

**TOMORROW'S HUNGER:  
A FRAMEWORK FOR ANALYSING VULNERABILITY  
TO FOOD INSECURITY**

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A FRAMEWORK FOR ANALYSING VULNERABILITY TO FOOD  
INSECURITY**

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***Abstract***

While traditional food security analysis offers an *ex post* view on who the food insecure are and why they are so, looking at food insecurity from a vulnerability perspective provides a dynamic and forward-looking way of analysing causes and, more importantly, options for reducing food insecurity. This approach can help improve policy responses to food insecurity. The paper seeks to expand a standard food security analytical framework by including risks and the ability to manage these at different levels in order to reduce the probability of people being food insecure in the future. It looks at how different shocks can impact availability, access and utilization and, uses a twin-track approach to identify policy options for reducing vulnerability.

***Keywords:*** Food security, vulnerability, poverty, livelihoods, risks, risk management

***JEL codes:*** D18, I31, I32, 013

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## INTRODUCTION

The Millennium Development and World Food Summit Goals deadline of halving the number and share of undernourished by 2015 is less than ten years away, but progress towards those goals is slow. The number of undernourished people fell by a total of only 9 million over the last decade and, more worryingly, 4 million people per year were added in the second part of the decade, wiping out earlier achievements. The latest figures suggest that 815 million people are undernourished (FAO, 2004). While no comparative estimate exists on people vulnerable to undernourishment, several studies related to income or consumption poverty point out that the number of vulnerable people is much larger.

Reducing vulnerability is a prerequisite for addressing global and national food security targets. Policies and interventions seeking to reduce the number of undernourished or the prevalence of underweight children under 5 years of age will be more effective if based on a forward-looking analysis. Who are those most likely to be food insecure *in the future*, why are they likely to be or become so, and what instruments exist for influencing this probability?

Frameworks for integrating longer-term vulnerability into food security analysis are largely absent (Haddad and Frankenberger, 2003; Webb and Rogers, 2003), and most existing vulnerability analyses, often applied in the context of early warning information systems, focus on transitory risks<sup>1</sup>. Less emphasis is placed on identifying and analysing the potential longer-term food security impact of risks, which require a set of interventions different from humanitarian responses.

While some existing food security frameworks (Smith *et al.*, 2000; UN–SCN, 1999; FIVIMS, 2000) identify a range of multi-sectoral food security risks, these often assume a direct causal relationship between risks and food security outcomes and are static. Risks are treated as exogenous, thus putting aside the range of risk management strategies that are used for attenuating the impact that risks have on food security.

Over the last five years, frameworks for analysing vulnerability to negative social welfare outcomes in general (Holzmann and Jørgensen, 2000), and specifically income and consumption poverty (Mansuri and Healy, 2003; Dercon, 2001a), have been developed. These frameworks are geared toward identifying those who are likely to have an income below a certain threshold. As such they are helpful in analysing the access dimension of food security, but they are less helpful when it comes to the availability and utilization dimensions. There are, of course, strong linkages between poverty and food insecurity, but the causes and consequences of each are different (Webb and Rogers, 2003).

This paper seeks to fill this analytical gap by providing a framework for understanding who is likely to be food insecure in the future and why, with the aim of improving the ability to address vulnerability before it manifests itself as food insecurity. The main body of the paper is divided into four sections. The first clarifies conceptual issues and presents an expanded food security framework for understanding vulnerability. The second explains the role that current conditions play in determining vulnerability. The risk side is analysed in the third section, while risk management and instruments for reducing vulnerability are addressed in the fourth section. Main conclusions are presented in a final section.

## CONCEPTS OF FOOD SECURITY AND VULNERABILITY

*What are food insecurity and vulnerability?*

Following a number of international summits since the World Food Conference in 1974 and based on work over several decades, the definition of food security is today generally agreed upon. The World Food Summit in 1996 built on earlier work by adopting “*Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*” (FAO, 1996). This definition integrates stability, access to food, availability of nutritionally adequate food and the biological utilization of food.

*Food availability* refers to the physical presence of food at various levels from household to national level, whether from own production or through markets. *Food access* refers to the ability to obtain an appropriate and nutritious diet and is in particular linked to resources at the household level. *Biological utilization* relates to individual level food security and is the ability of the human body to effectively convert food into energy. The “at all times” language introduces a *stability* dimension, which points to the need for understanding both current and likely future status at different points in time. A framework for analysing food security must capture the temporal dynamics of food security.

The concept of vulnerability is used with different connotations. A fundamental difference exists between *vulnerability as defencelessness vis-à-vis a harmful event* (for example vulnerability to drought) and *vulnerability to a specific negative outcome, following a harmful event* (for example vulnerability to food insecurity).

Much of the disaster management literature uses vulnerability with reference to a natural hazard (Alwang, Siegel and Jørgensen, 2001), while the food security literature – and more recently, part of the social risk management and poverty literature (Mansuri and Healy, 2001; Dercon, 2001a; Holzmann and Jørgensen, 2000

World Bank, 2000) – defines vulnerability in terms of an unfavourable future outcome. This dichotomy is to some extent driven by the underlying policy issues in question. Humanitarian aid and disaster management tend to focus on short-term responses targeted at people who require relief assistance following a natural hazard: these are the vulnerable. Looking at vulnerability relative to a social welfare outcome, on the other hand, is concerned with guaranteeing a minimum welfare threshold of food security, through short- as well as longer-term measures.

The terms *vulnerability* and *food insecurity* are often used interchangeably. This matters less when focusing on the short term under stable conditions, where there is little or no difference between those being food insecure today or tomorrow. However, over longer periods of time, people move in and out of food insecurity. We define vulnerability relative to the negative outcome of food insecurity: vulnerability refers to people's propensity to fall, or stay, below a food security threshold within a certain time frame. In these terms, while vulnerability refers to the *ex ante* probability of falling or remaining below a specific threshold, food insecurity is the current or *ex post* measure relative to the threshold.

Because vulnerability is linked to the uncertainty of events, everyone is vulnerable to food insecurity, but some more so than others. Vulnerability can be thought of as a continuum. The higher the probability of becoming food insecure, the more vulnerable one is. While “the vulnerable” in praxis are often implicitly understood to be those with a probability (above a certain predetermined threshold) of becoming food insecure, no standard exists that defines this threshold<sup>ii</sup>. However, for the purpose of this paper we will assume that a cutoff point exists and will adopt Tesluic and Lindert's 50 percent cutoff point; and so the term *vulnerable* refers to people with a higher than 50 percent probability of being food insecure.

#### *Why the little difference matters*

Expanding the analysis of food security to include risks and risk management, focusing on vulnerability, is important for several reasons.

First, numerous studies on poverty dynamics suggest that people move in and out of poverty. Baulsch *et al.* (2000) summed up 13 panel data studies and showed that the share of the population being *sometimes* poor is often much larger than the share being *always* poor, in some cases several times larger. If “vulnerable” is understood as the probability of experiencing at least one period of poverty in a given period, then during the period 1986–1991 in Pakistan, 3 percent were always poor, while 55.3 percent were sometimes poor – making 58.3 percent vulnerable. Following the same definition of vulnerability, Pritchett (2000) shows that at the current 20 percent level of poverty in Indonesia, another 10–30 percent of the population face a high probability of falling below the poverty line.

Table 1, based on per capita consumption expenditures from KwaZulu-Natal in South Africa in 1993 and 1998, gives an example of how people moved in and out of consumption poverty. Eighteen percent of households were poor in both periods, while 48 percent were non-poor in both time periods. Ten percent of households got ahead and 24 percent fell into poverty.

**Table 1: Poverty dynamics due to consumption shocks in KwaZulu-Natal, South Africa**

	<i>Non-poor in 1998</i>	<i>Poor in 1998</i>
<i>Non-poor in 1993</i>	48 % never poor	24% became poor
<i>Poor in 1993</i>	10 % got out of poverty	18% stayed poor

*Adapted from Carter and May (2001)*

The implication of these statistics is that basing interventions on a snapshot at a given time will most likely miss a large part of the picture.

Second, the food insecure and vulnerable are not homogenous groups. Some are chronically food insecure, others transitorily so and others again food insecure on a seasonal basis – and for different reasons. These are important distinctions since the causes of – and policy measures for addressing – transitory food insecurity may be different from those associated with chronic food insecurity (Barrett and Sahn, 2001).



Third, the presence of risks influences livelihood choices. High risk adversity can lead to income-earning strategies with low variability but often also low mean returns. Reducing the potential impact of shocks, e.g. through provision of social benefits under certain conditions, allows households to make productivity-enhancing investments perceived as being riskier.

Finally, vulnerability analysis identifies *ex ante* as well as *ex post* interventions, thus partly shifting the focus of interventions from addressing an already-manifested negative outcome (i.e. coping) to addressing problems before they actually arise (i.e. prevention or mitigation).

*A framework for analysing vulnerability to food insecurity*

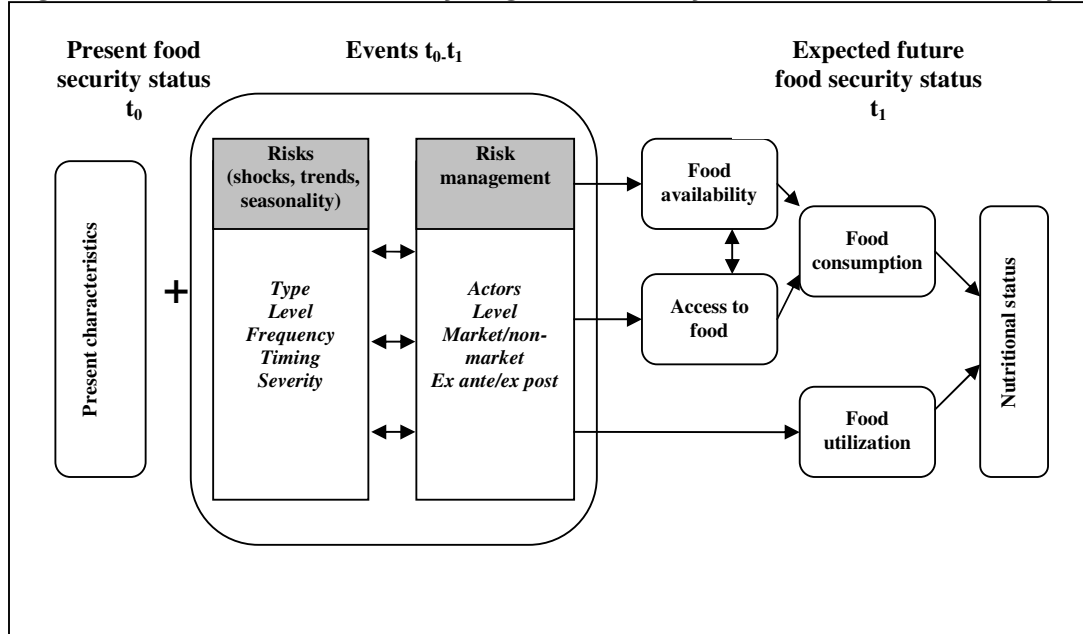
Being food insecure today does not necessarily indicate vulnerability, because the food situation could improve, in particular if looking beyond the very short run. *Chronically* food insecure people live below the food security threshold today. *Potentially* food insecure people are “living on the edge”. Although they are not food insecure today, they face a high probability of becoming so.<sup>iii</sup> The difference between present and future food insecurity is shown in Table 2.

**Table 2: Present and future food security**

		Expected future food security status	
		<i>Food secure</i>	<i>Food insecure</i>
<b>Present food security status</b>	<i>Food secure</i>	Food secure	Potentially food insecure
	<i>Food insecure</i>	Potentially food secure	Chronically food insecure
		<b><i>Non-Vulnerable</i></b>	<b><i>Vulnerable</i></b>

Figure 1 presents a causality framework for identifying the factors determining the probability of negative food security outcomes in the future. The probability of becoming food insecure in the future is determined by present conditions, the risks potentially occurring within a defined period and the capacity to manage these.

**Figure 1: A framework for analysing vulnerability to future food insecurity**



Vulnerability is determined by a cumulative chain of events through time. What happened yesterday is reflected in today's status and what happens today influences tomorrow's status and so forth. As well as connections through time, there is an inter-relationship between risk management instruments at different levels (global, national, community, household and individual). For instance, the presence of a functioning state-sponsored safety net programme lowers the need for individual insurance against economic or health shocks. There can also be crowding-in effects, if risk management instruments at one level create an environment that stimulates activities at other levels. In 1998, the Government of Bangladesh accelerated trade liberalization policies by removing rice import tariffs, minimizing government open-market price sales and speeding up customs procedures. This encouraged the private sector to play an important role in guaranteeing national food availability through private sector imports during the major 1998 floods (del Ninno, Dorosh and Smith, 2001).

### *Measuring vulnerability*

Although not the focus of this paper, this section briefly discusses measuring of vulnerability<sup>iv</sup>. While much of the work on vulnerability has been of a contextual or

qualitative nature, we focus in this section on what to quantify in terms of vulnerability to food insecurity.

Just as no single measure of food security exists (FAO 2002), there is no unique approach to measuring vulnerability to food insecurity. Such a measurement must be related to a specific dimension of food security or a nutritional outcome. Regardless of the choice of dependent variable, the measurement must be based on information about assets and livelihoods, risks faced, options available for addressing different risks and more importantly, possible future states of the world and their probabilities.

One set of existing measures focuses on predicting shortages in food *availability*, seeking to forecast seasonal variations in food production through crop, drought and flood monitoring. Such work also includes longer-term food production scenarios focusing on specific risks such as environmental changes. Because food availability in particular is related to the national or sub-national level, the question becomes whether, at the aggregated level, there is sufficient food available to meet aggregate demand. This, however, ignores the fact that food is not distributed or accessed equally and that food availability may not be the binding constraint for achieving food security.

Another approach is to measure the probability of falling under a specific income or consumption threshold, in line with many of the studies related to vulnerability to poverty, based either on cross-sectional or panel data (Pritchett *et al.*, 2000; Vakis *et al.*, 2004). This allows measuring whether people are likely to have enough food given certain assumptions about food availability and prices. However, it does not contain information on diet composition, access to micro-nutrients, etc. An alternative access-based indicator is to measure how much “buffer” there is in current income for increasing food expenditure. Vulnerability would thus be the probability of food expenditures as a share of total expenditures being above a certain level (Engel coefficient). A more indirect approach is to use asset values as proxies for the ability to withstand shocks, assuming that the more assets people have, the less vulnerable they are.

Finally, measuring the probability of a negative nutritional outcome – e.g. wasting, stunting or underweight of children under 5 – encompasses all dimensions of food security, including food utilization, and picks up other factors as well. In addition to including health and care practices (i.e. taking into account that even a well-fed child can be wasted due to diarrhea), anthropometric indicators record both acute malnutrition (wasting) and chronic malnutrition (stunting) or a combination of both (underweight).

## **UNDERSTANDING PRESENT CONDITIONS**

Present conditions play a role in determining which risks threaten food security and how effectively they can be managed. Of relevance to vulnerability are: food security status; assets portfolio; the livelihood-related activities in which people are engaged (for example food production, income generation and health care practices); and the context in which people are embedded.

### *Food security status*

Present food security status can indicate how far people have to climb or fall before their food security status changes. Although major falls into food insecurity or jumps out of food insecurity are possible, those who are well above the minimum threshold and those who are well below it are less likely to do so within a short time span. For those living close to the minimum threshold, even a small push can change their food security status.

Present food security status also has important inter-temporal effects. Undernourished mothers are more likely to give birth to children with low birth weight, while malnourished children tend to have lower educational attainments and reduced income earning potential.

### *Livelihood assets and activities*

The livelihood activities that people pursue are based on the quantity and quality of assets to which they have access. Assets can be of various types (social, financial, physical, natural and human) and be privately or publicly held. Assets are important to risk management as tools for smoothening consumption to reduce fluctuations in food intake. Different households have different levels of access to assets, influencing their ability to prevent, mitigate or cope with shocks.

The characteristics of assets that contribute to determining risk management capacities include: the security of access and use; the rate and volatility of returns and their ability to maintain value during crisis; the ease with which assets can be liquidated or traded; and in the absence of markets, the ability to fulfill consumption needs.

The types of risks that form a threat to people's food security are also a function of their livelihoods. For example, communities relying on access to forests will be more affected by policy reform affecting forest access or forest depletion than urban-area rickshaw drivers are.

### *Policies, institutions and organizations*

Access, use and expected returns to assets are all influenced by the environment of policy, institutions and organizations in which people are embedded. Policies provide a framework that constrains or supports the role played by institutions and organizations. Institutions refer to the "rules of the game", which include established sets of rules, legislation, norms and patterns of behaviour. They determine the context within which organizations operate; the activities that can legitimately be undertaken; the relationships within organizations; and relationships between organizations and the public. Institutions may be formal (include laws, constitution, treaties, regulations and established rights at international, national and subnational levels) and informal (e.g. gender relations or caste).

Organizations are the “players” or service-delivery structures in private, public and civil society spheres at various levels. They include political bodies (political parties, city councils, regulatory agencies); economic bodies (firms, trade unions, cooperatives) and social bodies (churches, clubs, associations). These players have specific objectives based on (among other things) self-interest, political power, ideology, perceptions of risks and their impacts, and resources. If food security is not high on the agenda of these organizations, neither will managing risks to reduce vulnerability be.

## **UNDERSTANDING THREATS TO FOOD SECURITY: THE RISK SIDE**

Risks are events, trends and structural factors that threaten food supplies, access or utilization. This section looks at the defining characteristics of risks in order to determine how they are best managed.

### *Characteristics of risks*

The defining characteristics of risks are *type, level, frequency, timing, and severity*. These determine the potential impacts of a specific risk on food security, including which dimension(s) they affect.

### *Type*

The types of risks perceived to impinge on future food security depend on the food security model adopted. Until the early 1980s, food security was associated with national food stocks and production. Consequently economic, environmental and natural risks were considered to be the predominant threats to food security due to their impact on national/sub-national food availability. Now there is increased acknowledgement of the importance of other dimensions of food security, and so a wider range of risks has become relevant to analysing vulnerability.

Risks can be clustered into various categories, including political risks, social risks, economic risks, health risks, natural risks, environmental risks and life cycle-related risks. Risks affect people in different ways. While an economic shock in the form of a

collapse in grain prices may be beneficial (at least in the short run) to urban or rural households that are net food buyers, the impact on rural households that produce a food surplus will be negative.

### *Level*

Risks have effects at different levels, be they individual/household (micro), community/regional (meso), national (macro) or global/regional (supra-macro). Risks at the meso, macro and supra-macro levels, also referred to as *covariant risks*, have low inter-household variance and affect groups of households, livelihoods or even entire nations. Political, social, economic, health, natural and environmental risks often fall into this category. Micro-level risks, also referred to as *idiosyncratic risks*, have high inter-household variance. Life cycle-related risks fall into this category. The extent to which a risk is covariant or idiosyncratic largely depends on the causes of the risk: ill health can be an individual risk or it can be covariant, if the cause is a pandemic such as HIV/AIDS (World Bank, 2000; Murdoch, 1999).

### *Frequency*

Risks can be transitory, trend-related or structural. *Transitory* risks come and go and include unpredictable events, as well as more predictable cyclical/seasonal events. *Trends*, such as falling economic growth or declining agricultural yields, refer to the movement of variables over time. *Structural* risks are associated with long-term conditions that are rooted in the social, economic or political fabric. Examples of these include discrimination based on ethnic group or gender and risks related to poor working conditions. Although unexpected transitory risks attract more attention, structural or regularly-occurring transitory risks often have a greater role in determining people's vulnerability by gradually, but continuously, wearing away risk management capacities. (Tesiluc and Lindert, 2002; Devereux, 2001).

### *Timing*

The timing of negative events matters. Ability to manage risks differs seasonally, through life and within economic cycles. A single idiosyncratic shock may suffice to tumble an individual into food insecurity during times of hardship, while it could be easily handled during more buoyant times. This is especially relevant in the case of

*concatenated* risks, striking with short intervals between them, or *compounded* risks, striking simultaneously, because they place a greater strain on risk management capacities. The 2001/02 drought in southern Africa was less severe in terms of lack of rainfall than the 1991/92 drought but had far harsher consequences since it was compounded by political instability, an economic downturn, poor governance and HIV/AIDS (Heitzmann *et al.*, 2002; Baulch and Hoddinott, 2000; Ellis, 2002).

### *Severity*

Negative events differ in strength and intensity (Holzmann and Jørgensen, 2000). The severity of a flood is characterized by its coverage, duration, deviation from standard water levels or the number of people affected, while the severity of an economic shock may be measured by its duration, deviation from trend levels or sectors affected. The greater the severity of a risk, the greater the capacities required for managing it.

### *Types and levels of risks and links to food security*

Table 3 provides an overview of the main risk types and their potential impact on the various dimensions of food security. For the sake of simplicity, risks have been associated with their main level of occurrence, although some risks are relevant to several levels.

At the **global and regional levels**, key threats to food security relate to two factors in particular. Macroeconomic shocks, transmitted via flows of capital or goods, affect access to food through their impact on the income and wealth of households and can – together with global climate changes – reduce food availability through changes in production incentives, increasing fluctuations and regional variance in food supplies.

The main threats to food security at a **national level** are political, economic and natural risks. In 2003–2004, almost a third of all food emergencies (35) were caused by present or past conflicts; half of them (18) were caused by natural shocks; and three were caused by economic shocks or refugee crises. The causes of national-level food emergencies have shifted over the last decade, with the percentage of



food emergencies caused by conflict or economic shocks growing from 15 percent to 35 percent (FAO, 2004). These risks are often highly covariant and influence food availability by their impact on food production, import/export and the pressure they put on food stocks. These risks can also increase transaction costs or isolate entire parts of countries, either because of damages to infrastructure or because of lack of security in specific areas.

On the access side, most risks put pressure on real income, stemming from erosion of purchasing power and reduction in agricultural income and amplified by the absence of alternative income-generating opportunities. Both political and economic risks can erode the ability of the national governments (in some cases not even in existence) to provide national health care. Finally, earthquakes, floods and other natural shocks can result in increased water-borne diseases, negatively affecting food utilization.

**Table 3: Key risks and their potential impact on food security**

Risk types	Food availability	Food access	Food utilization
<b>Supra-macro (global, regional)</b>			
<b>Economic risks</b> <i>Financial crisis, trade related shocks</i>	<ul style="list-style-type: none"> <li>• Reduced import capacity</li> <li>• Changes in production incentives</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income and wealth</li> <li>• Reduced economic growth</li> </ul>	<ul style="list-style-type: none"> <li>• Falling public health expenditures</li> </ul>
<b>Natural risks</b> <i>Global climate changes</i>	<ul style="list-style-type: none"> <li>• Falling productivity of cropland</li> </ul>	<ul style="list-style-type: none"> <li>• Increased income variability</li> <li>• Increased pressure on resources for livelihood adaptation</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in water-borne diseases</li> </ul>
<b>Macro (national)</b>			
<b>Political risks</b> <i>Civil strife, war</i>	<ul style="list-style-type: none"> <li>• Lower production</li> <li>• Increased transaction costs</li> <li>• Breakdown in agricultural support system</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced purchasing power (price, income)</li> </ul>	<ul style="list-style-type: none"> <li>• Breakdown of health care system</li> </ul>
<b>Economic risks</b> <i>Growth collapse, fiscal or monetary crisis</i>	<ul style="list-style-type: none"> <li>• Food stock depletion</li> <li>• Reduced import capacity</li> <li>• Changes in production incentives</li> <li>• Falling public expenditures to support agricultural</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced purchasing power (price, income)</li> <li>• Reduced wealth</li> </ul>	<ul style="list-style-type: none"> <li>• Breakdown of health care system</li> </ul>

<b>Risk types</b>	<b>Food availability</b>	<b>Food access</b>	<b>Food utilization</b>
	production, rural development		
<b>Natural risks</b> <i>Earthquakes, floods, droughts, desertification</i>	<ul style="list-style-type: none"> <li>• Lower production</li> <li>• Reduced livestock holdings</li> <li>• Pressure on food stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income (agricultural, non-farm)</li> <li>• Reduced wealth</li> <li>• Reduced economic growth</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced access to clean drinking water</li> <li>• Increase in water-borne diseases</li> </ul>
<b>Meso (community)</b>			
<b>Political risks</b> <i>Civil strife, war</i>	<ul style="list-style-type: none"> <li>• Lower production</li> <li>• Increased transaction costs</li> <li>• Breakdown in agricultural support system</li> </ul>		<ul style="list-style-type: none"> <li>• Breakdown of health care system</li> </ul>
<b>Natural risks</b> <i>Landslides, rainfall, high winds, pest attacks, livestock diseases</i>	<ul style="list-style-type: none"> <li>• Lower production</li> <li>• Increased pressure on natural resources</li> <li>• Increased year-to-year fluctuations and regional variance</li> <li>• Increased production costs</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income (agricultural, non-farm)</li> <li>• Reduced purchasing power</li> <li>• Reduced wealth (livestock)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced access to clean drinking water</li> <li>• Increase in water-borne diseases</li> </ul>
<b>Environmental risks</b> <i>Deforestation, declining soil fertility</i>			
<b>Health risks</b> <i>Epidemics, HIV/AIDS, poor water and sanitation</i>	<ul style="list-style-type: none"> <li>• Lower food production</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of working days (reduced income)</li> <li>• Increased non-food expenditures</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced uptake of macro- and micronutrients</li> <li>• Exhaustion of health care systems leading to less treatment</li> </ul>
<b>Social risks</b> <i>Discrimination of access to common resources, social exclusion, loss of patronage</i>	<ul style="list-style-type: none"> <li>• Lower livestock production</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income diversification opportunities</li> <li>• Exclusion from informal insurance</li> </ul>	
<b>Micro (household)</b>			
<b>Health risks</b> <i>Illness, disability, injury</i>	<ul style="list-style-type: none"> <li>• Lower own production</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income</li> <li>• Increased health costs</li> <li>• Reduced asset holdings (selling off)</li> <li>• Increased indebtedness</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced uptake of macro- and micronutrients</li> <li>• Poor food utilization</li> </ul>
<b>Life cycle-related risks</b> <i>Old age, death, dowry</i>	<ul style="list-style-type: none"> <li>• Lower own production</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income</li> <li>• Increased health costs</li> <li>• Increased non-food expenditures</li> <li>• Reduced asset holdings</li> <li>• Increased indebtedness</li> </ul>	
<b>Social risks</b>		<ul style="list-style-type: none"> <li>• Discriminatory</li> </ul>	<ul style="list-style-type: none"> <li>• Transfer of</li> </ul>

<b>Risk types</b>	<b>Food availability</b>	<b>Food access</b>	<b>Food utilization</b>
<i>Inequitable intra-household food distribution</i>		access to food by certain household members (women or children)	malnourishment to children
<b>Economic risks</b> <i>Unemployment, harvest failure</i>	<ul style="list-style-type: none"> <li>• Less own production</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced income earned</li> <li>• Reduced asset holdings</li> <li>• Increased indebtedness</li> </ul>	

*Adapted from World Bank, 2000*

In addition to some of the above risks, which may have particular subnational effects, threats related to natural, environment, health and social conditions are the key risks affecting **groups of households or communities**. At this level, natural risks cause higher variability in production in particular, as well as increased production costs related to higher losses, irrigation, treatment of infections and insecticides. Depending on stock levels and the ability of traders to bring in food from other (non-affected) areas, this may or may not interrupt food supplies or lead to price increases.

The key environmental risks are trends rather than shocks. They negatively affect mean production, in the case of declining soil fertility through lower yields but also through increased unit production costs. This limits the profitability of farming and the opportunities to earn income from other natural resource-based activities.

On the health side, the risk of epidemics – and increasingly, HIV/AIDS – increases vulnerability. WHO (2002) ranked “unsafe water supply, sanitation and hygiene” as the third most important risk leading to poor health and death in 2000. In developing countries, the main burden of such risks falls on children, increasing their immediate food insecurity. However, these health-related risks also increase vulnerability by reducing educational achievements because of higher absence and lower cognitive capacity due to poor nutritional status. Health risks imply loss of labour time either periodically or permanently, meaning lower income and decreased food access, reduced ability to absorb both macro- and micronutrients, and in cases where a large part of a community is affected, reduced local food production.

Social risks relate to the lack of access to common resources and informal networks in times of difficulties, leading to lower income earnings and seclusion from community resources.

At the **household level**, risks (health, life cycle-related, social and economic) affect primarily access to food and food utilization. For households based on subsistence farming without alternative income sources or no access to markets, such shocks can also reduce food availability. Life cycle events, such as funerals or weddings, often imply significant extra expenditures, reducing the resources available for food purchase. Similarly, illnesses, disability and injuries involve additional expenditures, but also reduce labour supply and income and can lead to poor food utilization. Economic risks can reduce the access to food through loss of income, either as a result of unemployment or because income-generating activities (be they farming, small trade or manufacturing) fail.

While some of these risks relate to the household *per se*, members of households are also faced with individual risks. In addition to life cycle events, a set of risks relates to individual food access. Sufficient aggregated access to food at the household level does not imply that all individual household members access food in proportion to their needs. Discrimination on the basis of gender or age can make individuals vulnerable, even if their household on an aggregate basis is not.

## **DEALING WITH THREATS TO FOOD SECURITY: THE RISK MANAGEMENT SIDE**

Individuals, households and communities are not passive victims of negative events, but seek to reduce vulnerability through risk management<sup>v</sup>. The effectiveness of risk management instruments depends partly on their suitability *vis-à-vis* the specific risks. Hence, identifying and analysing the instruments that are available for managing risks is an integral step in understanding people's degree of vulnerability and the causes of this. In the following sections, the characteristics of risk

management instruments are analysed to understand their potential effectiveness in relation to ensuring food security.

### *Characteristics of risk management*

Features of risk management instruments that need to be considered include their levels, the actors involved, whether they are market-based or non-market-based and whether they are *ex ante* or *ex post*.

### *Levels*

Risks can be managed at different levels – individual, household, community, (sub-) national or global – both individually and simultaneously. Effectively managing risks requires the ability to share the burden either across time or between affected and non-affected people.

Instruments available at one level are often embedded in, and/or related to, instruments at other levels. Suppose that an effective way for managing a given idiosyncratic risk is through access to credit. Although the immediate response is at the individual level (taking a loan), the framework for providing financial services and the required financial resources need to be in place at the macro level. In this instance, effective risk management involves several levels simultaneously.

When it is not possible to spread the costs of risk management over time, risks that are covariant can be more difficult to manage locally given that micro- and meso-level support mechanisms are simultaneously affected. Thus, macro-level interventions, which can draw from a wider pool of unaffected resources, are often better suited for managing covariant risks. Similarly, recurring or severe risks may require transfers beyond micro- and meso-level capacities, requiring interventions at macro levels where actors can draw from a wider pool of resources (Gaiha and Imai, 2003; Heitzmann *et al.*, 2002; Baulch and Hoddinott, 2000).

### *Actors*

The levels at which risks are managed are associated with specific risk management *actors*. Some of these actors operate at more than one level or switch between levels depending on the circumstances.

Food security ultimately manifests itself at the individual level. Thus, the parts of risks not taken care of by other actors inevitably fall back on **individuals** and **households**, leaving them to either manage the risk or suffer the consequences. They are involved mainly in managing risks related to food access and utilization, and, in the absence of functioning markets, availability as well<sup>vi</sup>. The degree of influence over household assets and income varies between household members, resulting in different degrees of vulnerability within a household. In times of food shortages, for example, women are often the first to reduce their own food consumption and redistribute part of their share of food to other household members. While this may reduce the impact of a shock on some members of a household, it comes at the cost of the food security of other members (Murdoch, 1995; Dercon 1999; Siegel and Alwang, 1999).

The role of **community-based organizations (CBOs)** in managing risks, especially in the absence of formal safety nets, is well documented and related to all dimensions of food security. The *Susu* schemes in West Africa, mutual support arrangements reinforced through celebration and rituals in South Asian countries, and burial societies in Andean countries are just some examples. CBOs assist households in mitigating and coping with risks and are sometimes used as vehicles for larger programmes sponsored by macro-level actors. Some CBOs also play a role in strategies aimed at preventing risks, for example through co-sponsoring local initiatives to develop infrastructure. Where traditional practices and norms are sources of risks, community-based organizations can also be used for changing them (Marsh, 2003).

The functioning of CBOs depends on the presence of social capital within communities and on principles of reciprocity. These solidarity bonds may be unevenly distributed and poorer households may be unable to reciprocate or to afford the *ex ante* investments (in social assets) required to benefit from them. As a result,

some community members receive more support than others and some groups are excluded on the basis of ethnicity, caste, sex or socio-economic status. The consequences can be that risk management instruments serve the interests of the more influential community elites and/or marginalize the less powerful (Marsh, 2003; Mattingly, 2002).

**Private sector institutions** are involved in risk management in numerous ways through the pursuit of business opportunities. Traders often play a key role in ensuring national and local food availability in times of production shortfalls, whether directly or as providers of credit against harvests, labour, etc. Traders also facilitate the availability of agricultural inputs, sometimes based on credit. Banks and insurance companies at times provide credit and savings facilities as well as insurance to compensate for income losses.

**National governments** play a central role in managing threats to food security through policies and budgetary allocations and by providing the legislative framework for the risk management efforts of other actors. They control macroeconomic, structural and sector policies, provide early warning systems and may help complement community and private sector efforts. These functions are supported by **international institutions, United Nations agencies, bilateral donors, etc.**, which provide resources, technical guidance and global frameworks and facilities to manage risks that are beyond the national-level capacity.

#### *Market-based/non-market-based*

Formal risk management instruments can be market-based or non-market-based. Market-based mechanisms relate mainly to mitigating or coping to ensure stable access to food. Market-based mechanisms rely on functioning market institutions and are motivated by profits. However, the rural poor are often not seen as profitable clients by bankers or insurance firms for a range of reasons, including moral hazard problems, information asymmetries, chronic poverty, lack of collateral, high transaction costs and weak environments for enforcing contracts. This means that formal market-based insurance, credit and savings instruments have largely failed to emerge in rural areas of developing countries (Devereux, 2001; Heitzmann *et al.*,

2002; Holzmann and Jørgensen, 2000). The task of providing such services is often left to governments and/or community-based organizations.

### *Preventing/mitigating/coping*

Risk management instruments can be implemented before, during or after risks materialize and can be categorized as *ex ante* (prevention and mitigation) or *ex post* (coping) instruments. The same risk can often be addressed at different points in time. For instance, floods can be managed *ex ante* by building embankments to avoid inundation of agricultural land and by providing crop and livestock insurance that is accessible to farmers with low incomes. Alternatively, or in combination with these *ex ante* instruments, floods can be managed *ex post* by distributing food aid and inputs for rehabilitating agriculture.

**Prevention** instruments aim at reducing the probability of a shock or negative event occurring. **Mitigation** instruments seek to reduce the impact of a negative event by providing compensation for risk-generated losses. **Risk preparedness** efforts are *ex ante* measures seeking to ensure effective *ex post* responses.

*Ex post* instruments, also referred to as **coping mechanisms**, are reactive and put to work only once risks materialize. In relation to food security they aim at relieving immediate food needs. Changes in livelihood strategies, such as migration in search of work elsewhere, do not necessarily imply negative repercussions on future risk management capacities. On the other hand, distress sales of assets, borrowing at high interest rates, reducing consumption or withdrawing children from school are examples of *ex post* instruments that relieve immediate food needs at the expense of future risk management capacities. Hence, although such strategies may reduce food insecurity, they increase vulnerability, even if the degree of exposure to risks remains constant.

Some empirical studies suggest that *ex ante* instruments can be more effective than *ex post* instruments in managing risks. An analysis by Vakis, Kruger and Mason (2004) on the impact on rural households of the coffee crisis in Nicaragua shows that *ex ante* strategies were more effective in allowing households to insulate themselves



from the shock than *ex post* strategies. Similarly, using data on poverty rates in Zimbabwe, Owens, Hoddinott and Kinsey (2002) suggest that *ex ante* instruments would have been more effective than *ex post* instruments in controlling the impact of the 1994/95 drought in terms of poverty levels.

### *Instruments for managing threats to the availability, access and utilization of food*

In this section we look at the main instruments for managing threats related to the availability, access and utilization of food.

The choice of instruments is specific to the environmental, political, social and economic conditions of a country or region and to the risks faced. It is also specific to the group of vulnerable people targeted, given that risks – but also risk management instruments – can have different impacts on different groups. Some risk management instruments reduce vulnerability for some groups, while increasing it for others. One example of this is a currency devaluation that increases domestic prices of food and tradables. The devaluation benefits farmers producing surpluses of tradable products, but negatively affects producers of non-tradables, such as subsistence farmers or unskilled landless labourers (FAO, 1997).

In line with recent work in FAO on how best to reduce hunger in a sustainable manner, we use a twin-track approach to analyse instruments for risk management. The approach builds on the premise that sustainable reductions in hunger require two sets of interventions: I) sustainable agricultural and rural development to support and enhance the livelihoods of the poorest and most vulnerable groups; and II) targeted interventions and programmes to enhance immediate and direct access to food and nutrition by the most needy (FAO, 2003).

The first track involves mainly *ex ante* measures. These include prevention instruments for removing structural risks and for creating the conditions that allow households to mitigate risks. The second track mainly addresses food insecurity through *ex post* instruments. Because in a dynamic chain of events a post-shock environment is also a pre-shock environment, some Track II instruments aimed at

addressing immediate food needs may also be used for reducing vulnerability in the future. The main mechanism for achieving this is to help households avoid meeting their current food needs through the exhaustion of those capacities that serve to manage future risks.

Table 4 presents an overview of key instruments available for managing risks related to food security. Most of the measures are well-known and so are not described in detail. As was done above with risks, the instruments have been linked to the food security dimension they mainly address. However, given the links between the various dimensions of food security, some of the instruments affect more than one dimension.

**Table 4: Instruments for managing risks related to the availability, access and utilization of food**

	Food availability	Food access	Food utilization
<b>Track 1</b>	<b>Improving long-term food security</b>		
<b>Prevention</b>	<ul style="list-style-type: none"> <li>• Ensure stable macro environment</li> <li>• Promote trade</li> <li>• Develop market and storage infrastructure</li> <li>• Improve input and output markets</li> <li>• Improve natural resource management</li> <li>• Increase productivity and production capacity</li> <li>• Improve sustainable and diversified production</li> <li>• Reduce production variability</li> <li>• Improve agricultural research</li> <li>• Raise investment in agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Increase productivity of income-generating activities</li> <li>• Promote rural development and farm/non-farm linkages</li> <li>• Empower women and other marginalized groups</li> <li>• Promote and protect needs of children</li> <li>• Promote access to education</li> </ul>	<ul style="list-style-type: none"> <li>• Promote preventive health practices</li> <li>• Enforce food safety regulations and institutions</li> <li>• Increase immunization</li> <li>• Provide or improve water and sanitation infrastructure</li> </ul>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Improve agricultural extension services</li> <li>• Facilitate diversification</li> <li>• Establish buffer stocks</li> </ul>	<ul style="list-style-type: none"> <li>• Diversify livelihoods</li> <li>• Promote insurance and savings</li> </ul>	<ul style="list-style-type: none"> <li>• Provide health services</li> </ul>

	Food availability	Food access	Food utilization
<b>Track 2</b>	<b>Addressing immediate food requirements</b>		
<b>Coping</b>	<ul style="list-style-type: none"> <li>• Facilitate functioning of markets (transport, information)</li> <li>• Provide food aid</li> <li>• Facilitate food imports</li> </ul>	<ul style="list-style-type: none"> <li>• Provide social safety nets, including cash transfers, food subsidies, work fare programmes</li> <li>• Migrate</li> <li>• Smoothen consumption</li> <li>• Sell assets</li> <li>• Provide formal or informal credit</li> <li>• Provide school feeding</li> </ul>	<ul style="list-style-type: none"> <li>• Control disease</li> <li>• Provide immunization</li> <li>• Improve water and sanitation</li> </ul>

*Adapted from World Bank (2001) and FAO (2003)*

#### *Instruments for managing risks related to food availability*

Instruments for stabilizing food availability must aim at ensuring the supply of nutritionally adequate food. Stability can be achieved through domestic production, domestic food stocks changes and concessional/non-concessional food imports. Empirical research indicates that among these instruments, improved food productivity and non-concessional imports are more useful in dampening volatility in food availability than concessional imports (Barrett, 2001).

Improving food production and handling comprise measures that concern agricultural sector development (FAO, 1997). Instruments for improving national production include: investments in irrigation; research into drought/pest resistant varieties; encouraging farm-level adoption of new technologies; the provision of effective agricultural extension services addressing longer-term food production issues; and rehabilitating agricultural activities after shocks affecting production. The ability to diversify or change production modes will vary between livelihood and wealth groups, and will depend on individuals' risk adversity.

A range of instruments relate to the capacity of the market to respond to supply fluctuations. These include efforts to improve the longer-term performance of input/output markets through infrastructural development aimed at increasing spatial market integration; and the development of information systems to increase market transparency and allow a more efficient spread of supply shocks. Early warning

systems providing weather, crop or price forecasts are ways of bridging information asymmetries between actors. Such systems also provide contingency planners with a basis for estimating the extent of risks and preparing effective responses (Von Braun *et al.*, 1992; Buchanan Smith and Davies, 1995; Mattingly, 2002).

Commercial imports – by the public or private sector – play a crucial role in stabilizing food availability in low- and middle-income developing countries, but foreign exchange constraints can limit the capacity to use this instrument (Barrett, 2001). An alternative is to maintain buffer stocks, whether public, private or community-based, to assist in spreading out the impact of local, regional or national harvest failures or in seasonally cut off areas.

#### *Instruments for managing risks related to food access*

Instruments for managing access to food aim at ensuring that households are able to meet food consumption needs. The instruments attempt to stabilize households' purchasing power/consumption ability through asset management, and to stabilize income flows and/or food prices. The means used include financial instruments, diversifying income and livelihood activities, increasing the returns to livelihood activities, asset sales and safety net programmes.

Formal and informal insurance, savings and consumption credit are financial instruments used for smoothing consumption. However, informal community-based insurance mechanisms relying on limited pools of participants may default when confronted with a covariant shock. Alternatively, savings may involve investing income surpluses in private assets (for example livestock, food stocks, jewellery and cash) with the intention of using these to gain access to food in times of need. The extent to which the assets maintain, or even increase, their value over time is critical in determining their effectiveness as risk management instruments (Zeller *et al.*, 1997).

In the absence of formal credit services, households obtain consumption credit through informal mechanisms such as friends and family. However, among the poor, lending capacities may be limited, especially *vis-à-vis* meso- and macro-level shocks,

when a large proportion of households are facing disruptions to income flows. Credit restrictions drive interest rates up so that households may be forced to take out expensive loans, which undermines their longer-term asset accumulation and increases their vulnerability.

Income diversification can also be used for mitigating risks. To be effective in increasing stability of income and access to food, a household's set of income sources must have low covariance for each given risk. Unfortunately, a characteristic of developing countries is that most income-generating opportunities available to rural households are highly covariant for specific risks because income-earning opportunities depend on a limited set of mainly agricultural-based activities. Economic development beyond the agricultural sector, including improving farm/non-farm linkages, can therefore be used as an instrument for increasing the effectiveness of livelihood diversification (Swift, 1989; Ellis, 1998; Baulch and Hoddinott, 2000). Changing or diversifying livelihoods is also used for *ex post* coping, for example through migration to find additional sources of income or, in more desperate stages, forcibly as a consequence of asset sales (Ellis, 1998; Devereux, 2001).

When households are faced with declining access to food, they may decide to trade off short-term consumption needs against longer-term viability by selling their assets, reducing expenditures on non-food items or shifting to lower-cost diets. Instruments that have lower long-term costs, such as food rationing, are adopted first, whereas instruments with higher long-term costs and low reversibility, for example selling the family's plough, are adopted later (Corbett, 1988). The effectiveness of distress sales of assets will depend on the price behaviour of the asset in question. With highly covariant risks, asset prices tend to rise and fall widely if many households want to buy and/or sell similar goods at the same time (Murdoch, 1999; Holzmann and Jørgensen, 2000).

Safety net programmes – such as public employment programmes, food subsidies and school feeding, and transferring assets (cash, food or other commodities) to households – can be used to maintain a minimum, nutritionally adequate food

consumption level and at the same time help households avoid eroding their asset bases. In non-emergency contexts, safety nets can also be used to reduce risk adversity by encouraging diversification into riskier activities with higher returns (Drèze, 1990; Sinha and Lipton, 1999; Devereux, 2001).

Until the 1980s, many governments kept large quantities of food reserves that were used to stabilize food prices in the event of hikes in food prices. These were the target of much criticism because of the expenses of storage and the effects on producers' incentives. Despite criticism, government food stock policies still play an important role in many developing countries. Another *ex post* instrument that is not well-tested involves using variable import tariffs to dampen the effect on domestic prices of rises in international food prices (Barrett and Sahn, 2001).

#### *Instruments for managing risks related to utilization of food*

Risk management instruments related to proper food utilization evolve around protecting the health status of individuals. The main instruments are concerned with improving nutrition and health care practices, health service delivery and ensuring access to safe water and sanitation, but they are also concerned with protection of food quality and safety.

Promotion of good nutritional practices, including safe food handling and an awareness of the importance of balanced diets, together with simple information on how to avoid or treat basic diseases like diarrhoea, assist in preventing diseases. Such activities are often a part of community-based nutrition programmes or larger health sector programmes and can include campaigns for national immunization and better sanitation habits.

Access to health services is key to mitigating disease-related risks to food security. Resources devoted to health care in developing countries are notoriously low (Schieber and Maeda, 1999), which can be a particular problem when dealing with highly covariant health risks that stretch resources to or beyond the limit. This is especially true when treatments are costly, as in the case of HIV/AIDS. Furthermore, poorer people have less access to health services than richer people. In their review

of inequality in the health sector of eight developing countries, Makinen *et al.* (2000) concluded that access to health care services was unequally distributed to the advantage of the wealthier in part due to their own higher private health expenditures, but also because of their better access to publicly-subsidized health care services.

Finally, controlling risks related to food safety for consumers requires both national and international regulation to guide national food production as well as to ensure standards for internationally traded food. Moreover, it requires food control systems and programmes – at national and local levels – that monitor processes from primary production to final consumption. While export industries in developing countries are pressed to implement food standards in compliance with their target markets, incentives are generally weaker for tight controls on food standards in the local markets.

## **CONCLUSION**

Improving food security requires an understanding not only of who is food insecure *today* and why they are so, but also of who is likely to be food insecure *in the future* and why that is so. Basing interventions on *ex post* measures of food security will likely miss important parts of the food security picture, both in terms of who the future food insecure are (targeting), why they are so (causes) and what can be done about it (policy options).

Analysing vulnerability offers a dynamic, forward-looking way of understanding food security. It calls for explicit attention to risks and the options for managing them so as to improve future food security. Managing risks goes beyond assisting those affected by a particular shock in addressing their immediate food needs. A range of options are available for addressing longer-term food security through sustainable agricultural and rural development, aimed at preventing or mitigating risk.

Risk factors will continue to threaten food security and cause vulnerability. The rising incidence of HIV/AIDS, continuing civil conflicts and political instability, increasing

severe weather events and adverse consequences of globalization are some of the risks likely to cause vulnerability in the coming years (Devereaux, 2001). Clearly, dealing with such risks through an effective mix of *ex post* and *ex ante* interventions will be essential in moving towards achieving global food security targets.





## BIBLIOGRAPHY

**Alwang, J., Siegel, P. and Jørgensen, S.** 2001. *Vulnerability: A view from different disciplines*. Social Protection Discussion Papers No. 115. Washington DC, World Bank.

**Barrett, C.** 2001. Does food aid stabilize food availability? *Econ. Dev. and Cult. Change*, 39(2): 335–349.

**Barrett, C. and Sahn, D.** 2001. *Food policy in crisis management*. Washington DC, World Bank.

**Baulch, B. and Hoddinott, J.** 2000. Economic mobility and poverty dynamics in developing countries. *Journal of Dev. Studies*, 36(6): 1–24.

**Buchanan Smith, M. and Davies, S.** 1995. *Famine early warning and response: The missing link*. London, Intermediate Technology Publications. In S. Devereux. *Famine in the twentieth century*. IDS working paper 105. Brighton, UK, IDS.

**Carter, M. and May, J.** 2001. One kind of freedom: Poverty dynamics in post-apartheid South Africa. *World Dev.*, 29(12): 1987–2006.

**Corbett, J.** 1988. Famine and household coping strategies. *World Development*, 16(9): 1099–1112. In S. Devereux. *Livelihood insecurity and social protection: A re-emerging issue in rural development*. *Dev. Policy Review*, 19(4): 507–519.

**Dercon, S.** 1999. *Income risk, coping strategies and safety nets*. World Bank Research Observer. In S. Dercon. *Assessing vulnerability to poverty*. Oxford, UK, Oxford University Press.

**Dercon, S.** 2001a. *Assessing vulnerability to poverty*. Oxford, UK, Oxford University Press.

**Dercon, S.** 2001b. *Insurance against poverty*. Oxford, UK, Oxford University Press.

**Devereux, S.** 2001. Livelihood insecurity and social protection: A re-emerging issue in rural development. *Dev. Policy Review*, 19(4): 507–519.

**Drèze, J.** 1990. Famine prevention in India. In J. Drèze and A. Sen, eds. 1990. *The political economy of hunger: Hunger and public action*. Vol. 2. Oxford, UK, Clarendon Press.

**Ellis, F.** 1998. Survey article: Household strategies and rural livelihood diversification. *Journal of Dev. Studies*, 35(1): 1–38 .

**Ellis, F.** 2002. *Human vulnerability and food insecurity: Policy implications*. Forum for food security in southern Africa. London, ODI.

**FAO.** 1996. *World Food Summit – Rome Declaration on World Food Security and WFS Plan of Action*. WFS document. Rome, FAO.

- FAO.** 2000. *The State of Food Insecurity in the World 2000*. Rome, FAO.
- FAO.** 2002. *Proceedings: Measurement and Assessment of food deprivation and Undernutrition. International Scientific Symposium, Rome June 2002*. Rome, FAO.
- FAO.** 2003. *Anti-hunger programme. A twin-track approach to hunger reduction: Priorities for national and international action*. Rome, FAO.
- FAO.** 2004. *The State of Food Insecurity in the World 2004 – Monitoring progress towards the World Food Summit and Millennium Development Goals*. Rome, FAO.
- FIVIMS.** 2000. *Guidelines for national FIVIMS: Background and principles*. IAWG Guidelines Series No. 1. Rome, FAO.
- Gaiha, R. and Imai, K.** 2003. *Vulnerability, shocks and persistence of poverty: Estimates for semi-arid rural south India*. Royal Economic Society Annual Conference Paper No 111. Nottingham, UK, Royal Economic Society.
- Haddad, L. and Frankenberger, T.** 2003. *Integrating relief and development to accelerate reductions in food insecurity in shock-prone areas*. Occasional Paper no. 2. Washington, DC, USAID Office for Food for Peace.
- Heitzmann, K., Sudharshan Canagarajah, R. and Siegel, P.** 2002. *Guidelines for assessing the sources of risk and vulnerability*. Social Protection Discussion Paper No. 0218. Washington DC, World Bank.
- Holzmann, R. and Jørgensen, S.** 2000. *Social risk management: A new conceptual framework for social protection and beyond*. Social Protection Discussion Paper No. 0006. Washington DC, World Bank.
- Mansuri, G. and Healy, A.** 2001. *Vulnerability prediction in rural Pakistan*. Washington DC, World Bank. (mimeo)
- Makinen, M., Waters, H., Rauch, M., Almagambetova, N., Bitran, R., Gibson, L., McIntyre, D., Pannarunothai, S., Prieto, A.L., Ubilla, G. and Ram, S.** 2000. *Inequalities in health care use and expenditures: Empirical data from eight developing countries and countries in transition*. Bulletin of the World Health Organization. Geneva, WHO.
- Marsh, R.** 2003. *Working with local institutions to support sustainable livelihoods*. Rome, FAO.
- Mattingly, S.** 2002. *Summary paper on best practices in disaster mitigation*. Regional workshop on practices in disaster mitigation in Bali, Indonesia, 24–26 September 2002. Bangkok, Asian Disaster Preparedness Center.

**Murdoch, J.** 1995. Income smoothening and consumption smoothening. *Journal of Econ. Perspectives*, 9: 103–104.

**Murdoch, J.** 1999. Between the state and the market: Can informal insurance patch the safety net? *The World Bank Research Observer*, 19(2): 187–207.

**Owens, T., Hoddionott, J. and Kinsey, B.** 2004. Ex ante actions and ex post responses to drought shocks: Evidence and simulations from Zimbabwe. *World Dev.*, 31[7]: 1239–1256.

**Schieber, G. and Maeda, K.** 1999. Health care financing and delivery in developing countries. *Health Affairs*, 18(1): 193–205.

**Sinha, S. and Lipton, M.** 1999. *Damaging fluctuations, risk and poverty: A review*. Background paper for the World Development Report 2001/01. Brighton, UK, Poverty Research Unit, University of Sussex.

**Siegel, S. and Alwang, J.** 1999. *An asset-based approach to social risk management: A conceptual framework*. Social Protection Discussion Paper Series. No. 9926. Washington DC, World Bank Social Protection Unit.

**Smith, L., Obeid, A. and Jensen, H.** 2000. The geography and causes of food insecurity in developing countries. *Ag. Econ.*, 20: 199–215.

**Swift, J.** 1989. Why are rural people vulnerable to famine? *IDS Bulletin*, 20(2): 8–15. In F. Ellis. *Human vulnerability and food insecurity: Policy implications*. Forum for food security in southern Africa. London, ODI.

**Tesliuc, E. and Lindert, K.** 2002. *Vulnerability: A quantitative and qualitative assessment*. Washington DC, World Bank.

**UN–SCN.** 1999. *Ending malnutrition by 2020: An agenda for change in the millennium*. Geneva, United Nations.

**UNDP.** 2004. *Reducing disaster risk: A challenge for development*. New York, UNDP.

**Vakis, R., Kruger, D. and Mason, A.** 2004. *Shocks and coffee: Lessons from Nicaragua*. Social protection discussion paper series. No. 0415. Washington DC, World Bank.

**Von Braun, J., Bouis, H., Kumar, S. and Pandya-Lorch, R.** 1992. *Improving food security of the poor: Concept, policy and programs*. Washington DC, International Food Policy Research Institute (IFPRI).

**Webb, P. and Rogers, B.** 2003. *Addressing the ‘in’ in food insecurity*. Occasional paper No. 1. Washington DC, USAID Office of Food for Peace.

**World Bank.** 2000. *World Development Report 2000/01: Attacking poverty*. Washington DC, World Bank.

**World Bank.** undated. *The contribution of social protection to the Millennium Development Goals*. Washington DC, World Bank.

**Zeller, M., Schreider, G., von Braun, J. and Heidues, F.** 1997. *Rural finance for food security for the poor: Implications for research and policy*. Food Review No. 4. Washington DC, IFPRI.

## Notes

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<sup>i</sup> Examples of these include Save the Children's Household Economy Approach and the World Food Programme's Standard Analytical Framework.

<sup>ii</sup> To illustrate, Tesliuc and Lindert (2002) use a 50 percent probability as the cutoff point, implying that being vulnerable is facing a higher probability of being food insecure than being food secure.

<sup>iii</sup> Dercon (2001a) makes a further categorization of the potentially vulnerable into those who are potentially food insecure following an unexpected shock, those who are potentially insecure following cyclical/seasonal shocks and those who are potentially insecure due to negative trends, for example negative changes over time in key food security factors.

<sup>iv</sup> For a detailed treatment of the subject, see Dercon (2001b), *Insurance against poverty*.

<sup>v</sup> The ability to recover or resist being affected by an adversity is also termed *resilience*. However, to stress that options to influence future food insecurity include both *ex post* response capacity (i.e. ability to cope) as well as *ex ante* (preventive or mitigating) actions – which alter the characteristics of the risk itself (this latter ability sometimes also termed *resistance*) – the term *risk management* is used here.

<sup>vi</sup> If functioning food markets exist, few vulnerable households are likely to influence aggregate food availability, even if production for auto-consumption is an important livelihood strategy.