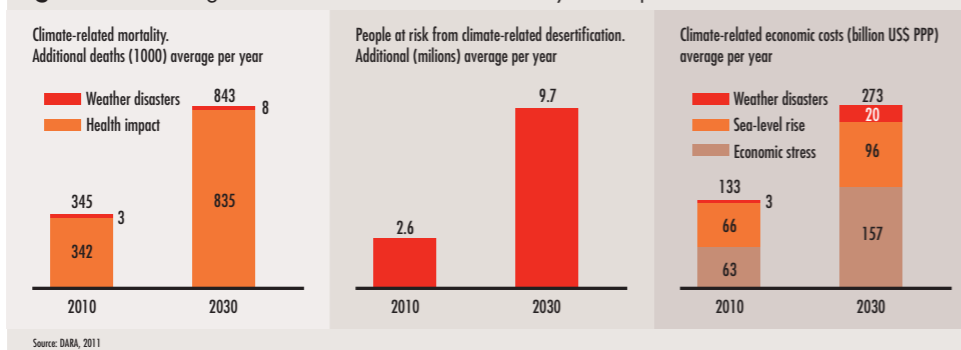
hoods with prevention, preparedness and response as part of a way to build more resilient communities (Ramo, 2009).

Population growth: In a humanitarian context, it is an unjust but accepted probability that populations in areas already prone to disasters are increasing more than populations in less hazard-prone areas (Brown, 2008). Such population growth includes urban and periurban areas, riparian settlements and other areas regarded as highly disaster-prone (Myers, 1995). It is all too evident that at least until the mid-point of this century, risk reduction calculations will have to take into account much larger numbers of people and much longer planning time frames, e.g., four decades (Mazo, 2010).

Demographic shifts: Closely related to the issue of population growth is that of demographic shifts. The cause of such shifts ranges from the mortality revolution and changing age distributions to economic pushes, conflict and environmental disparities. Their consequences are reflected in as equally wide a spectrum, from rural to urban migration to large-scale immigration (Haub, 2009). The challenges that face growing conurbations are very much on the agendas of DRR specialists (IFRC, 2010). Overlooked, however, are the medium and small conurbations that inevitably will be faced with disaster risks not dissimilar to larger conurbations, for example, the 20 new cities that China plans to build in order to accommodate more than 22 million people. It is all too likely that they will face the future without comparable government attention to possible risks of disasters and to the resources to offset such threats.

The globalization paradox: The paradox of globalization is that it brings localization to the fore (Khan et al., 2009). With the growing awareness of the interconnected nature of everything from the economy to the transmission of disease comes a greater awareness of the diversity that imbues most regions of the world. A recent study about emerging vulnerabilities in the Hindu Kush, a Himalayan region of Afghanistan and Pakistan, suggested that a major challenge facing those attempting to map potential threats was the number of ethnically and linguistically diverse communities in the region, many of whom were unfamiliar to their own respective governments and, in some instances, even to local authorities (HFP et al., 2010).

Priority-setting and resilience: Policy-makers, confronted with a general need to reduce budget deficits, may well be tempted to focus on immediate crises rather than on those which are plausible but apparently not imminent. Conversely, as the Japanese earthquake might suggest to a growing number of governments, efforts to reduce risks and undertake effective preparedness may actually have perceived political and financial pay-offs. Efforts to bring risk reduction and resilience-building into development frameworks may emerge as the most effective way to deal with emerging humanitarian threats and economic stresses and strains (DFID, 2011).

Figure II.4 The magnitude of climate-related vulnerability and impact

Crisis-drivers of the future

The types of crisis-drivers – and ultimately the types of crises that need to be anticipated – will in many respects change the concept of vulnerability (Casti, 2011). Assumptions about the nature of ‘hazard-prone countries’, hazard propensities and vulnerable people themselves, will have to be reassessed as one begins to speculate about the changing types of crisis-drivers and their dimensions and dynamics.

The conventional adage that crisis-drivers expose the vulnerability of the poor will have to be questioned. The March 2011 events in Japan demonstrated that there is an emerging category that can be labelled ‘the new poor’, people who – despite insurance and government support – have lost so much that they inevitably fall down several socio-economic rungs. At the same time, emerging crisis-drivers will not only put an end to the long-held assumptions about the ‘hapless South’ and the ‘resilient North’, but they will also blur the socio-economic demarcations of vulnerability. In other words, the types of crisis-drivers of the future may in some instances have greater impact upon the socio-economic advantaged than the disadvantaged.

Types of future crisis-drivers: The dimensions and dynamics of conventional crisis-drivers, such as volcanic eruptions, floods, droughts and earthquakes, will increase exponentially. The short-term perspectives of government policy-makers (Leonard and Howitt, 2010) and the effects of environmental changes, including climate change, will further exacerbate the potential impact of these standard crisis-drivers (Bailey, 2011). They will join a growing number of technological and infrastructural threats that will intensify vulnerability across the globe.

There is clearly a growing link between disaster risks and abandoned technologies – the potential catastrophes that could arise in central Asia and beyond from radioactive waste and nuclear tailings are cases in point. According to one analysis, the festering remnants of the Soviet nuclear arms industry could poison significant portions of the water sources

and agricultural lands of countries in the region and, in a resource-strapped environment, could ultimately be the source of conflicts within and between those countries. Such waste could also have far more extensive psychological effects as people’s anxieties about the impacts of such threats often exceed the reality of the damage that such waste could cause (Harvey et al., 2009). Nevertheless, the physical and psychological consequences of such waste could multiply if particles, for example, get caught in airstreams that carry it well beyond the region where it originated (Hobbs, 2010).

Technology’s impact on vulnerability is also reflected in issues such as cybernetic collapse, nanotechnology and biotechnology. All three reflect scientific innovations that are increasingly important and positive parts of modern society, while at the same time presenting potential hazards that could generate vulnerabilities which in turn could translate into large-scale crises.

The disaster risks that will emerge from what might be regarded as ‘poorly planned development’ are numerous. The evident dilemma for policy-makers is the need to reconcile seemingly incompatible objectives, for example, between economic growth and longer-term risk. Hence, displacement caused by large infrastructure projects, especially dam construction, has become common in China – as in other countries in Asia – in response to the escalating demand for electricity and water. The sorts of risks that projects such as China’s Three Gorges dam create are reflected in the potential environmental catastrophe that is forecast in the aftermath of moving more than 1.4 million people away from in and around the dam site.

Although policy-makers may frequently have to deal with imperfect if not contradictory choices, the disturbing fact is that all too often their full consequences are not analysed or understood sufficiently. As highlighted in the recent controversy over the Zipingpu dam’s contribution to the 2008 earthquake in Sichuan, China, dams can become agents of their own demise. The pressure of the water in lakes of several square kilometres locked behind a large dam may contribute to an increase in the seismic activity beneath it, especially if the dam is built directly over a fault (HFP et al., 2010).

Dimensions and dynamics: Hurricane Katrina in the United States, the BP oil spill in the Gulf of Mexico and the Russian firestorms of 2010 demonstrate that all geographical areas are vulnerable to the impact of crisis-drivers and that the severity of impact is more often than not a reflection of the ways that societies structure themselves and allocate their resources. Yet, whatever the characteristics of past vulnerabilities, it is increasingly apparent that the dimensions and dynamics of humanitarian crises are changing exponentially and that those concerned with reducing disaster risks and their impacts will have to take both into account. As noted in the *Humanitarian Response Index 2008* report, “Given the heavy strains on the humanitarian system, there is an urgent need to invest more in making sure that the system as a whole works better to meet current and future humanitarian needs” (DARA, 2008).

For those involved in humanitarian action, greater attention will have to be given to the ways in which a seemingly random number of multiple risks may interact. There may in this context be high-impact and low-frequency risks, such as solar flares, that can have devastating, cross-sectoral consequences (Channel 4, 2010). For policy-makers, the cost–benefits of investing in preparations for seemingly low-frequency and high-impact risks are a difficult call. Yet, what cannot be dodged is the emerging reality that future crisis dynamics already suggest that policy-makers need to prepare for what have been described as synchronous failures, simultaneous crises and sequential crises.

“It’s the convergence of stresses that’s especially treacherous and makes synchronous failure a possibility as never before,” noted Thomas Homer-Dixon in his seminal work, *The Upside of Down*. “In coming years, our societies won’t face one or two major challenges at once, as usually happened in the past. Instead they will face an alarming variety of problems – including oil shortages, climate change, economic instability, and mega-terrorism – all at the same time” (Homer-Dixon, 2007). This describes *synchronous* failures.

On 26 July 2005, the Indian city of Mumbai was hit by the eighth-heaviest 24-hour rainfall ever recorded, reaching 994 millimetres on one day and intermittently continuing the next day, depositing a further 644mm. The resulting floods offer a relatively small example of what a synchronous failure can be. It was not that the floods alone affected people’s lives. Rather it was the flood’s impact on cybernetic systems in Mumbai that brought the city to a halt. Everything from sewage systems to hospital services to traffic lights were affected by a relatively small-scale systems collapse.

As Haiti and Pakistan reminded practitioners and policy-makers alike during 2010, the capacity to respond to such individual crises leaves the humanitarian sector overstretched. The challenge is how to cope with the consequences of such events happening *simultaneously*. The prospect that a significant earthquake might happen in San Francisco, California at the same time as a major flood in Mozambique and a conflict situation spreading in central Asia is not implausible. It does, however, raise the issue about the extent to which there would be available capacity to deal adequately with such crises.

Policy-makers and practitioners, too, have to take into account the cascading effects of a single crisis-driver that may trigger a range of other crises. Such *sequential* crises are not hard to imagine. Here the Japanese crises of March 2011 offer a dramatic spectre.

Planning from the future

Every age regards itself as unique. Underpinning that sense of uniqueness are themes of uncertainty and complexity – that even while history may be a useful guide to the future, most people accept that their ages are circumscribed by dimensions of the

unknown that few other times have had to confront. This is certainly true of the first decade of the 21st century where issues of complexity and uncertainty reflect a major policy theme as well as an academic one (Ramo, 2009).

Increasing numbers of governmental and related military and corporate sectors are dealing with complexity and uncertainty by speculating about ‘what might be’s’, or developing plausible scenarios and simulations about the types of factors that might affect their strategic and operational objectives. They are increasingly accepting that time spent on anticipating possible and plausible futures is time well spent. Not only does such speculation broaden institutional sensitivities to new types of possible threats and opportunities, the anticipatory process itself makes organizations more adaptive and more agile when it comes to confronting the unexpected.

Dealing with what might be

When one considers the increasing expectations of actions by humanitarian organizations, there are five key characteristics that will determine whether they are fit for the future; whether, in other words, they not only are sensitive to potential threats, but also able to explore their plausibility and ways to deal with them.

The art of anticipation: There is a growing acceptance throughout the humanitarian sector that much greater time and effort must be devoted to longer-term strategic thinking (DFID, 2011). The starting point is perhaps the most difficult of all and to a significant extent relates to the issue of strategic leadership (discussed below). That starting point begins with changing mindsets rather than organizational reshuffles or additional specialist layers within the organization. Changing mindsets can be fostered by promoting an ethos of speculation throughout the organization. When, for example, a senior official at Google was asked who was responsible for innovation in the company, the answer was everyone. Innovation was not a departmental responsibility; it was in one sense ‘what the company does’.

Devoting time, for example, to scenario development and simulation exercises can enhance mindset change. Such techniques, used by some of the most advanced private sector organizations in the world, can provide the conceptual space that is needed not only to identify future risks, but also to underscore the importance of such thinking for the organization.

From anticipation to adaptation: “There is a drawer that is marked strategies,” noted an official from a major US-based NGO. “It is the lowest drawer in the filing cabinet, and rarely gets opened.” It is generally accepted that strategies, per se, are often regarded as fodder for periodic executive board meetings or an institutional requirement that needs to be fulfilled at least every five years. The results of such strategies are

all too rarely seen as ‘living documents’, let alone as statements about objectives and benchmarks that directly impact upon operations – the programmes and projects of humanitarian organizations.

Enhancing the adaptive capacities of an organization can be approached from a variety of perspectives, but most fundamental of all is an organization’s commitment to regular reviews of longer-term strategic objectives. To be adaptive, it must focus upon anticipated changes in its external operating environment in order to assess the extent to which strategic objectives might need to be adjusted. It also must commit itself to regular reviews of operational activities (i.e., what the organization actually does) against its strategic objectives and related benchmarks.

An adaptive organization is intensely interactive. In analysing all too many initiatives that attempt to develop common purpose between ‘the field’ and headquarters, one of the most consistent complaints is that headquarters assumes its objectives are understood by the field. In an analysis of the strategy formulation process of BRAC, a Bangladeshi NGO, it was apparent that that was not the case. Field workers felt that understanding about presumed common objectives would improve if headquarters also dedicated more time to listening to them (HFP, 2009).

Promoting effective collaboration networks: Dealing with humanitarian crises will increasingly require capacities that stem from a wide range of disciplines. Hence collaboration with a growing number of actors is inevitable, but effectiveness will depend upon a clear sense of the objectives needed for such possible collaborative partnerships. It is worth noting in this context that in a series of studies of UN country teams, it was apparent that potential partnerships with local natural and social scientists would have provided a deeper understanding of the viability of UN country programmes and projects (HFP, 2011). Such obvious collaborative networks had never been used previously; following the studies, the usefulness of such networks was recognized.

Innovation and innovative practices: One of the critical challenges for the humanitarian community is acquiring the capacity to identify risks and seek ways to mitigate or eliminate them. However, as noted in an analysis of innovation in the humanitarian sector, “Currently, humanitarian organizations – responsible for implementing projects over a relatively short time frame [usually 12 to 18 months] – have little time to observe and reflect on the profile and changing needs of their ‘customers’ and on the efficacy of their implementation of goods and services” (White, 2008). Here, innovation is important. It offers ways to do something differently – to achieve better results in a more efficient manner, in many instances in order to meet new and changing demands. It is an essential tool for seeing things in new ways. With that in mind, “one method is to learn from the people most immersed in a problem”. This advice from a highly experienced senior civil servant in the United Kingdom underscores the point that:

“Anyone seeking to find an answer to the management of chronic diseases or alienation amongst teenagers may do best by looking at how people are themselves solving their problems, and starting from the presumption that they are ‘competent interpreters’ of their own lives” (Mulgan, 2009).

The challenge in this context is to ensure such organizations accept the premise that ‘customer-led’ approaches are essential to adopting appropriate innovative practices.

Strategic leadership and an enabling environment: A persistent complaint within the humanitarian sector is perceived lack of leadership (Harvey et al., 2009). In the context of promoting greater understanding about the need for more strategic approaches to humanitarian action, *strategic* leadership is the catalytic key – plus the enabling environment that fosters it.

Reflecting upon the characteristics of a futures-oriented organization, one of the essential characteristics of strategic leadership is the ability to promote a collaborative rather than an authoritarian structure. Strategic leadership, therefore, is not about having answers, but instead about the ability to release collective creativity and capacity or “the capacity to release the collective intelligence and insight of a group of organisations” (Binney et al., 2009). While many current models of successful leadership are based on projecting certainty and confidence, real strategic leadership involves a more experimental process in which a leader does not provide categorical answers.

Yet, strategic leadership in this context depends upon an enabling environment. The failure of organizations to provide an enabling environment for strategic leaders has often resulted in the creation of new organizations established by leaders who could not deal with the limitations of their current institutions. In many instances, strategic leadership is thwarted by the restrictions imposed by the demands of narrow accountability.

The five competencies that are likely to enhance organizational capacities for exploring potential risks, risk reduction and preparedness approaches are in and of themselves no guarantee that the complexities of the future can be adequately anticipated, let alone addressed. And yet organizations that fail to take the implications of such competencies into account would appear to be too fixed in the past to be able to deal with the uncertainties and complexities of the future.

Futures from a humanitarian sector perspective

No matter how fit for the future individual organizations might be to deal with longer-term complexities and uncertainties, there is also a futures agenda that relates to the wider humanitarian sector as a whole. There are strategic initiatives that need to be pursued now to deal with future challenges.

The tsunami, which followed the massive March 2011 earthquake in Japan, razed this petrol station in Otsuchi. The ensuing fire burnt the town down.

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Japanese
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Expand planning perspectives: Too often, humanitarian planning is conducted within national borders and lacks the cross-border regional perspectives that reflect some of the critical sources of potential crises. Regional perspectives have to be placed higher up on the ‘humanitarian agenda’. This means that a more concerted, coherent and cross-regional effort is required to identify the range of emerging and potential threats that regions will have to face.

Develop a new planning construct: The complexities that will underpin so many future crises will require a new planning framework or concept. The proposed construct should have at least four core components: vulnerability and resilience needs to be the main focus, linking development and humanitarian action; vulnerability mapping based on regional perspectives should identify potential flows of hazards and possible solutions; greater attention to the interactive nature of future threats resulting in more integrated modelling; and preparedness planning based upon futures scenarios, including the consequence of synchronous failures and sequential and simultaneous crises.

Create non-intrusive means for international support: Over the past three decades, humanitarian organizations from the international community have become accustomed to intervening in ‘overseas crises’ in ways that are seen in many instances as intrusive and disempowering. An increasing number of governments will be less amenable to such intrusive external intervention and greater attention will, therefore, have

to be given by even the most well-intentioned external actor to non-intrusive support. This means that greater emphasis has to be placed on the means for sharing best practices and standards, and also on ways to share data on regional dimensions of vulnerability on a consistent and systematic basis. There should also be regionally developed scenario exercises to assess and test appropriate approaches for international support for regional crises and, wherever possible, efforts should be made to agree on pre-response arrangements between relevant regional bodies and international counterparts.

Foster cross-regional dialogue between humanitarian policy-makers and scientists: Greater efforts need to be made to understand the nature of hazards and possible solutions for addressing future crises. With that in mind, a far more focused dialogue is needed between scientists and policy-makers. The former need to be at the table, not just in the room. Scientific information needs to be shared more systematically between and among countries, regionally and globally, and greater attention needs to be made by scientists and policy-makers to ensure that the practical outcomes of their work are accessible to threatened communities.

Address knowledge gaps and coordination for comprehensive research: Despite the extensive research undertaken on a range of hazards in regions, there remain many areas in which further research is required to develop effective approaches for prevention, preparedness and response approaches. They range from the technical to the socio-cultural and include the need for greater understanding about the effects of global activities (e.g., food pricing) upon the vulnerabilities of local communities within specific regions and a better understanding of social, cultural or political factors that may impede acceptance of risks and adaptation. Towards this end, greater efforts need to be made to identify critical knowledge gaps for collaborative research and research partnerships.

Promote innovation consortia: Cross-disciplinary efforts through traditional consortia (for example, the Inter-Agency Standing Committee and the Red Cross Red Crescent Movement) and through online networks (such as the Global Risk Register) are needed to identify, prioritize and promote implementation of scientific and technological innovations for anticipating and addressing crisis threats. This is not to ignore the fact that there are already a number of scientific and technological innovations that can address various aspects of possible future crises, but rather to emphasize that this must be done more systematically and be linked to risk reduction and preparedness planning. Of particular importance in this context is working with local communities to identify innovative solutions that directly relate to local needs.

Initiate a vulnerability mapping and monitoring network: More systemic means are required for mapping and monitoring factors that could create humanitarian crises at local, national, regional and global levels. Towards this end, a global platform is required that will interact with established regional and national platforms. Through

the UN system and related interactive networks, the focus of this initiative would be to ensure that essential data and knowledge are regularly available and can be incorporated into the plans of those with humanitarian roles and responsibilities. It should be a key objective of the exercise and system to ensure that localized dynamics are incorporated into the regional framework. This will also require deeper investigations into community resilience at the micro level which can affect the severity of any future crisis scenario.

In essence, as one looks to the future, humanitarian policy planners will have to develop a new planning framework that will capture the dynamics and dimensions of change. The transformations that will have to be addressed, the increasingly interconnected and transnational threats that are emerging as well as ways to deal with them, will require very fundamental changes of mindsets. Humanitarian action must be fully integrated with development activities, both aiming at sustainable development. Nowhere is this more evident than when one considers global food needs and the likely levels of hunger and malnutrition in the future.

Section II was written by Randolph Kent, Director, Humanitarian Futures Programme (HFP), King's College London, and Philip Tamminga, Head, Humanitarian Response Index, DARA.

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For further information regarding the figures, data and analysis provided, please contact the Centre for Research on the Epidemiology of Disasters (CRED).

Students eating lunch at a primary school in Osogbo, Nigeria. The school participates in Osun state's Home-Grown School Feeding Programme, established to improve the nutritional status of schoolchildren and to increase their enrolment and completion rates.

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Bill & Melinda Gates Foundation

Disaster data

According to the Centre for Research on the Epidemiology of Disasters (CRED), 406 natural disasters and 234 technological disasters were reported worldwide in 2010.

The number of natural disasters is close to the annual average for the decade (402) but shows an 11 per cent increase compared to the decade's lowest value (367), reported for both 2008 and 2009.

The number of technological disasters (234) is the decade's second lowest, after 2009, far below the numbers reported during the first five years of the decade.

The number of deaths caused by natural disasters (297,752) is by far the highest of the decade, exceeding 2004 (242,010 deaths) and 2008 (235,272 deaths). This is attributable to the January 2010 earthquake in Haiti (222,570 deaths), which was the second deadliest natural disaster of the decade (after the 2004 Indian Ocean tsunami, with 226,408 deaths), and to the summer heatwave in Russia (55,736 deaths), the second deadliest heatwave of the decade, after that in Western Europe in 2003 (72,210 deaths). Also in 2010, the total number of people reported killed by mass movements of hydrological origin (3,402) is the highest of the decade and the number of deaths caused by floods (8,408), the second highest.

The technological disaster that resulted in the highest number of deaths (346) was a stampede of people during a festival, in November, in Cambodia. Among industrial accidents, lead poisoning caused by illegal gold mining resulted in 200 deaths in Nigeria. The accident and explosion of a fuel truck led to the deaths of 192 people in the Democratic Republic of the Congo.

The number of people reported affected by natural disasters (304 million) is the second highest of the decade, but far below the peak of 2002 (709 million). In 2010, more than 60 per cent of people reported affected were victims of floods. The most severe occurred in China (134 million) and in the Indus river basin in Pakistan (more than 20 million). Six other floods affected 1 to 9 million people for a total of 23 million. Droughts accounted for 32 per cent of people affected by natural disaster. The most severe occurred in China, affecting 60 million people. Droughts in Ethiopia, Kenya, Somalia, Sudan and Zimbabwe affected more than 20 million people. Four other droughts affected more than 1 million people: in Niger and Chad (more than 10 million affected), Thailand (6.5 million), Venezuela (2.6 million) and Syria (1.3 million). The Haiti earthquake affected 3.7 million people and the Chile earthquake, 2.7 million. In May and June, landslides of hydrological origin affected 2 million people in China. In continental China, Typhoon Megi and a local storm in Xinjiang and Altay affected around 2 million people each. In Taiwan, Typhoon Fanapi affected 1 million people.

By comparison, technological disasters affect, proportionally, very few people. The lead pollution caused by illegal gold mining in Nigeria was the technological disaster that affected the most people (18,000) in 2010.

Natural disaster costs (US\$ 123.3 billion) were the fourth highest of the decade, after 2005 (US\$ 240.4 billion, 2010 prices), 2008 (US\$ 193.3 billion, 2010 prices) and 2004 (US\$ 155.8 billion, 2010 prices).

In 2010, the number of natural disasters (24) whose costs were equal to or greater than US\$ 1 billion (2010 prices) is the highest of the decade, above the peak of 2005 (21) and far above the decade's average (16). These 24 disasters accounted for almost 92 per cent of reported damages.

Damages from earthquakes accounted, in 2010, for more than US\$ 46 billion (almost 40 per cent of all reported damages) with the earthquake in Chile, which caused damages amounting to US\$ 30 billion, being the costliest disaster of the year. Damages from the Haiti earthquake amounted to US\$ 8 billion; an earthquake in Christchurch, New Zealand, cost US\$ 6 billion and the Kaohsiung earthquake in Taiwan, US\$ 1 billion.

Damages from floods accounted for more than US\$ 43 billion (35 per cent of all reported damages). The floods in China, from May to August, cost US\$ 18 billion, while the Pakistan flood cost US\$ 9.5 billion. Six other floods cost more than US\$ 1 billion for a total of US\$ 11.7 billion.

Damages from storms accounted for almost US\$ 27 billion (more than 21 per cent of all reported damages). In Western Europe, the winter storm Xynthia caused damages amounting to more than US\$ 6 billion and, in Mexico, Hurricane Karl cost almost US\$ 4 billion. Seven other storms cost more than US\$ 1 billion, for a total of US\$ 13.3 billion.

Two droughts in China and Russia amounted to a total of US\$ 3.2 billion and the wildfires in Russia to US\$ 1.8 billion.

No damages were reported for technological disasters in 2010.

EM-DAT – a specialized disaster database

Tables 1–13 on natural and technological disasters and their human impact over the last decade were drawn and documented from CRED's EM-DAT. Established in 1973 as a non-profit institution, CRED is based at the School of Public Health of the Catholic University of Louvain in Belgium and became a World Health Organization collaborating centre in 1980. Although CRED's main focus is on public health, the centre also studies the socio-economic and long-term effects of large-scale disasters.



Since 1988, with the sponsorship of the United States Agency for International Development's Office of Foreign Disaster Assistance (OFDA), CRED has maintained EM-DAT, a worldwide database on disasters. It contains essential core data on the occurrence and effects of more than 18,000 disasters in the world from 1900 to the present. The database is compiled from various sources, including United Nations (UN) agencies, non-governmental organizations, insurance companies, research institutes and press agencies.

Priority is given to data from UN agencies, followed by OFDA, governments and the International Federation of Red Cross and Red Crescent Societies. This prioritization is not a reflection of the quality or value of the data but the recognition that most reporting sources do not cover all disasters or may have political limitations that could affect the figures. The entries are constantly reviewed for redundancies, inconsistencies and the completion of missing data. CRED consolidates and updates data on a daily basis. A further check is made at monthly intervals. Revisions are made annually at the end of the calendar year.

The database's main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting.

Data definitions and methodology

CRED defines a disaster as "a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance (definition considered in EM-DAT); an unforeseen and often sudden event that causes great damage, destruction and human suffering".

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:

- Ten or more people reported killed
- 100 people or more reported affected
- Declaration of a state of emergency
- Call for international assistance.

The number of people killed includes people confirmed as dead and people missing and presumed dead. People affected are those requiring immediate assistance during a period of emergency (i.e., requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance). People reported injured or homeless are aggregated with those reported affected to produce a 'total number of people affected'.

The economic impact of a disaster usually consists of direct consequences on the local economy (e.g., damage to infrastructure, crops, housing) and indirect consequences (e.g., loss of revenues, unemployment, market destabilization). In EM-DAT, the registered figure corresponds to the damage value at the moment of the event and usually only to direct damage, expressed in US dollars (2010 prices).

In 2007, a new natural disaster category classification was introduced in EM-DAT. This new classification was initiated by CRED and Munich Re and brought together CRED, Munich Re, Swiss Re, the Asian Disaster Reduction Center (ADRC) and the UN Development Programme (UNDP). The goals were to create and agree on a common hierarchy and terminology for all global and regional databases on natural disasters and to establish a common and agreed definition of sub-events that is simple and self-explanatory.

This classification is a first step in the development of a standardized international classification of disasters. It distinguishes two generic categories for disasters: natural and technological.

The natural disasters category is into five sub-groups, which in turn cover 12 disaster types and more than 32 sub-types. The five sub-groups and 12 types are as follows:

- **Biological disasters:** Insect infestations, epidemics and animal attacks (the two last categories are not included in the *World Disasters Report*)

A woman in Thaba Patsoa, Leribe District, Lesotho is growing vegetables in her backyard. She is supported by staff from the Food Facility Support project for people living with HIV and AIDS, who need a healthy diet to strengthen their immune systems.

© Monika Mayer/
Lesotho Red Cross

- **Geophysical disasters:** Earthquakes and tsunamis, volcanic eruptions, dry mass movements (avalanches, landslides, rockfalls and subsidence of geophysical origin)
- **Climatological disasters:** Droughts (with associated food insecurities), extreme temperatures and wildfires
- **Hydrological disasters:** Floods (including waves and surges), wet mass movements (avalanches, landslides, rockfalls and subsidence of hydrological origin)
- **Meteorological disasters:** Storms (divided into nine sub-categories).

The technological disasters remain unchanged and comprise three groups:

- **Industrial accidents:** Chemical spills, collapse of industrial infrastructure, explosions, fires, gas leaks, poisoning, radiation
- **Transport accidents:** Transportation by air, rail, road or water
- **Miscellaneous accidents:** Collapse of domestic/non-industrial structures, explosions, fires.

In Tables 1–13, ‘disasters’ refer to disasters with a natural and technological trigger only, and do not include wars, conflict-related famines, diseases or epidemics.

The classification of countries as ‘very high’, ‘high’, ‘medium’ or ‘low human development’ is based on UNDP’s 2010 Human Development Index (HDI). For a small number of countries, which do not appear in the HDI, the World Bank’s classification of economies by the countries’ level of income is used as reference (‘high’, ‘upper middle’, ‘lower middle’ and ‘low’).

In both EM-DAT and the tables in this annex, data are considered at country level for many reasons, including the fact that it is at this level that they are reported most of the time and also due to issues regarding possible aggregation and disaggregation of data. For droughts or food insecurities, which are often multi-year events, their impact over time is taken into account.

Bearing in mind that data on deaths and economic damage from drought are infrequently reported, CRED has adopted the following rules regarding data for droughts:

- The total number of deaths reported for a drought is divided by the number of years for which the drought persists. The resulting number is registered for each year of the drought’s duration.
- The same calculation is done for the reported economic damages.
- For the total number of people reported to be affected, CRED considers that the same number is affected each year that the disaster persists.

Some disasters begin at the end of a year and may last some weeks or months into the following year. In such case, CRED has adopted the following rules:

- With regard to the number of people reported affected, the total number is recorded for both the start year and the end year.
- For the number of people reported to be killed, CRED distinguishes between sudden-onset disasters (earthquakes, flash floods, landslides, etc.) and slow-onset disasters (wildfires, some floods, extreme temperatures, etc.) as follows:
 - Sudden-onset disasters – all those killed are registered according to start year of the disaster
 - Slow-onset disasters – the total of all those killed is divided by two, and a half is attributed to each year of persistence.
 - Reported economic damages are always attributed to the end year of the disaster. This is because damage is related to both the strength of a disaster and its duration.

By using these rules, some data bias correction is attempted. However, they are far from perfect and CRED will try to improve them, as well as the database as a whole, in the future.

Caveats

Key problems with disaster data include the lack of standardized collection methodologies and definitions. The original information, collected from a variety of public sources, is not specifically gathered for statistical purposes. So, even when the compilation applies strict definitions for disaster events and parameters, the original suppliers of information may not. Moreover, data are not always complete for each disaster. The quality of completion may vary according to the type of disaster (for example, the number of people affected by transport accidents is rarely reported) or its country of occurrence.

Data on deaths are usually available because they are an immediate proxy for the severity of the disaster. However, the numbers put forward immediately after a disaster may sometimes be seriously revised, occasionally several months later.

Data on the numbers of people affected by a disaster can provide some of the most potentially useful figures, for planning both disaster preparedness and response, but they are sometimes poorly reported. Moreover, the definition of people affected remains open to interpretation, political or otherwise. Even in the absence of manipulation, data may be extrapolated from old census information, with assumptions being made about percentages of an area’s population affected.

Data can also be skewed because of the rationale behind data gathering. Reinsurance companies, for instance, systematically gather data on disaster occurrence in order to assess insurance risk, but with a priority in areas of the world where disaster insurance is widespread. Their data may therefore miss out poor, disaster-affected regions where insurance is unaffordable or unavailable.

For natural disasters over the last decade, data on deaths are missing for around one-tenth of reported disasters; data on people affected are missing for about one-fifth of disasters; and data on economic damages are missing for 76 per cent of disasters. The figures should therefore be regarded as indicative. Relative changes and trends are more useful to look at than absolute, isolated figures.

Dates can be a source of ambiguity. For example, a declared date for a famine is both necessary and meaningless – a famine does not occur on a single day. In such cases, the date the appropriate body declares an official emergency has been used. Changes in national boundaries cause ambiguities in the data and may make long-term trend analysis more complicated.

However, in some cases, available data may differ greatly according to sources, be more or less documented estimations and/or subject to controversies. In these cases, CRED always compiles all available data or analysis to try to make its own documented estimation, which can be revised when more accurate data are provided.

Information systems have improved vastly in the last 25 years and statistical data are now more easily available, intensified by an increasing sensitivity to disaster occurrence and consequences. Nevertheless, there are still discrepancies. An analysis of quality and accuracy of disaster data, performed by CRED in 2002, showed that occasionally, for the same disaster, differences of more than 20 per cent may exist between the quantitative data reported by the three major databases – EM-DAT (CRED), NatCat (Munich Re) and Sigma (Swiss Re).

Despite efforts to verify and review data, the quality of disaster databases can only be as good as the reporting system. This, combined with the different aims of the three major disaster databases (risk and economic risk analysis for reinsurance companies, development agenda for CRED) may explain differences between data provided for some disasters. However, in spite of these differences, the overall trends indicated by the three databases remain similar.

The lack of systematization and standardization of data collection is a major weakness when it comes to long-term planning. Fortunately, due to increased pressures for accountability from various sources, many donors and development agencies have started giving attention to data collection and its methodologies.

Part of the solution to this data problem lies in retrospective analysis. Data are most often publicly quoted and reported during a disaster event, but it is only long after the event, once the relief operation is over, that estimates of damage and death can be verified. Some data gatherers, like CRED, revisit the data; this accounts for retrospective annual disaster figures changing one, two and sometimes even three years after the event.

Please note that in the following tables, some totals may not correspond due to rounding.

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Table 1 Total number of reported disasters,¹ by continent, by year and by level of human development² (2001 to 2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total ³
Africa	184	197	170	164	170	202	184	172	155	131	1,729
Americas	134	156	126	138	139	105	133	144	115	142	1,332
Asia	295	311	294	321	360	306	261	240	233	251	2,872
Europe	96	115	96	98	125	98	104	57	75	98	962
Oceania	18	20	20	22	16	18	11	13	19	18	175
Very high human development	119	140	120	110	124	114	99	89	87	94	1,096
High human development	152	182	159	188	171	121	155	124	125	155	1,532
Medium human development	270	295	255	287	312	284	251	251	219	232	2,656
Low human development	186	182	172	158	203	210	188	162	166	159	1,786
Total	727	799	706	743	810	729	693	626	597	640	7,070

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ In Tables 1–13, disasters, refer to those with a natural and/or technological trigger only, and do not include wars, conflict-related famines, diseases or epidemics.

² See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this annex.

³ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the methodology chapter of this annex).

With 640 disasters reported, 2010 is the year with the third lowest number of disasters of the decade, far below the peaks of 2002 and 2005. Among

continents, the number of disasters was the third highest of the decade in the Americas. In Europe and in Oceania, the number of disasters was near the decade's average. In Asia, this number was the third lowest of the decade and, in Africa, the lowest for the second consecutive year. Numbers of disasters were at their second lowest level, in 2010, in countries with medium and low human development, and at their third lowest level in countries with very high human development. In countries with high human development, the number of disasters was near the average for the decade. With 39 per cent of all disasters, Asia remains the most frequently hit continent and is, in 2010, near its decade's average of 40 per cent.

Table 2 Total number of people reported killed, by continent, by year and by level of human development¹ (2001 to 2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Africa	4,519	7,639	6,160	4,246	3,193	5,780	3,821	3,027	3,180	3,045	44,610
Americas	3,077	2,108	2,080	8,439	5,434	1,563	2,921	2,737	2,245	226,616	257,220
Asia	105,990	89,336	39,030	238,360	90,853	20,623	15,816	235,622	9,995	17,654	863,279
Europe	2,338	1,821	73,373	1,259	1,026	5,837	1,665	787	1,352	57,048	146,506
Oceania	9	91	64	35	46	24	273	25	888	113	1,568
Very high human development	1,819	1,652	72,940	1,061	3,104	4,485	1,528	963	2,326	1,253	91,131
High human development	4,350	3,709	33,061	3,546	3,005	3,672	3,045	2,062	3,265	60,029	119,744
Medium human development	28,789	9,969	8,845	236,913	89,290	19,998	8,924	96,212	8,444	16,541	523,925
Low human development	80,975	85,665	5,861	10,819	5,153	5,672	10,999	142,961	3,625	226,653	578,383
Total	115,933	100,995	120,707	252,339	100,552	33,827	24,496	242,198	17,660	304,476	1,313,183

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this annex.

In 2010 the number of people reported killed was by far the highest of the decade, greater than in 2004 and 2008. In the Americas, the number of people reported killed was the highest of the decade, almost ten times higher than the decade's average. In Europe the number of people reported killed was the second highest of the decade and in Oceania, the third highest. In Asia and Africa, however, the number of people killed was respectively the third lowest and second lowest of the decade.

In 2010, 74 per cent of people killed by disasters lived in the Americas and 19 per cent in Europe, far above their decade's average of 20 and 11 per cent respectively. Inversely the proportions of people killed in Asia (6 per cent),

Africa (1 per cent) and Oceania (0.04 per cent) were significantly lower than the decade's average (66, 3 and 0.1 per cent, respectively). The number of people reported dead was the highest of the decade in countries of high and low human development, but below the decade's average in very high and medium human development countries.

The high number of people reported killed in 2010 is attributable to the earthquake in Haiti, which led to the deaths of 222,570 people and a heatwave in Russia (55,736 deaths). The other major disasters of the decade were the Indian Ocean tsunami in 2004 (226,408 deaths), Cyclone Nargis in Myanmar in 2008 (138,375), the 2008 Sichuan earthquake in China (87,476), the Kashmir earthquake in 2005 (74,648), the 2003 heatwave in Western Europe (72,210) and major earthquakes in Bam, Iran in 2003 (26,796) and in Gujarat, India in 2001 (20,017).

Table 3 Total number of people reported affected, by continent, by year and by level of human development¹ (2001 to 2010), in thousands

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total ²
Africa	44,817	43,874	28,539	36,174	22,856	26,665	12,530	21,933	41,916	34,812	314,116
Americas	10,767	2,371	3,849	9,557	8,308	1,455	9,119	20,314	7,046	12,173	84,959
Asia	186,203	660,811	235,689	132,860	129,717	119,101	190,885	182,754	174,056	255,995	2,268,070
Europe	787	1,493	1,546	538	525	260	1,651	268	141	834	8,043
Oceania	31	46	38	119	28	38	172	105	77	574	1,228
Very high human development	1,263	1,012	575	5,572	1,180	183	1,176	13,490	2,500	1,232	28,184
High human development	47,423	3,092	5,202	4,413	7,027	1,699	8,266	5,756	4,053	7,761	94,692
Medium human development	137,982	648,626	235,382	110,036	129,041	116,074	167,562	180,117	170,010	255,490	2,150,321
Low human development	55,938	55,865	28,501	59,227	24,186	29,563	37,351	26,011	46,673	39,904	403,220
Total	242,606	708,595	269,660	179,248	161,435	147,519	214,356	225,374	223,236	304,388	2,676,416

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this annex

² Since slow-onset disasters can affect the same people for a number of years, it is best to use figures on total numbers affected to calculate annual averages over a decade rather than as absolute totals.

In 2010, the number of 304 million people affected by disasters was the second highest of the decade, although it is much lower than the peak of almost 709 million of 2002. In Oceania, the number of people reported affected was the highest of the decade. It was the second highest in the Americas and in Asia. In Europe and Africa, the number of people affected was near their decade's average.

In 2010, the number of people affected living in countries of high and of medium human development was the second highest of the decade. In countries of very high and of low human development, the number of people affected was far below their decade's average.

In 2010, two major disasters occurred in China: floods, from May to August, affected a total of 134 million people and droughts, which began in 2009, affected around 60 million people. The Indus river basin flood in Pakistan affected more than 20 million people.

Table 4 Total amount of disaster estimated damage, by continent, by year and by level of human development¹ (2001 to 2010) in millions of US dollars (2010 prices)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Africa	818	443	6,561	1,939	38	248	689	928	176	59	11,899
Americas	16,204	15,637	25,314	76,056	192,174	7,720	16,640	65,228	15,075	56,981	487,029
Asia	15,941	16,102	28,073	76,553	30,863	25,430	36,344	119,886	17,975	36,621	403,788
Europe	2,433	40,940	21,765	2,105	17,552	2,628	23,177	4,722	12,303	17,696	145,320
Oceania	596	2,752	703	638	245	1,391	1,512	2,548	1,754	11,944	24,083
Very high human development	17,112	61,466	52,088	124,490	195,157	12,309	47,343	65,296	26,675	36,198	638,134
High human development	5,572	4,247	9,087	8,868	14,790	2,154	13,069	7,858	3,700	42,155	111,500
Medium human development	13,232	10,100	20,604	19,167	30,855	22,950	14,449	115,562	16,391	36,861	300,171
Low human development	76	63	636	4,766	70	3	3,502	4,596	516	8,087	22,314
Total	35,992	75,875	82,415	157,290	240,872	37,417	78,363	193,312	47,282	123,302	1,072,120

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this annex.

As mentioned in the introduction, damage assessment is frequently unreliable. Even for the existing data, the methodologies are not standardized and the financial coverage can vary significantly. Depending on where the disaster occurred occurs and who reports it, estimations may vary from zero to billions of US dollars.

The total amount of damage reported in 2010 was the fourth highest of the decade. In Oceania, the amount of damages was the highest of the decade. It was the third highest in Asia, and the fourth highest in the Americas and in

Europe. Inversely, in Africa, the amount of reported damages was the second lowest of the decade.

In 2010, Oceania accounted for almost 10 per cent of damage, far greater than its average of 2 per cent for the decade. The contribution of high human development countries to the total amount of damages climbed to 34 per cent (decade average: 10 per cent). However, very high human development countries contributed 28 per cent of damage in 2010, far below their decade's average of 59 per cent.

The earthquake which occurred in February in Chile was the costliest disaster in 2010 (US\$ 30 billion reported damages). The damages associated with the floods in China amounted to US\$ 18 billion.

Table 5 Total number of reported disasters, by type of phenomenon and by year (2001 to 2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total ¹
Droughts/food insecurity	43	40	23	19	28	20	13	20	30	24	260
Earthquakes/tsunamis	25	37	40	42	25	24	21	23	22	25	284
Extreme temperatures	23	15	26	19	29	32	25	11	26	34	240
Floods ²	157	173	160	135	193	232	219	175	159	189	1,792
Forest/scrub fires	14	23	14	8	13	10	18	5	9	7	121
Insect infestation	2	n.d.r.	n.d.r.	12	n.d.r.	1	n.d.r.	n.d.r.	1	n.d.r.	16
Mass movement: dry ³	n.d.r.	1	n.d.r.	1	n.d.r.	1	n.d.r.	3	1	n.d.r.	7
Mass movement: wet ⁴	24	20	21	16	12	20	10	12	29	32	196
Volcanic eruptions	6	7	2	5	8	12	6	7	3	6	62
Windstorms	108	123	86	127	131	77	105	111	87	89	1,044
Subtotal climato-, hydro- and meteorological disasters	371	394	330	336	406	392	390	334	341	375	3,669
Subtotal geophysical disasters	31	45	42	48	33	37	27	33	26	31	353
Total natural disasters	402	439	372	384	439	429	417	367	367	406	4,022
Industrial accidents	54	48	52	81	76	62	52	38	43	36	542
Miscellaneous accidents	50	52	45	62	66	33	43	30	27	47	455
Transport accidents	221	260	237	216	229	205	181	191	160	151	2,051
Total technological disasters	325	360	334	359	371	300	276	259	230	234	3,048
Total	727	799	706	743	810	729	693	626	597	640	7,070

Source : EM-DAT, CRED, University of Louvain, Belgium

¹ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the methodology chapter of this annex).

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.d.r.' signifies 'no disaster reported'.

In 2010, the number of natural disasters was near the average for the decade. The number of technological disasters was the second lowest of the decade, far below the peak of 2005.

Among natural disasters, the most frequent disasters were floods (47 per cent), in a proportion close to their average of 45 per cent for the decade. The number of disasters caused by both extreme temperatures and mass movements of hydrological origin were the highest of the decade. All other natural disasters were below their respective average for the decade.

Among technological disasters, transport accidents were the most frequent, although the number of such accidents was the lowest of the decade. The number of industrial accidents was also the lowest of the decade.

Table 6 Total number of people reported killed, by type of phenomenon and by year (2001 to 2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Droughts/food insecurity	76,475	76,903	38	80	88	208	n.a.	6	2	2	153,802
Earthquakes/tsunamis	21,348	1,636	29,617	227,290	76,241	6,692	780	87,918	1,888	226,735	680,145
Extreme temperatures	1,787	3,019	74,748	556	814	5,104	1,044	1,608	1,212	57,268	147,160
Floods ¹	5,044	4,236	3,770	7,102	5,767	5,845	8,565	4,029	3,534	8,408	56,300
Forest/scrub fires	33	6	47	14	47	16	150	86	190	135	724
Insect infestation	n.a.	n.d.r.	n.d.r.	n.a.	n.d.r.	n.a.	n.d.r.	n.d.r.	n.a.	n.d.r.	n.a.
Mass movement: dry ²	n.d.r.	60	n.d.r.	44	n.d.r.	11	n.d.r.	120	36	n.d.r.	271
Mass movement: wet ³	786	1,100	707	313	646	1,638	271	504	657	3,402	10,024
Volcanic eruptions	n.a.	200	n.a.	2	3	5	11	16	n.a.	323	560
Windstorms	1,914	1,384	1,030	6,609	5,294	4,329	6,035	140,985	3,287	1,479	172,346
Subtotal climato- hydro- & meteorological disasters	86,039	86,648	80,340	14,674	12,656	17,140	16,065	147,218	8,882	70,694	540,356
Subtotal geophysical disasters	21,348	1,896	29,617	227,336	76,244	6,708	791	88,054	1,924	227,058	680,976
Total natural disasters	107,387	88,544	109,957	242,010	88,900	23,848	16,856	235,272	10,806	297,752	1,221,332
Industrial accidents	1,279	1,112	1,444	1,797	2,281	1,832	1,656	776	933	1,061	14,171
Miscellaneous accidents	1,341	2,013	1,438	2,115	2,669	1,126	909	895	911	1,512	14,929
Transport accidents	5,926	9,326	7,868	6,417	6,702	7,021	5,075	5,255	5,010	4,151	62,751
Total technological disasters	8,546	12,451	10,750	10,329	11,652	9,979	7,640	6,926	6,854	6,724	91,851
Total	115,933	100,995	120,707	252,339	100,552	33,827	24,496	242,198	17,660	304,476	1,313,183

Source : EM-DAT, CRED, University of Louvain, Belgium

¹ Includes waves and surges.

² Landslides, rockfalls, subsidence, etc. of geophysical origin.

³ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

In 2010, the number of deaths caused by natural disaster was the highest of the entire decade, while the number of deaths caused by technological disasters was the lowest of the decade.

Among natural disasters, the number of deaths from volcanic eruptions and from mass movements of hydrological origin was the highest of the decade. The number of deaths from earthquakes and tsunamis was the second highest of the decade, as was the number of deaths caused by floods and extreme temperatures. Forest and scrub fires caused the death of 135 people, the third highest figure of the decade.

Deaths from transport accidents were the lowest of the decade and deaths from industrial accidents, the second lowest.

Most reported deaths caused by droughts and food insecurity during the decade were attributable to the famine in the Democratic People's Republic of Korea, although the estimates provided are disputed.

Table 7 Total number of people reported affected, by type of phenomenon and by year (2001 to 2010), in thousands

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total ¹
Droughts/food insecurity	165,898	428,006	809,668	34,398	30,643	44,371	8,278	36,761	108,946	98,235	1,036,504
Earthquakes/tsunamis	9,711	851	4,194	3,147	6,187	3,859	1,382	47,580	3,221	6,937	87,071
Extreme temperatures	213	104	1,890	2,140	2	63	988	79,171	856	892	86,320
Floods ²	34,552	167,789	169,515	117,569	75,027	31,124	177,840	46,066	58,983	186,894	1,065,359
Forest/scrub fires	6	31	184	21	7	3	1,785	59	12	30	2,137
Insect infestation	n.a.	n.d.r.	n.d.r.	n.a.	n.d.r.	n.a.	n.d.r.	n.d.r.	500	n.d.r.	500
Mass movement: dry ³	n.d.r.	n.a.	n.d.r.	<1	n.d.r.	<1	n.d.r.	<1	3	n.d.r.	4
Mass movement: wet ⁴	71	305	459	230	10	432	9	5	44	2,460	4,024
Volcanic eruptions	110	278	25	53	341	379	51	40	57	171	1,504
Windstorms	31,991	111,163	11,758	21,383	49,117	67,112	23,974	15,652	50,583	8,733	391,465
Subtotal climato- hydro- and meteorological disasters	232,731	707,397	264,774	175,741	154,806	143,106	212,875	177,715	219,922	297,244	2,586,309
Subtotal geophysical disasters	9,822	1,130	4,219	3,200	6,528	4,237	1,433	47,621	3,281	7,108	88,580
Total natural disasters	242,553	708,526	268,993	178,941	161,335	147,343	214,308	225,336	223,203	304,352	2,674,889
Industrial accidents	19	2	646	157	16	137	3	14	6	26	1,027
Miscellaneous accidents	31	61	15	102	77	35	41	21	23	7	413
Transport accidents	3	6	5	48	6	4	4	4	5	3	87
Total technological disasters	53	68	667	307	100	175	48	39	33	36	1,527
Total	242,606	708,595	269,660	179,248	161,435	147,519	214,356	225,374	223,236	304,388	2,676,416

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Since slow-onset disasters can affect the same country for a number of years, it is best to use figures on total numbers to calculate annual averages over a decade rather than as absolute totals (see the methodology chapter of this annex).

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'.

In 2010, the number of people reported affected by natural disasters was the second highest of the decade, while the number of those reported affected by technological disasters was the second lowest of the decade. Among natural disasters, floods affected almost 187 million people in 2010, the highest number of people affected by floods in the decade.

With the exception of volcanic eruptions, the numbers of people reported affected by all other natural disasters in 2010 are below the average for the decade.

The numbers of people affected by both transport accidents and miscellaneous accidents are the lowest of the decade.

Table 8 Total amount of disaster estimated damage, by type of phenomenon and by year (2001 to 2010) in millions of US dollars (2010 prices)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Droughts/food insecurity	2,832	10,045	877	1,728	2,185	3,393	532	220	2,078	3,316	27,205
Earthquakes/tsunamis	9,064	2,506	9,780	44,550	7,490	3,713	15,751	86,911	6,156	46,151	232,070
Extreme temperatures	246	n.a.	14,836	n.a.	447	1,082	n.a.	22,225	1,118	462	40,416
Floods ¹	5,850	32,513	24,366	12,333	19,657	8,816	25,233	20,032	8,132	43,191	200,123
Forest/scrub fires	n.a.	548	7,223	3	4,185	1,016	4,837	2,462	1,539	2,070	23,883
Insect infestation	n.a.	n.d.r.	n.d.r.	n.a.	n.d.r.	n.a.	n.d.r.	n.d.r.	n.a.	n.d.r.	n.a.
Mass movement: dry ²	n.d.r.	n.a.	n.d.r.	n.a.	n.d.r.	n.a.	n.d.r.	n.a.	n.a.	n.d.r.	n.a.
Mass movement: wet ³	87	233	53	12	61	43	n.a.	n.a.	156	1,277	1,924
Volcanic eruptions	21	11	n.a.	n.a.	n.a.	162	n.a.	n.a.	n.a.	n.a.	194
Windstorms	17,874	17,872	25,281	97,155	206,377	19,190	31,096	61,462	26,553	26,835	529,694
Subtotal climato-, hydro- & meteorological disasters	26,890	61,211	72,636	111,231	232,913	33,540	61,698	106,400	39,576	77,151	823,245
Subtotal geophysical disasters	9,084	2,517	9,780	44,550	7,490	3,875	15,751	86,911	6,156	46,151	232,264
Total natural disasters	35,974	63,728	82,415	155,781	240,402	37,416	77,449	193,312	45,732	123,302	1,055,509
Industrial accidents	12	12,072	n.a.	1,039	458	n.a.	914	n.a.	1,551	n.a.	16,046
Miscellaneous accidents	6	75	n.a.	n.a.	11	1	n.a.	n.a.	n.a.	n.a.	94
Transport accidents	n.a.	n.a.	n.a.	471	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	471
Total technological disasters	18	12,147	n.a.	1,509	469	1	914	n.a.	1,551	n.a.	16,610
Total	35,992	75,875	82,415	157,290	240,872	37,417	78,363	193,312	47,282	123,302	1,072,120

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Includes waves and surges.² Landslides, rockfalls, subsidence, etc. of geophysical origin.³ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

Estimates of disaster damage must be treated with caution, as the financial value attached to infrastructures in developed countries is much higher than

in developing countries. While reporting is better for large disasters, the low reporting rates of direct damage make analysis difficult.

In 2010, among natural disasters, geophysical disasters accounted for 37 per cent of reported damages and floods for 35 per cent, far above their respective averages for the decade (22 and 19 per cent). Damages reported for windstorms were half of the decade's average, while those resulting from mass movements of hydrological origin were by far the highest of the decade in 2010.

Table 9 Total number of reported disasters, by type of phenomenon, by continent and by level of human development¹ (2001 to 2010)

	Africa	Americas	Asia	Europe	Oceania	VHHD ¹	HHD ¹	MHD ¹	LHD ¹	Total
Droughts/food insecurity	131	56	60	11	2	14	32	84	130	260
Earthquakes/tsunamis	24	43	170	35	12	35	91	125	33	284
Extreme temperatures	3	39	59	137	2	96	78	44	22	240
Floods ²	442	357	686	256	51	248	423	614	507	1,792
Forest/scrub fires	12	47	14	38	10	67	29	20	5	121
Insect infestation	13	n.d.r.	1	1	1	1	1	3	11	16
Mass movement: dry ³	1	3	2	n.d.r.	1	n.d.r.	2	4	1	7
Mass movement: wet ⁴	16	38	126	10	6	6	39	111	40	196
Volcanic eruptions	7	23	19	2	11	3	18	28	13	62
Windstorms	86	343	398	149	68	380	183	354	127	1,044
<i>Subtotal climato-, hydro- & meteorological disasters</i>	703	880	1,344	602	140	812	785	1,230	842	3,669
<i>Subtotal geophysical disasters</i>	32	69	191	37	24	38	111	157	47	353
Total natural disasters	735	949	1,535	639	164	850	896	1,387	889	4,022
Industrial accidents	57	27	406	51	1	30	68	386	58	542
Miscellaneous accidents	110	58	222	65	n.d.r.	52	95	205	103	455
Transport accidents	827	298	709	207	10	164	473	678	736	2,051
Total technological disasters	994	383	1,337	323	11	246	636	1,269	897	3,048
Total	1,729	1,332	2,872	962	175	1,096	1,532	2,656	1,786	7,070

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this chapter. VHHD stands for very high human development; HHD for high human development, MHD for medium human development and LHD for low human development.

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

During the decade, Asia accounted for 41 per cent of the total number of disasters but for 75 per cent of industrial accidents, 64 per cent of mass movements of hydrological origin, 60 per cent of earthquakes/tsunamis, 45 per cent of

miscellaneous accidents and 38 per cent of windstorms. Africa accounted for 24 per cent of the total number of disasters but for 81 per cent of insect infestations, 50 per cent of droughts/food insecurities and 40 per cent of transport accidents. Americas accounted for 19 per cent of the total number of disasters but for 43 per cent of mass movements of geological origin, 39 per cent of wildfires, 37 per cent of volcanic eruptions and 33 per cent of windstorms. Europe accounted for 14 per cent of the total number of disasters but for 57 per cent of extreme temperatures and for 31 per cent of wildfires. Oceania accounted for 2.5 per cent of the total number of disasters but for 18 per cent of volcanic eruptions, 8 per cent of wildfires and 6.5 per cent of windstorms.

During the decade, wildfires affected most frequently countries of very high human development, while industrial accidents and mass movement of both geological and hydrological origin occurred in countries of medium human development.

Table 10 Total number of people reported killed, by type of phenomenon, by continent and by level of human development¹ (2001 to 2010)

	Africa	Americas	Asia	Europe	Oceania	VHHD ¹	HHD ¹	MHD ¹	LHD ¹	Total
Droughts/food insecurity	996	51	152,755	n.a.	n.a.	n.a.	12	282	153,508	153,802
Earthquakes/tsunamis	3,336	225,172	450,742	651	244	419	31,927	423,485	224,314	680,145
Extreme temperatures	122	1,765	9,019	135,907	347	77,768	60,491	5,762	3,139	147,160
Floods ²	7,397	8,549	38,937	1,318	99	1,082	7,132	33,143	14,943	56,300
Forest/scrub fires	162	51	67	238	206	443	97	126	58	724
Insect infestation	n.a.	n.d.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mass movement: dry ³	98	108	55	n.d.r.	10	n.d.r.	72	189	10	271
Mass movement: wet ⁴	643	1,254	7,853	191	83	67	1,162	6,775	2,020	10,024
Volcanic eruptions	206	23	331	n.a.	n.a.	n.a.	21	327	212	560
Windstorms	1,269	10,230	160,030	514	303	5,695	925	16,187	149,539	172,346
Subtotal climato-, hydro- & meteorological disasters	10,589	21,900	368,661	138,168	1,038	85,055	69,819	62,275	323,207	540,356
Subtotal geophysical disasters	3,640	225,303	451,128	651	254	419	32,020	424,001	224,536	680,976
Total natural disasters	14,229	247,203	819,789	138,819	1,292	85,474	101,839	486,276	547,743	1,221,332
Industrial accidents	2,050	533	10,451	1,108	29	366	1,656	9,865	2,284	14,171
Miscellaneous accidents	3,269	2,191	7,983	1,486	n.d.r.	1,267	3,255	6,941	3,466	14,929
Transport accidents	25,062	7,293	25,056	5,093	247	4,024	12,994	20,843	24,890	62,751
Total technological disasters	30,381	10,017	43,490	7,687	276	5,657	17,905	37,649	30,640	91,851
Total	44,610	257,220	863,279	146,506	1,568	91,131	119,744	523,925	578,383	1,313,183

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this chapter. VHHD stands for very high human development; HHD for high human development, MHD for medium human development and LHD for low human development.

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

During the decade, very high human development countries accounted for only 7 per cent of the total number of reported deaths, but for 61 per cent of deaths

from wildfires and for 53 per cent of deaths from extreme temperature. High human development countries accounted for 9 per cent of the total number reported deaths but for 41 per cent of deaths from extreme temperatures and for 27 per cent of those from mass movements of geological origin. Medium human development countries accounted for 40 per cent of the total number reported deaths but for almost 70 per cent of deaths from industrial accidents and mass movements of both geological and hydrological origin, for 62 per cent of deaths from earthquakes and for 59 per cent of deaths from floods and volcanic eruptions. Low human development countries accounted for 44 per cent of the total number reported deaths but for 99 per cent of those caused by droughts/food insecurities and 87 per cent of deaths from windstorms.

Table 11 Total number of people reported affected, by type of phenomenon, by continent and by level of human development¹ (2001 to 2010), in thousands

	Africa	Americas	Asia	Europe	Oceania	VHHD ¹	HHD ¹	MHD ¹	LHD ¹	Total
Droughts/food insecurity	286,449	6,624	742,159	1,273	n.a.	n.a.	41,060	702,329	293,115	1,036,504
Earthquakes/tsunamis	386	9,456	76,193	717	319	563	5,771	76,749	3,988	87,071
Extreme temperatures	n.a.	4,976	81,236	106	2	21	5,079	80,544	675	86,320
Floods ²	22,455	34,605	1,004,261	3,644	393	13,321	23,937	945,522	82,579	1,065,359
Forest/scrub fires	12	908	25	1,170	22	970	1,011	150	7	2,137
Insect infestation	500	n.d.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	500	500
Mass movement: dry ³	1	3	n.a.	n.d.r.	n.a.	n.d.r.	n.a.	4	n.a.	4
Mass movement: wet ⁴	36	95	3,882	1	11	1	35	3,073	916	4,024
Volcanic eruptions	405	558	472	n.a.	69	n.a.	554	504	446	1,504
Windstorms	3,530	27,152	359,293	1,078	412	13,256	16,655	340,964	20,590	391,465
Subtotal climato-, hydro- & meteorological disasters	312,982	74,359	2,190,856	7,272	840	27,569	87,777	2,072,581	398,383	2,586,309
Subtotal geophysical disasters	792	10,017	76,665	717	388	563	6,325	77,257	4,434	88,579
Total natural disasters	313,774	84,376	2,267,521	7,990	1,228	28,132	94,102	2,149,838	402,817	2,674,889
Industrial accidents	121	566	310	30	n.a.	41	554	311	120	1,027
Miscellaneous accidents	206	9	178	20	n.d.r.	5	26	155	228	413
Transport accidents	15	7	61	4	n.a.	6	9	18	54	87
Total technological disasters	343	582	548	54	n.a.	52	589	483	402	1,527
Total	314,116	84,959	2,268,070	8,043	1,228	28,184	94,692	2,150,321	403,220	2,676,416

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this chapter. VHHD stands for very high human development; HHD for high human development, MHD for medium human development and LHD for low human development.

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

During the decade, medium human development countries accounted for 80 per cent of the total number of people reported affected by disasters but for 93 per

cent of those affected by extreme temperatures, 88 per cent of those affected by earthquakes/tsunamis or by floods and 87 per cent of those affected by windstorms. Low human development countries accounted for 15 per cent of the total number of people reported affected by disasters but for 63 per cent of those affected by transport accidents, 55 per cent of those affected by miscellaneous accidents and 29 per cent of deaths from droughts/food insecurities and volcanic eruptions. High human development countries for 3.5 per cent of the total number of people reported affected by disasters but for 53 per cent of those affected by industrial accidents, 47 per cent of those affected by wildfires and 37 per cent of people affected by volcanic eruptions. Very high human development countries accounted for only 1 per cent of the total number of people reported affected by disasters but for 45 per cent of those affected by wildfires.

Table 12 Total amount of disaster estimated damage, by type of phenomenon, by continent and by level of human development¹ (2001 to 2010) in millions of US dollars (2010 prices)

	Africa	Americas	Asia	Europe	Oceania	VHHD ¹	HHH ¹	MHD ¹	LHD ¹	Total
Droughts/food insecurity	369	7,667	12,479	4,266	2,424	9,266	5,954	11,985	n.a.	27,205
Earthquakes/tsunamis	6,681	44,713	168,228	5,786	6,662	64,173	40,471	118,034	9,392	232,070
Extreme temperatures	n.a.	1,118	22,761	16,291	246	16,173	1,482	22,761	n.a.	40,416
Floods ²	2,681	29,698	105,957	54,495	7,291	75,097	20,878	99,264	4,884	200,123
Forest/scrub fires	436	10,472	285	10,695	1,996	21,477	1,923	482	n.a.	23,883
Insect infestation	n.a.	n.d.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mass movement: dry ³	n.a.	n.a.	n.a.	n.d.r.	n.a.	n.d.r.	n.a.	n.a.	n.a.	n.a.
Mass movement: wet ⁴	n.a.	529	1,177	218	n.a.	218	29	1,677	n.a.	1,924
Volcanic eruptions	11	176	3	4	n.a.	4	176	3	11	194
Windstorms	785	392,572	91,747	39,125	5,464	439,538	37,327	45,272	7,557	529,694
Subtotal climato-, hydro- & meteorological disasters	4,271	442,055	234,407	125,090	17,421	561,770	67,593	181,442	12,441	823,245
Subtotal geophysical disasters	6,692	44,889	168,231	5,790	6,662	64,177	40,647	118,037	9,403	232,264
Total natural disasters	10,964	486,945	402,638	130,880	24,083	625,947	108,239	299,479	21,844	1,055,509
Industrial accidents	936	7	663	14,441	n.a.	12,187	3,183	676	n.a.	16,046
Miscellaneous accidents	n.a.	78	16	n.a.	n.d.r.	n.a.	78	16	n.a.	94
Transport accidents	n.a.	n.a.	471	n.a.	n.a.	n.a.	n.a.	n.a.	471	471
Total technological disasters	936	84	1,150	14,441	n.a.	12,187	3,261	691	471	16,610
Total	11,899	487,029	403,788	145,320	24,083	638,134	111,500	300,171	22,314	1,072,120

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ See note on UNDP's Human Development Index country status in the section on disaster definitions in the introduction to this chapter. VHHD stands for very high human development; HHD for high human development, MHD for medium human development and LHD for low human development.

² Includes waves and surges.

³ Landslides, rockfalls, subsidence, etc. of geophysical origin.

⁴ Landslides, avalanches, subsidence, etc. of hydrological origin.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

Estimates of disaster damage must be treated with caution, as the financial value attached to infrastructures in developed countries is much higher than in developing countries. While reporting is better for large disasters, the low reporting rates of direct damage make analysis difficult.

During the decade, Americas accounted for 45 per cent of the reported damages but for 90 per cent of costs related to volcanic eruptions and for 74 per cent of those related to windstorms. Asia accounted for 38 per cent of the reported damages but for 72 per cent of costs caused by earthquakes/tsunamis, 61 per cent of those related to mass movements of hydrological origin, 56 per cent of those caused by extreme temperatures, 53 per cent of those caused by floods and 46 per cent from droughts/food insecurities. Europe accounted for 13 per cent of the reported damages but for 90 per cent of those caused by industrial accidents, 40 per cent of those related to extreme temperatures and 27 per cent of those caused by floods. Oceania accounted for 2.2 per cent of reported damages but for 9 per cent of those caused by droughts and 8 per cent of those caused by wildfires. Africa accounted for only 1.1 per cent of the reported damages but for 6 per cent of those caused by industrial accidents and 5 per cent of those caused by volcanic eruptions.

Almost 60 per cent of costs were reported from countries with very high human development.

Table 13 Total number of people reported killed and affected by disasters by country and territory (1991 to 2000; 2001 to 2010; and 2010)

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
AFRICA	32,385	248,019,540	44,610	314,116,276	3,045	34,812,286
Algeria	515	68,604	4,161	411,757	31	69
Angola	1,070	4,089,281	862	977,401	25	189,781
Benin	88	834,276	380	1,121,702	46	831,000
Botswana	23	244,276	n.a.	10,016	n.d.r.	n.d.r.
Burkina Faso	28	239,940	386	448,890	16	133,362
Burundi	4	1,331,310	487	7,574,676	9	183,490
Cameroon	609	191,834	787	42,196	77	4,850
Cape Verde	18	16,306	60	30,001	n.d.r.	n.d.r.
Central African Republic	19	76,628	285	74,854	3	1,585
Chad	41	911,206	284	6,120,917	24	2,544,579
Comoros	240	200	342	286,855	n.d.r.	n.d.r.
Congo, Democratic Republic of the	1,152	114,642	3,819	344,965	496	74,519
Congo, Republic of	653	78,831	181	140,037	54	400
Côte d'Ivoire	387	288	166	114,038	18	6,425
Djibouti	145	240,775	197	1,223,173	n.d.r.	n.d.r.
Egypt	2,705	262,080	3,183	10,449	69	3,540
Equatorial Guinea	1	100	104	5,200	n.a.	250
Eritrea ¹	133	6,215,725	56	8,607,043	n.d.r.	n.d.r.
Ethiopia ¹	933	37,369,054	1,639	56,883,944	19	6,280,700
Gabon	102	n.a.	94	2,253	n.a.	1,442
Gambia	153	37,000	71	70,996	9	38,961
Ghana	389	3,024,611	869	713,958	115	17,174
Guinea	562	6,107	431	335,101	27	48,035
Guinea Bissau	217	5,222	140	190,956	23	56,792
Kenya	1,931	57,912,462	1,903	68,343,931	226	4,102,514
Lesotho	n.a.	994,750	41	1,956,561	n.d.r.	n.d.r.
Liberia	10	7,000	75	536,926	12	15,502
Libyan Arab Jamahiriya	275	18	573	85	104	1
Madagascar	854	4,747,555	1,083	4,760,432	120	192,132
Malawi	545	28,588,624	803	15,038,189	n.a.	21,290

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Mali	171	310,763	256	2,800,109	43	619,284
Mauritania	137	514,194	187	3,442,513	13	308,750
Mauritius	5	10,800	5	1,050	n.d.r.	n.d.r.
Mayotte (F)	n.d.r.	n.d.r.	21	12	n.d.r.	n.d.r.
Morocco	1,487	649,370	1,565	423,196	88	77,085
Mozambique	1,511	14,326,067	835	7,909,792	89	477,000
Namibia	20	881,400	175	1,269,309	8	110,000
Niger	119	1,757,546	156	29,468,818	5	8,133,226
Nigeria	5,145	812,563	7,530	2,107,543	373	1,518,272
Réunion (F)	61	600	2	3,190	n.d.r.	n.d.r.
Rwanda	199	1,953,308	273	5,056,117	32	5,937
Saint Helena (UK)	n.d.r.	n.d.r.	n.a.	300	n.d.r.	n.d.r.
Sao Tome and Principe	n.d.r.	n.d.r.	33	34	n.d.r.	n.d.r.
Senegal	369	419,017	1,587	918,127	2	102,516
Seychelles	5	1,237	3	11,630	n.d.r.	n.d.r.
Sierra Leone	965	200,025	528	21,285	16	239
Somalia	2,667	2,814,110	1,060	11,094,543	11	2,416,200
South Africa	1,883	382,781	1,438	15,244,628	131	133
Sudan	891	23,470,526	1,145	12,366,189	121	4,438,510
Swaziland	n.a.	1,522,000	55	1,391,744	n.d.r.	n.d.r.
Tanzania	1,795	16,851,065	1,325	7,928,375	75	50,129
Togo	3	341,905	131	299,764	35	111,597
Tunisia	34	89	533	33,651	n.d.r.	n.d.r.
Uganda	671	1,884,763	1,455	5,648,454	453	12,814
Zambia	134	5,985,455	394	4,249,792	9	1,350
Zimbabwe	311	25,321,251	456	26,048,609	18	1,680,851
AMERICAS	77,943	50,605,918	257,220	84,958,500	226,616	12,173,051
Anguilla (UK)	n.a.	150	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Antigua and Barbuda	6	11,684	n.a.	30,800	n.a.	5,000
Argentina	424	608,401	584	724,473	57	4
Aruba (NL)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Bahamas	5	1,700	68	20,578	n.d.r.	n.d.r.
Barbados	n.a.	n.a.	1	5,381	n.a.	2,500
Belize	45	125,170	41	88,000	n.a.	n.a.

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Bermuda	18	n.a.	4	n.a.	n.d.r.	n.d.r.
Bolivia	621	524,085	893	2,442,664	90	290,769
Brazil	2,251	20,572,744	2,849	7,435,554	447	294,967
Canada	519	81,605	59	31,916	n.a.	n.a.
Cayman Islands (UK)	n.d.r.	n.d.r.	2	300	n.d.r.	n.d.r.
Chile	435	514,717	905	3,255,151	674	2,671,747
Colombia	2,977	1,985,066	2,501	7,957,880	659	2,239,380
Costa Rica	173	1,009,442	132	472,242	27	3,106
Cuba	813	2,524,991	267	9,838,800	68	n.a.
Dominica	13	5,716	5	7,805	n.d.r.	n.d.r.
Dominican Republic	783	1,024,425	1,244	347,667	7	47,200
Ecuador	1,109	457,772	529	1,155,801	108	116,993
El Salvador	704	102,021	1,735	2,194,308	44	12,042
Falkland Islands (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
French Guiana (F)	n.a.	70,000	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Greenland (DK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Grenada	n.a.	210	40	61,650	n.a.	n.a.
Guadeloupe (F)	4	899	21	153	n.d.r.	n.d.r.
Guatemala	862	154,584	2,408	3,874,104	246	455,908
Guyana	10	1,252,600	34	409,774	n.a.	n.a.
Haiti	4,155	2,605,714	229,551	4,990,988	222,658	3,800,230
Honduras	15,260	2,814,155	556	1,088,313	144	29,685
Jamaica	28	556,512	70	431,916	15	2,506
Martinique (F)	2	3,610	2	106	n.d.r.	n.d.r.
Mexico	3,924	2,540,817	1,568	8,254,476	294	1,600,374
Montserrat (UK)	32	13,000	n.a.	200	n.d.r.	n.d.r.
Netherlands Antilles (NL)	2	40,000	15	4	n.d.r.	n.d.r.
Nicaragua	3,695	1,828,816	387	630,180	71	75,860
Panama	149	50,102	136	132,612	15	32,941
Paraguay	162	495,664	420	551,945	12	0
Peru	2,646	3,270,670	4,135	7,295,410	735	375,284
Puerto Rico (US)	126	156,005	54	16,999	n.d.r.	n.d.r.
Saint Kitts and Nevis	5	12,980	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Saint Lucia	4	1,125	11	3,000	10	3,000

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Saint Pierre et Miquelon (F)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Saint Vincent and The Grenadines	3	300	4	7,634	n.a.	6,100
Suriname	n.d.r.	n.d.r.	35	31,548	n.d.r.	n.d.r.
Trinidad and Tobago	5	627	3	1,760	n.a.	n.a.
Turks and Caicos Islands (UK)	43	n.a.	89	1,818	n.d.r.	n.d.r.
United States	5,165	4,502,527	5,079	20,807,165	154	12,612
Uruguay	117	24,587	50	153,220	16	8
Venezuela	30,638	650,722	723	204,205	65	94,835
Virgin Islands (UK)	n.a.	3	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Virgin Islands (US)	10	10,000	n.a.	n.a.	n.d.r.	n.d.r.
ASIA	789,216	2,036,599,311	863,279	2,268,069,884	17,654	255,994,856
Afghanistan	10,602	3,116,217	5,511	8,348,508	520	46,237
Armenia ²	106	7,319,954	1	n.a.	n.d.r.	n.d.r.
Azerbaijan ²	613	2,446,621	93	106,510	3	70,000
Bahrain	143	n.a.	69	60	n.d.r.	n.d.r.
Bangladesh	148,690	82,636,493	13,279	70,452,105	435	927,702
Bhutan	239	66,600	23	12	n.d.r.	n.d.r.
Brunei Darussalam	n.a.	n.a.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Cambodia	1,163	22,237,432	555	4,944,674	366	388
China, People's Democratic Republic ^{3,4}	37,156	1,235,805,479	117,175	1,366,323,689	7,997	205,658,297
Georgia ²	446	700,620	7	726,552	n.d.r.	n.d.r.
Hong Kong (China) ³	220	9,052	61	19,166	1	15,000
India	59,072	411,430,090	63,611	563,498,367	2,234	4,790,863
Indonesia	9,456	8,029,788	183,259	11,454,266	1,374	225,449
Iran, Islamic Republic of	5,127	75,217,854	31,371	39,355,182	82	4,868
Iraq	133	507	1,554	72,745	61	205
Israel	119	1,672	92	20,497	46	20,022
Japan	6,581	1,883,739	1,284	1,081,632	202	15,004
Jordan	82	348,552	122	110	n.d.r.	n.d.r.
Kazakhstan ²	244	640,536	258	107,849	44	29,200
Korea, Democratic People's Republic	458,161	58,181,383	154,047	17,871,507	30	95,785
Korea, Republic of	2,321	261,630	1,339	558,659	68	41,571

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Kuwait	2	200	44	76	n.d.r.	n.d.r.
Kyrgyzstan ²	266	205,464	312	2,037,920	n.a.	8,350
Lao People's Democratic Republic	223	3,310,867	34	936,077	n.d.r.	n.d.r.
Lebanon	35	104,102	173	17,582	90	n.a.
Macau (China) ⁴	n.a.	3,986	0	133	n.d.r.	n.d.r.
Malaysia	970	58,074	257	507,793	26	11
Maldives	10	23,849	133	28,963	n.d.r.	n.d.r.
Mongolia	216	1,626,061	143	3,963,884	3	769,113
Myanmar	575	676,339	139,184	3,157,781	149	405,107
Nepal	3,602	913,012	2,962	2,917,920	218	8,000
Oman	n.d.r.	n.d.r.	208	20,115	16	n.a.
Pakistan	9,036	23,313,723	80,976	44,518,002	2,466	20,397,957
Palestine (West Bank and Gaza) ⁵	14	20	5	1,265	n.a.	500
Philippines	13,583	36,324,314	10,899	45,685,503	376	3,940,159
Qatar	n.d.r.	n.d.r.	30	n.a.	n.d.r.	n.d.r.
Saudi Arabia	1,172	1,938	1,345	24,613	24	85
Singapore	3	1,437	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Sri Lanka	627	3,890,449	35,909	6,994,847	52	239,247
Syrian Arab Republic	155	658,097	353	3,910,670	n.a.	1,300,000
Taiwan (China)	3,219	513,898	1,368	2,978,223	34	196
Tajikistan ²	1,868	3,385,304	301	6,309,105	100	16,462
Thailand	2,633	25,446,025	9,968	41,052,404	258	15,453,555
Timor-Leste ⁶			5	13,685	n.d.r.	n.d.r.
Turkmenistan ²	51	420	n.d.r.	n.d.r.	n.d.r.	n.d.r.
United Arab Emirates	97	101	108	46	11	n.a.
Uzbekistan ²	141	674,388	60	605,030	n.d.r.	n.d.r.
Viet Nam	9,068	24,775,149	3,652	17,413,474	285	1,514,445
Yemen	976	357,875	1,139	32,683	83	1,078
EUROPE	35,787	52,229,067	146,506	8,043,218	57,048	833,953
Albania	75	3,248,600	82	632,796	14	20,612
Austria	289	10,224	385	61,721	n.d.r.	n.d.r.
Azores (P)	74	1,215	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Belarus ²	61	63,468	36	1,851	n.d.r.	n.d.r.

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Belgium	70	2,989	2,197	3,661	36	882
Bosnia and Herzegovina ⁷	62	1,504	21	401,315	5	34,910
Bulgaria	44	6,959	107	13,985	3	90
Canary Islands (SP)	n.a.	0	168	1,280	n.d.r.	n.d.r.
Croatia ⁷	137	2,825	832	2,616	n.a.	1,110
Cyprus	59	3,057	35	48	n.d.r.	n.d.r.
Czech Republic ⁸	54	102,171	534	220,315	23	1,400
Czechoslovakia ⁸	20	n.a.				
Denmark	7	100	6	2,072	n.a.	n.a.
Estonia ²	912	140	25	130	n.d.r.	n.d.r.
Finland	11	33	24	415	n.d.r.	n.d.r.
France	818	3,532,919	21,309	577,565	81	500,079
Germany	330	237,441	9,658	333,437	46	346
Gibraltar (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Greece	563	159,637	415	17,052	1	150
Hungary	107	135,774	766	53,780	10	9,120
Iceland	34	282	n.a.	n.a.	n.a.	n.a.
Ireland	45	4,200	n.a.	500	n.d.r.	n.d.r.
Isle of Man (UK)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Italy	834	117,306	20,972	83,790	14	325
Latvia ²	6	n.a.	76	n.a.	n.d.r.	n.d.r.
Lithuania ²	50	780,000	54	n.a.	9	n.a.
Luxembourg	n.a.	n.a.	190	n.a.	n.a.	n.a.
Macedonia, Former Yugoslav Rep. of ⁷	198	11,515	59	1,110,149	n.d.r.	n.d.r.
Malta	295	n.a.	112	31	n.d.r.	n.d.r.
Moldova ²	61	2,654,537	18	233,394	1	12,000
Montenegro ⁹			n.a.	8,336	n.a.	6,800
Netherlands	209	268,170	1,996	196	n.a.	n.a.
Norway	270	4,630	18	1,612	n.d.r.	n.d.r.
Poland	530	225,967	1,401	121,946	285	100,701
Portugal	125	3,410	2,933	151,445	46	618
Romania	492	245,932	650	164,234	90	12,239
Russian Federation ²	5,794	2,187,015	60,070	1,933,460	56,100	55,836

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Serbia ⁹			9	48,010	9	31,930
Serbia-Montenegro ⁷⁹			63	40,569	n.d.r.	n.d.r.
Slovakia ⁸	73	48,015	131	11,637	70	850
Slovenia ⁷	n.a.	700	309	1,655	n.d.r.	n.d.r.
Soviet Union ²	556	298,543				
Spain	545	30,069,933	15,727	8,372	17	40
Sweden	79	184	8	n.a.	n.d.r.	n.d.r.
Switzerland	94	6,711	1,099	5,900	n.a.	n.a.
Turkey	20,876	5,307,989	1,879	751,394	121	3,849
Ukraine ²	454	2,109,253	1,690	652,669	67	40,066
United Kingdom	356	292,534	431	387,349	n.a.	n.a.
Yugoslavia ⁷⁹	118	83,185	11	2,531		
OCEANIA	3,676	38,867,250	1,568	1,228,412	113	573,513
American Samoa (US)	n.d.r.	n.d.r.	40	25,563	n.d.r.	n.d.r.
Australia	421	36,644,091	706	311,501	57	211,042
Cook Islands (NZ)	19	900	n.a.	3,554	n.a.	2,202
Fiji	80	430,730	68	90,463	2	39,101
French Polynesia (F)	13	511	21	3,411	1	3,411
Guam (US)	229	12,033	5	15,644	n.d.r.	n.d.r.
Kiribati	n.a.	84,000	n.a.	85	n.d.r.	n.d.r.
Marshall Islands	n.a.	6,000	n.a.	600	n.d.r.	n.d.r.
Micronesia Federated States	n.a.	28,800	48	8,631	n.d.r.	n.d.r.
Nauru	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
New Caledonia (F)	n.a.	n.a.	2	1,100	n.d.r.	n.d.r.
New Zealand	4	3,365	75	307,674	51	300,024
Niue (NZ)	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Northern Mariana Islands	n.d.r.	n.d.r.	n.a.	300	n.d.r.	n.d.r.
Palau	1	12,004	1	702	n.d.r.	n.d.r.
Papua New Guinea	2,686	1,431,506	286	320,198	n.d.r.	n.d.r.
Samoa	13	88,000	153	5,585	n.d.r.	n.d.r.
Solomon Islands	37	88,904	75	28,652	2	17,733
Tokelau (NZ)	n.d.r.	n.d.r.	n.a.	26	n.d.r.	n.d.r.
Tonga	n.a.	6,571	84	17,061	n.d.r.	n.d.r.

	Total number of people reported killed (1991 to 2000)	Total number of people reported affected (1991 to 2000)	Total number of people reported killed (2001 to 2010)	Total number of people reported affected (2001 to 2010)	Total number of people reported killed (2010)	Total number of people reported affected (2010)
Tuvalu	18	150	n.d.r.	n.d.r.	n.d.r.	n.d.r.
Vanuatu	150	29,665	4	87,662	n.d.r.	n.d.r.
Wallis and Futuna (F)	5	20	n.d.r.	n.d.r.	n.d.r.	n.d.r.
World	939,007	2,426,321,086	1,313,183	2,676,416,290	304,476	304,387,659

Source: EM-DAT, CRED, University of Louvain, Belgium

¹ Prior to 1993, Ethiopia was considered one country, after this date separate countries: Eritrea and Ethiopia.

² Prior to 1991, Soviet Union was considered one country, after this date separate countries. The western former republics of the Soviet Union (Belarus, Estonia, Latvia, Lithuania, Moldova, Russian Federation, Ukraine) are included in Europe; the southern former republics (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan) are included in Asia.

³ Since July 1997, Hong Kong has been included in China as a Special Administrative Region.

⁴ Since December 1999, Macau has been included in China as a Special Administrative Region.

⁵ Since September 1993 and the Israel-Palestine Liberation Organization Declaration of Principles, the Gaza Strip and the West Bank have a Palestinian self-government. Direct negotiations to determine the permanent status of these territories began in September 1999 but are far from a permanent agreement.

⁶ Since May 2002, Timor-Leste (formerly East Timor) has been an independent country.

⁷ Prior to 1991, Yugoslavia was considered one country, after this date separate countries: Croatia (1991), Slovenia (1991), Bosnia and Herzegovina (1992), Former Yugoslav Republic of Macedonia (1992), Yugoslavia (1992).

⁸ Prior to 1993, Czechoslovakia was considered one country, after this date separate countries: Czech Republic and Slovakia.

⁹ From 1992 to 2003 Yugoslavia was considered one country; in 2003, it became the State Union of Serbia and Montenegro and, in 2006, two separate countries: Serbia and Montenegro.

Note: 'n.a.' denotes 'no data available'; 'n.d.r.' signifies 'no disaster reported'. For more information, see section on caveats in introductory text.

Over the last decade, the highest numbers of deaths by continent were reported in Nigeria (Africa), Haiti (Americas), Indonesia (Asia), Russian Federation (Europe) and Australia (Oceania).

The highest numbers of people affected by disasters by continent were reported in Kenya (Africa), the United States of America (Americas), China (Asia), Russian Federation (Europe) and Papua New Guinea (Oceania).

Compared to 1991–2000, the past decade has seen disaster deaths rise by 39 per cent and the numbers affected by disasters rise by 10 per cent.

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