

Rural disaster risk – poverty interface

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Contents

Introduction	3
1. The Relationship between Rural Poverty and Hazard Exposure	6
1.1 Who are ‘the rural poor’?.....	6
1.2 Characteristics of Rural Poverty	7
1.3 Hazard exposure.....	11
1.4 Coping with hazards.....	14
1.5 Conclusion	15
2. Contribution of Rural Poverty to Vulnerability	15
2.1 Vulnerability	15
2.2 Vulnerability scenarios	17
2.3 Vulnerability – poverty linkages	18
2.4 Assets, poverty and vulnerability	19
2.5 Conclusion	20
3. Influence of Rural-Urban Linkages on Extensive Rural Disaster Risk	21
3.1 Research on Rural-Urban Linkages	21
3.2 Migration.....	23
3.3 Decentralisation and Rural Local Government	25
3.4 Conclusion	27
4. Climate Change: Threat and Opportunity for Rural Poverty	28
4.1 Impacts of climate change on rural populations.....	28
4.2 Reducing climate change risks: Disaster risk reduction and adaptation.....	30
4.3 Limiting climate change: Mitigation and rural poverty	32
4.4 Conclusion	33
5. Approaches to co-managing rural poverty and disaster risks.....	35
5.1. Poverty impacts of disasters.....	35
5.2. Case studies of co-managing poverty reduction and disaster risk	36
5.3 The Role of Social Protection	39
5.4 Linkages in Practice	42
5.5 Conclusions	44
6 Summary and Recommendations	45
References.....	48

Introduction

The majority of the world's poorest people live and work in rural areas. The 2008 World Bank World Development Report '*Agriculture for Development*' puts the figure at 75%¹. Regional differences are striking, ranging from 41% of poor people living in rural areas in Latin America and Caribbean to almost 93% in East Asia and Pacific region².

Definitions of urban and rural differ by country, and lines between the two can be blurred, for example in peri-urban areas people often pursue livelihood strategies that are akin to more rural settings, while rural towns might provide opportunities for rural non-farm incomes for people living in villages. There are often strong links and dependencies between rural and urban areas, through migration and flows of remittances and goods.

Rural poverty has particular characteristics. The livelihoods and survival of rural people depend heavily on agriculture and other rural sectors strongly reliant on natural resources. Weather-related shocks and stresses and risks associated with seasonality are intrinsic to rural livelihoods tied intimately to agricultural production. As a result, rural livelihoods tend to be characterised by risk, shocks and stresses, including economic shocks such as changing market prices and climate-related risks, which may lead to drought or repeated flooding. The poorest people are often the most vulnerable people to these shocks and stresses, though coping and risk management strategies are widespread. Poor people in rural areas also tend to suffer poverty over long time periods, with more limited income-generating opportunities compared to people in urban areas. Access to services and infrastructure is usually limited (Ravallion et al, 2007).

This research paper, IDS' contribution to the Global Assessment Report on Disaster Reduction (GAR), examines links between disaster risk and poverty trends to inform the central analysis of the GAR/DRR, illustrating the dynamics of the disaster-poverty interface. The paper looks at the disaster risk – poverty interface through the lens of rural livelihoods and sustainability, providing a framework for assessing rural poverty and disaster risk, encompassing research, detailed analysis, and case study materials. The main sections are:

- Relationship between rural poverty and hazard exposure
- Contribution of rural poverty to vulnerability
- Relationships between urban and rural disaster risks
- Climate change: threat and opportunity for rural poverty and disaster risk
- Approaches to co-managing rural poverty and disaster risk
- Policy recommendations

Underpinning each of these sections is a consideration of risk and resilience in rural lives and livelihoods.

The rural analysis presented here is set within a livelihoods framework, embodying notions of wellbeing as the absence of poverty. Livelihoods approaches as frameworks for conceptualising poverty and risk are informed by Sen's work on endowments, entitlements and capabilities (REF). In a given context, encompassing politics and policy processes and agro-ecological conditions, livelihoods approaches consider what combinations of capitals - human, financial, social, political, natural - are necessary to follow different livelihoods strategies and achieve different outcomes. In particular it considers the role of institutions and institutional dynamics, both formal and informal, in mediating capabilities and improving

¹ (World Bank, 2007)

² (Ravallion et al 2007).

wellbeing (Ellis, 1998; Scoones, 1998). As such, livelihoods approaches embody multi-dimensional concepts of poverty.

Key messages from this study for the Global Assessment Report

The following messages are highlighted within this study and are some of the authors' recommendations for transferring in to the Global Assessment Report. There are many other important points raised in this report, which are presented in **Chapter 6: Summary and Recommendations**.

- There is a decline in the \$1-a-day poverty rate in developing countries overall, from 28% in 1993 to 22% in 2002, largely due to falling rural poverty. However, this fall in the number of poor people in rural areas has been in the East Asia and Pacific region, and in other regions, notably Sub-Saharan Africa and South Asia, rural poverty is rising (World Bank, 2007:3).
- Rural poverty, like all poverty, is multidimensional. Notions of poverty expand beyond economic, material concepts of income and consumption to encompass experiential and psychological dimensions, such as access to services, feelings of social exclusion and lack of political rights. Consequently, the authors favour the concept of wellbeing within a livelihoods framework, with 'wellbeing' constituting an absence of poverty and a) access to assets, (b) ability to obtain an income, (c) access to services and (d) empowerment.
- The livelihoods and survival of rural people depend heavily on agriculture and other rural sectors strongly reliant on natural resources. Weather-related shocks and stresses and risks associated with seasonality are intrinsic to rural livelihoods tied intimately to agricultural production.
- Exposure to hazards undermines livelihoods, simultaneously causing and exacerbating rural poverty. Conversely, a hazard is more likely to impact negatively on an already compromised livelihood system, because resilience and ability to cope are diminished. Poverty is itself hazardous. Low incomes raise vulnerability to hazards, because the poor are less able to cope effectively with shocks to their fragile livelihoods.
- Rural poverty and vulnerability reinforce each other. Everyone is vulnerable to food insecurity, social exclusion and natural disasters, but the rural poor are more vulnerable because they are more exposed to these risks and are more likely to experience a larger and more prolonged (even irreversible) impact due to their limited (physical, financial, social and political) assets.
- Assets usually increase wellbeing and reduce vulnerability to livelihood shocks. In some perverse cases assets can increase vulnerability, but these are unusual circumstances.
- The importance of voice and influence over people with power cannot be overstated; it is critical for determining whether rural poor people must attempt to cope with disasters and disaster risk on their own or can count on external assistance in times of stress. When such assistance is guaranteed – for instance, where predictable and social security systems provide effective safety nets against shocks – the catastrophic consequences of disasters can be substantially contained.
- While climate change is commonly presented as a gradual shift in climatic trends, its impacts will be most strongly felt by poor rural communities through changes in the distribution, nature and magnitude of extreme weather events. Adapting to these

changes will require bolstering disaster risk reduction as a first line of defence, including disaster prevention as well as response.

- It is impossible to divorce measures for improving rural wellbeing from measures designed to reduce rural disaster risk. Such measures must build-up the asset base of (poor) people in rural areas to act as buffers against shocks and help reduce vulnerability to hazards. These include measures that not only strengthen existing asset bases but also those that enable people to create/access assets, such as essential inputs for farming, irrigation;
- If households resort to 'distress' coping strategies involving the sale of critical assets when face with disasters or disaster risk, rebuilding assets must be tackled in a timely way so as to avoid the 'poverty ratchet' effect, so keeping poor rural people above asset thresholds.

1. The Relationship between Rural Poverty and Hazard Exposure

This section examines the complex relationship between rural poverty and exposure to hazards. We detail where the rural poor live, we define what we mean by wellbeing (or the absence of poverty) and discuss the rural-specific characteristics of poverty. This leads us to examine sources and impacts of hazards and stresses in poor rural people's livelihoods.³ We then consider responses to these hazards and stresses, or 'coping strategies', in the context of rural peoples' dynamic livelihood strategies.

1.1 Who are 'the rural poor'?

This section explores rural poverty, situating rural poor people both spatially and in relation to their livelihoods. Notions of poverty are expanded beyond economic, material concepts of income and consumption to encompass wellbeing across multiple dimensions, including experiential and psychological.

A synthesis of the findings of 'Consultations with the poor' shows that poor people in both rural and urban areas experience ill-being in multiple ways, going beyond standard economic definitions of income and material consumption poverty based on yardsticks such as a dollar a day and encompassing bad experiences, and "bad feelings about the self". By contrast, "Wellbeing was variously expressed as happiness, harmony, peace, freedom from anxiety, and peace of mind...For many, too, spiritual life and religious observance were woven in with other aspects of wellbeing" (Narayan et al, 1999: 3). While the nature of illbeing and poverty is context and person-specific, there are also commonalities in people's experiences that transcend different countries and cultures, including rural and urban areas, as well as age and gender divides⁴.

Turning to material poverty, a recent World Bank study by Ravallion *et al* (2007) drew on over 200 household surveys in 90 developing countries, and other sources, to examine trends in income poverty disaggregated by rural and urban areas. They found that of people living on \$1 a day or less, the proportion in urban areas rose over the decade between 1993 and 2002, from 19 % to 24%, as did the urban share of the population, from 38 to 42%.

Regional differences are striking. Poverty is becoming more urbanised at the fastest rate in Latin America. Here, the majority of poor people now live in urban areas. In East Asia, on the other hand, less than 10% of poor people live in urban areas, and data for some countries and regions suggest poverty is becoming more ruralised – for example in China and in Eastern Europe and Central Asia (Ravallion et al 2007). Tables 1 and 2 show urban and rural poverty headcounts and poverty gap indices disaggregated by rural and urban areas.

Table 1.1a: Urban and rural income poverty 2002 (poverty line = \$1.08/day, 1993 PPP)

	Number of poor in millions			Headcount index (%)			Urban share of the poor (%)	Urban share of population (%)
	Urban	Rural	Total	Urban	Rural	Total		
East-Asia and Pacific	16.27	223.23	239.50	2.28	19.83	13.03	6.79	38.79
China	4.00	175.01	179.01	0.80	22.44	13.98	2.24	37.68
Eastern-Europe and Central Asia	2.48	4.94	7.42	0.83	2.87	1.57	33.40	63.45
Latin America and Caribbean	38.33	26.60	64.93	9.49	21.15	12.26	59.03	76.24

³ For this section we draw extensively on work by Sabates-Wheeler *et al.* (2008).

⁴ 'Consultations with the Poor' was a global endeavour across 23 developing countries using participatory research to uncover voices of the poor including their experiences, priorities, reflections and recommendations, and incorporate them into the 2000/2001 World Bank World Development Report. For a synthesis of findings see Narayan et al, 1999.

Middle East and North Africa	1.21	4.88	6.09	0.75	3.82	2.11	19.87	55.75
South Asia	125.40	394.34	519.74	32.21	39.05	37.15	24.13	27.83
India	106.64	316.42	423.06	36.20	41.96	40.34	25.21	28.09
Sub-Saharan Africa	98.84	228.77	327.61	40.38	50.86	47.17	30.17	35.24
Total	282.52	882.77	1165.29	12.78	29.32	22.31	24.24	42.34

Source: Ravallion, Chen, and Sangraula (2007).

Table 1.1b: Urban and rural poverty gap indices 2002 (poverty line = \$1.08/day, 1993 PPP)

	Poverty gap index (%)			
	Urban	Rural	Total	Urban share of Poverty Gap (%)
East-Asia and Pacific	0.54	4.42	2.92	7.16
China	0.238	4.96	3.11	2.99
Eastern-Europe and Central Asia	0.21	0.67	0.38	34.82
Latin America and Caribbean	3.01	8.60	4.33	52.86
Middle East and North Africa	0.15	0.74	0.41	19.98
South Asia	8.67	9.18	9.04	26.71
India	10.04	10.03	10.03	28.10
Sub-Saharan Africa	16.67	22.53	20.46	28.70
Total	4.13	8.53	6.67	26.25

Source: Ravallion, Chen, and Sangraula (2007).

The same data show a decline in the \$1-a-day poverty rate in developing countries overall, from 28% in 1993 to 22% in 2002, largely due to falling rural poverty. Urban poverty has stayed relatively constant at around 13%. However, this fall in the number of poor people in rural areas has been in the East Asia and Pacific region, and in other regions, notably Sub-Saharan Africa and South Asia, rural poverty is rising (World Bank, 2007:3). Projections suggest that it will be decades before most poor people in developing countries are living in urban areas. For the foreseeable future, poverty remains a largely rural phenomenon in the developing world.

In terms of absolute numbers of people, over half of the developing world's population (5.5 billion people) lives in rural areas (3 billion people). Half of the rural population are in smallholder farming households, and in all around 86% of rural people are in households where livelihoods are connected to agriculture in some way, either through farming or working in the sector (World Bank, 2007: 3-4). Rural poor people, therefore, can fit a range of 'profiles' ranging from smallholders, pastoralists, workers on plantations or smaller farms growing either food or cash crops for domestic consumption or export, engaging in on-farm, off-farm and non-farm activities including services, and living in rural towns, villages, and more remote places.

1.2 Characteristics of Rural Poverty

Wellbeing, or the absence of poverty, is best conceptualised within a livelihoods framework.⁵ A livelihood is defined as 'the activities, the assets and the access that jointly determine the living gained by an individual or household' (Ellis, 1999).⁶ The livelihoods literature has poverty reduction (and wellbeing) and engagement in the productive economy as its central focus. Fundamental to the livelihood approach is the asset or resource status of individuals and households. Assets provide capabilities for achieving satisfactory levels of living. Typically

⁵ The literature on wellbeing and the 'wellbeing approach' derives from the work of Sen (for instance, 1990, 1993, 2006). Recent theorists to explore this concept include Clark (2003, 2005) and McGregor (2005, 2006).

⁶ The livelihoods approach emerged out of the work of Chambers and Conway (1992); Carney (1998); Bebbington (1999) and Ellis (2000).

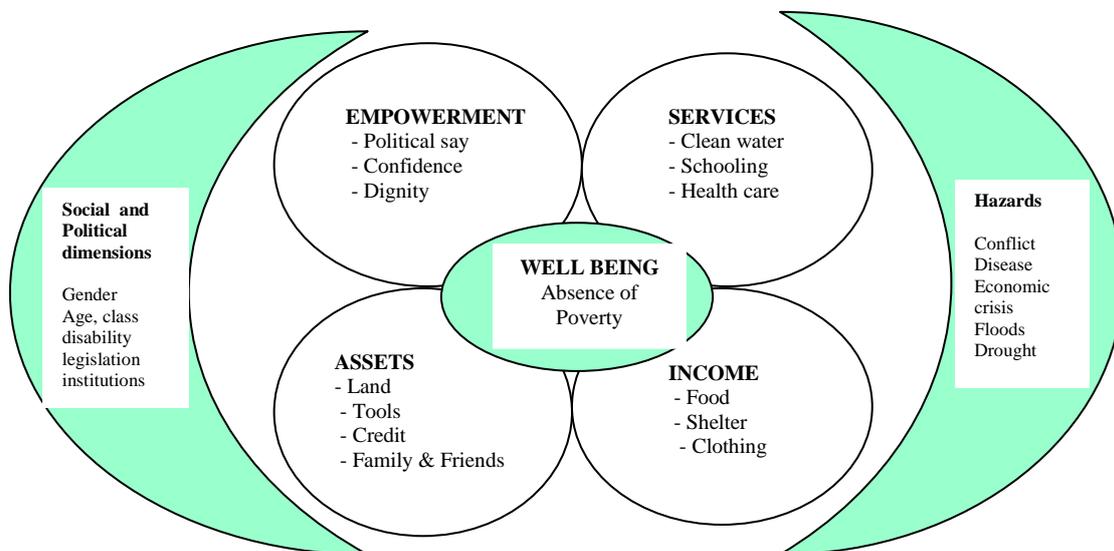
this means that the household is the unit of analysis, whereby the household and its corresponding resource profile is located within the context of the wider ‘vulnerability’ environment (external influences such as hazards and shocks will cause livelihoods to be compromised and lead to adaptation strategies), the context of social vulnerabilities (such as age, ethnic status, gender that causally impact how livelihoods are constructed and adapted) and within the policy and institutional context.⁷ Rural livelihood diversification is defined as ‘the process by which households construct an increasingly diverse portfolio of activities and assets in order to survive and improve their standard of living [or wellbeing]’ (Ellis, 1998; 2000, p.15).

Figure 1.2a (below) illustrates the dimensions that coalesce and reinforce each other to create a state of wellbeing within the livelihoods framework as detailed above. Wellbeing constitutes:

1. access to *assets* such as land, credit, and social assets such as friends and family;
2. ability to obtain an *income*;
3. access to *services* and;
4. *empowerment*, or the ability to make ‘voice’ heard.

Absence of poverty in this framework is defined along multiple dimensions (not just income) . For instance, we see that assets, access to services and political rights and power are important in defining wellbeing in a holistic way. The vulnerability context, which influences access to ‘productive factors’ that determine wellbeing, is made up of 1) social dimensions such as gender, class, age, disability; 2) political dimensions such as laws, policies and institutions that present structural barriers to achieving wellbeing; and 3) hazards, such as conflict, climate change, and economic crises. Political and social dimensions may reinforce each other. For instance, political marginalisation and social exclusion (based on ascriptive factors such as caste, race, and gender) could influence means of production and attributes of risk. Not all dimensions of wellbeing have to be fully met in order to achieve an absence of poverty, but all dimensions are critical in achieving wellbeing. The specific components and thresholds that make up any one individuals’ or household’s wellbeing will vary by context; however a minimum level of certain components, such as food, water, health care, shelter and education are likely to define the minimum threshold below which individuals and households across all contexts can be seen as poor.

Figure 1.2a: Livelihoods and Poverty



⁷ This could equally apply to individuals however the household has traditionally been the unit of analysis.

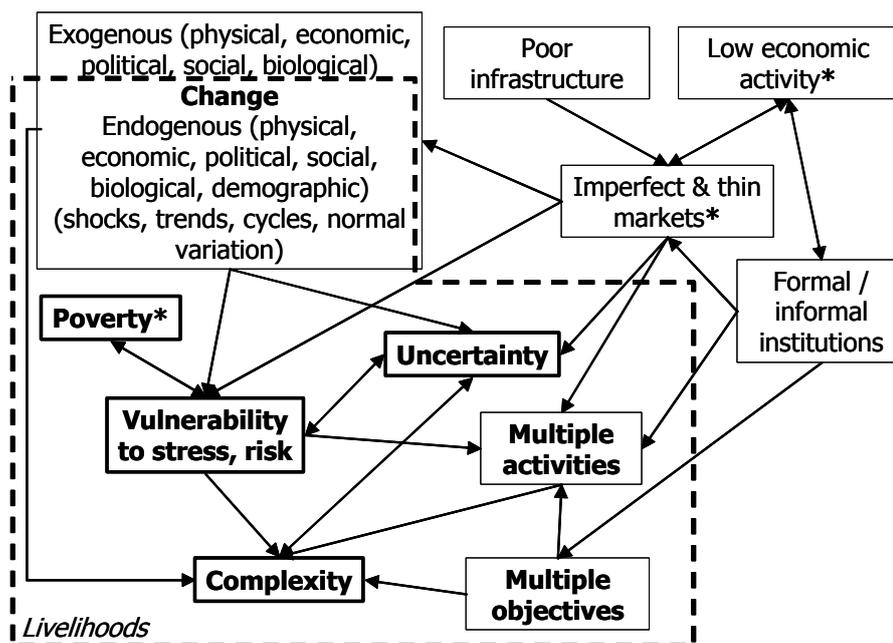
If poverty is defined as an inability to construct and maintain a viable livelihood, then rural poverty must be analysed in relation to rural livelihood systems. A defining characteristic of the rural poor is their lack of productive assets needed to maximise their income. Smallholder farmers, for instance, often face constrained access to:

- *land* – because of land pressure (especially in highly food insecure regions such as southern Malawi or highland Ethiopia), or the absence of tenure rights;
- *labour* – because the poorest households are those with high dependency ratios and limited adult labour power, such as ‘skip generation’ households containing only very old and very young members;
- *inputs* – because imported fertiliser and improved seeds are expensive, government subsidies have mostly been removed, and input credit is not readily available;
- *irrigation* – because of the high cost of installing irrigation systems, leaving farmers exposed and dependent on unpredictable and unreliable rainfall;
- *financial services* – because banks won’t lend to small farmers who lack collateral because they have no rights over the land they farm, and insurers won’t provide crop insurance because of ‘moral hazard’, asymmetric information and covariate risk.

The consequence of this constrained access to essential inputs for farming – land, labour, water, fertilisers, seeds, credit – is ‘low input, low output’ agriculture. Poor farmers apply sub-optimal levels of inputs to their fields and harvest extremely low yields – cereal yields in Malawi are one-tenth of average cereal yields in the United States (FAO, 2008b), for instance, where high levels of mechanisation means that harvests are both higher and more stable than in Africa. Low crop yields result in low incomes and chronic food insecurity, which leaves farming families close to the poverty line (sometimes above it and sometimes below), and acutely vulnerable to the smallest hazard or shock.

Rural poverty is primarily an outcome of the structural characteristics that are common to the livelihoods of most poor rural people, as summarised in Figure 1.2b.

Figure 1.2b: Common structural characteristics of poor rural peoples’ livelihoods



Source: Dorward *et al.* (2006) (* Threshold effects important – see text; Bold type indicates major feature of poor rural livelihoods)

Processes of *change*, which include hazard exposure such as climatic variations and price changes; but also include cyclical change such as seasonal fluctuations feature largely in rural poor livelihoods. This is discussed in detail below.

Another feature of poor rural livelihoods (highlighted in the figure above) is their location in *imperfect and thin markets*. Ellis, 1993 defines peasants in terms of their partial integration into imperfect and often personalised markets, while Dorward and Kydd, 2004 argue that poor rural areas are characterised by (*inter alia*) *low levels of economic activity*, thin markets and weak and costly coordination in exchange. These institutional and market characteristics contribute to uncertainty and vulnerability in terms both of wider market behaviour (with wilder price swings in response to local changes in production, for example) and of transaction risks (with buyers and sellers subject to risks of opportunism, coordination failure and rent seeking in exchange. Imperfect (costly and risky) markets are then an important cause for rural people constructing livelihoods in which they engage in a *multiple activities* to meet their diverse social and economic needs (for example subsistence production may be cheaper and less risky than reliance on markets to meet food needs). An example from Bangladesh of the risks associated with market failure is highlighted in Box 1.2.

Box 1.2 Markets and risk in Bangladesh

One of the most dramatic examples of market-related risk in the context of a natural disaster occurred in Bangladesh in 1974/75. Exaggerated predictions of a poor rice harvest due to flooding caused excessive quantities of rice to be withdrawn from the market and stored, for either precautionary or speculative purposes. The immediate consequence was that a minor production shortfall became a massive shortfall in market supplies. Prices rose rapidly to levels that were unaffordable for the poor. Up to 1.5 million people died because they were priced out of the market and had no alternative source of food or income. Landless labourers, especially agricultural workers, were worst affected, because they were entirely dependent on the market for their staple food. As rice prices escalated, so the purchasing power of wages fell precipitously, leaving the market-dependent poor unable to meet their subsistence needs.

Source: Sen (1981)

Market-related risks tend to be related to distance from urban centres. People living in ‘remote rural areas’ are more likely to face imperfect or missing markets than are people living closer to urban centres, and this remoteness in itself contributes to chronic poverty and vulnerability (Bird, *et al.*, 2002). Conversely, as discussed below (in section 3.1), proximity to urban centres creates opportunities for market deepening and urban-rural integration (including mutually beneficial exchange of commodities and services), leading to reduced risk for rural dwellers.

Further complexity arises from the existence of various thresholds in rural livelihoods and in the economies within which they are situated. Changes that cross thresholds can have very different qualitative and quantitative effects from changes which do not cross thresholds. For instance, ‘asset thresholds’ arise in individual livelihoods, where certain sets (or amounts) of assets are needed to engage in particular activities and/or to support particular levels of welfare, leading to poverty traps for households without these minimum asset sets/amounts.

The interaction of multiple objectives, multiple activities and multiple dimensions of predictable and unpredictable change means that poor rural livelihoods tend to be inherently complex so that exogenous and endogenous changes may have effects that are difficult to predict.

Complexity and exposure to uncertainty, together with poverty lead to high vulnerability and risk.

Next we focus on hazard exposure and stress, and explore the way that this fundamental characteristic of rural livelihoods interacts with rural poverty.

1.3 Hazard exposure

A prominent feature of rural livelihoods is their exposure to a variety of types and processes of change, with shocks, trends, cycles (particularly seasonal cycles) and ‘normal’ random variation occurring in many different dimensions. All these changes and variations can be viewed through the lens of ‘hazards’, where for the purpose of this paper we define *hazards* as events which, if they materialise, can adversely affect wellbeing. The context within which rural people and households operate and cope is both defined and affected by their exposure to shocks and hazards. Hazards affect rural poverty through effects on prices, resource availability, resource productivity, and livelihood opportunities. Some of these hazards are predictable in their occurrence while others are not. Similarly, some of the effects of change resulting from hazards are predictable while others are not.

Hazards may be covariate (operating at macro and meso levels and affecting large numbers of communities and/ or people) or more idiosyncratic (affecting individual communities, households or people). Hazards arise within livelihoods, again with different patterns, dimensions and predictability. Some are the direct result of changes in exogenous factors (such as those as discussed above) while others are more (but seldom completely) endogenous – for example, accumulation or loss of assets as a result of household members’ actions; or births, marriages and growing up and ageing processes affecting household demographics, consumption needs and labour resources. New types and sources of change are also constantly emerging and affecting rural livelihoods in new ways because of global and local processes and crises, including market liberalisation, potential impacts of climate change, the HIV/AIDS pandemic, civil conflict, and some aspects of the globalisation of agricultural trade.

It is important here to differentiate between the many diverse forms that rural livelihoods can take. For instance, in subsistence-oriented smallholder economies, a primary source of risk is weather shocks that undermine production of staple crops grown for family consumption. However, in plantation agriculture, where crops are grown mainly for export (e.g. nutmeg, rubber, sugar), major risks include the loss of an entire crop (as with nutmeg in Grenada), a collapse in world prices, or liberalisation that exposes producers to global market forces with inadequate protection (as affected cashew growers in Mozambique in the 1990s (Macmillan, *et al.*, 2002)). Also, many rural livelihoods are derived from tourism, but these livelihoods are vulnerable to weather shocks – like recurrent hurricanes in Central America, or the tsunami in South Asia – that can devastate the local tourism sector for months or even years.

Many of the direct costs and losses from hazards are self-evident and need little discussion: floods, drought or hail may cause crop losses while births, sickness, accident, disability, old age or schooling may lead in different ways to predictable and unpredictable increases in living costs and reductions in production or earnings. However, these immediate losses of assets and earnings may have far-reaching ‘knock on’ effects on other activities and asset holdings in rural households, effects which may not be so immediately obvious but which may be more damaging, particularly when poor rural people are forced into increasingly unsustainable responses in order to smooth their income or consumption. Distress sales of assets, for example, can act as ‘poverty ratchets’, with irrecoverable losses of productive resources below asset thresholds locking people into poverty or low-level traps from which they cannot escape without external transfers. Box 1.3 describes such a situation in Honduras following the impact of Hurricane Mitch in 1998.

Box 1.3 Natural disasters and poverty traps in Honduras

When Hurricane Mitch struck Central America in 1998 it not only caused tragic loss of life, it also destroyed crops, livestock and other productive assets, undermining the livelihood base of poor rural households and impoverishing them further. Some 30 months later, a survey of 850 households assessed the longer-term economic impact of this environmental shock. The survey found that wealthier households were more likely to have lost assets during Hurricane Mitch – they had more assets to lose – but that poorer households lost greater proportions of their productive assets, mainly land. This resulted in lost production and agricultural income, but it also pushed many households below a critical ‘asset threshold’ which left them with inadequate productive resources to accumulate wealth – a ‘poverty trap’ from which there was no escape. The study concluded that the asset shocks that are inevitably associated with natural disasters can have long-term impoverishing consequences.

Source: Carter *et al.* (2008)

This effect is highlighted during a period of livelihood stress or crisis, to which people respond by engaging in ‘coping strategies’ such as borrowing, selling assets, rationing food consumption, or withdrawing children from school. The consequence of adopting such ‘erosive’ coping strategies is that the household’s ability to generate future livelihoods is compromised, because its productive resource base has been compromised. When the next shock strikes, the household has fewer options and will again be forced to shed assets to survive. Over time, the ‘poverty ratchet’ effect that repeated shocks have on increasingly weakened livelihoods steadily undermines the ability to recover, and pushes people towards chronic poverty and destitution. This combination of recurrent shocks and chronic impoverishment may affect increasing numbers of people in rainfall-dependent rural areas of sub-Saharan Africa, south Asia and elsewhere, as a consequence of climate change.

Once again, as noted above and in section 3 below, the extent to which rural livelihoods are independent of, or integrated with, urban livelihoods and markets is critical to understanding their relative vulnerability. Households with diversified sources of income and strong linkages to urban markets (including urban-based employment opportunities) are better protected against weather fluctuations that can undermine agricultural production and rural incomes, but typically have only limited impact on urban economic activity and incomes.

Two factors that are major determinants of the vulnerability context of rural individuals and households are seasonality and HIV/AIDS.

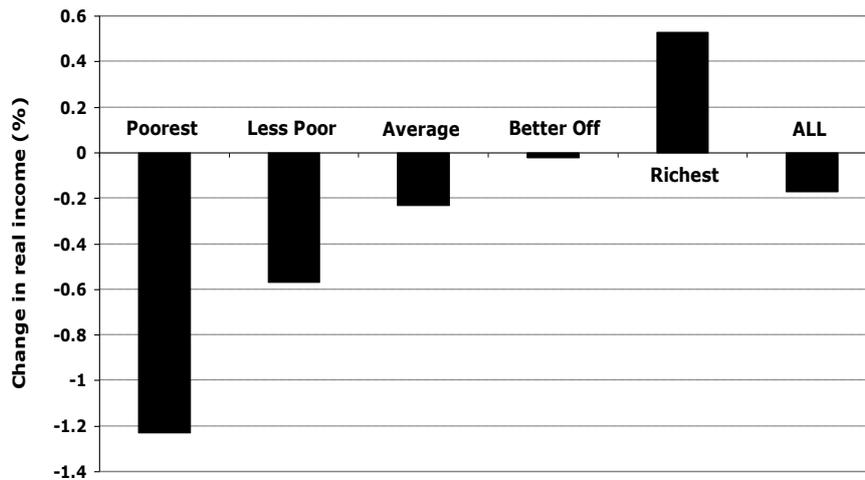
Vulnerability factor #1: Seasonality

Seasonality constitutes a stress or hazard in the lives of rural people and is a source of poverty and vulnerability for rural families throughout Africa and Asia. Dependence on a single main harvest for most of the family’s annual food and income exposes these families to enormous risk in the event of erratic weather, such as a drought or flood – even a brief break in the rains at a key stage of the growing cycle can spell disaster. Even in good rainfall years, the annual ‘hungry season’ can last for several months. This is a time of high food prices, hunger, malnutrition and debilitating diseases such as diarrhoea and malaria. There are few employment opportunities; most available work is low-paid agricultural labour, which can only be undertaken at the cost of neglecting the family’s own farm, which sets up a ‘poverty ratchet’ of low-yielding harvests, working on neighbouring farms for food, and further under-production in future years.

Food price rises are a significant source of risk for all poor families who depend on the market for their food. This applies not just to urban consumers but also to small-scale farmers whose food insecurity derives from the fact that they do not produce enough food to meet their

subsistence needs, and must cover some proportion of their families' food requirements by buying food from local markets. Even worse, many farmers are forced into selling some of their food production at low prices after harvest to meet urgent cash needs, only to buy this food back later in the year at two or three times the selling price, to bridge the consumption gap before the next harvest. This is a classic symptom of seasonality in tropical agricultural systems. Surplus producers profit from price rises, because their income from crop sales increases, but deficit producers are impoverished by having to buy food at high prices (see Figure 1.3, which illustrates the differential impact of a maize price increase on net producers and net consumers in rural Malawi.) This analysis applies equally to regular, predictable seasonality and to unforeseen shocks like the current 'high food prices' issue.

Figure 1.3 Projected effect of a 10% increase in maize prices on the welfare of different wealth groups in rural Malawi



Source: FAO (2008a)

Vulnerability factor #2: HIV and AIDS

The example of HIV and AIDS is instructive for drawing out this complex relationship. First, exposure to HIV can undermine livelihoods, which exacerbates poverty: HIV infects an individual but has wide repercussions on the family, community and ultimately the nation. HIV and AIDS has the greatest impact on 'productive' members of a society by directly undermining their ability to work, increasing the number of dependents in a household. This has a dual effect of decreasing household productivity directly (and income) and indirectly, by increasing the caring burden of other household members. It also interrupts the intergenerational transfer of knowledge and skills (e.g. farming skills, health knowledge, exchange of ideas and tools). These effects have knock-on impacts on assets (which are sold in order to fund medical, caring and living expenses), shrinking livelihood opportunities, increasing vulnerability and poverty. As income dries up, savings are run down, assets are liquidated and coping strategies becoming increasingly more irreversible, ultimately leading to assetlessness, destitution and family disintegration. More risky coping mechanisms are then employed, further promoting the likelihood of contracting HIV and AIDS.

As more and more households are affected by HIV/AIDS and AIDS-related illnesses, the networks and informal mechanisms that initially provide support to AIDS-affected people are shrinking and are being stretched at every level, from extended family to community to national. Other community-level organisations are also affected. The impact on the public health sector, as health workers fall chronically ill or leave to care for other family members, means that clinics have lower levels of qualified staff. This undermines preventative health care and puts extra burden on formal institutions for health provisioning. In this sense, the HIV pandemic is both an idiosyncratic and a covariate shock.

Second, HIV and AIDS impacts households differentially. Most low-income countries face problems with health service delivery, so people in poor countries are more vulnerable to the untreated consequences of HIV and AIDS. Even if treatment is available within the country (increasingly, for instance, ARVs are provided free of charge), poor people living in isolated rural communities are the least able to access this, because of lack of transport or high costs of travel, limited knowledge of available medicines, and stigma around HIV infection. In short, access to medical help for dealing with health hazards is more difficult for poor people.

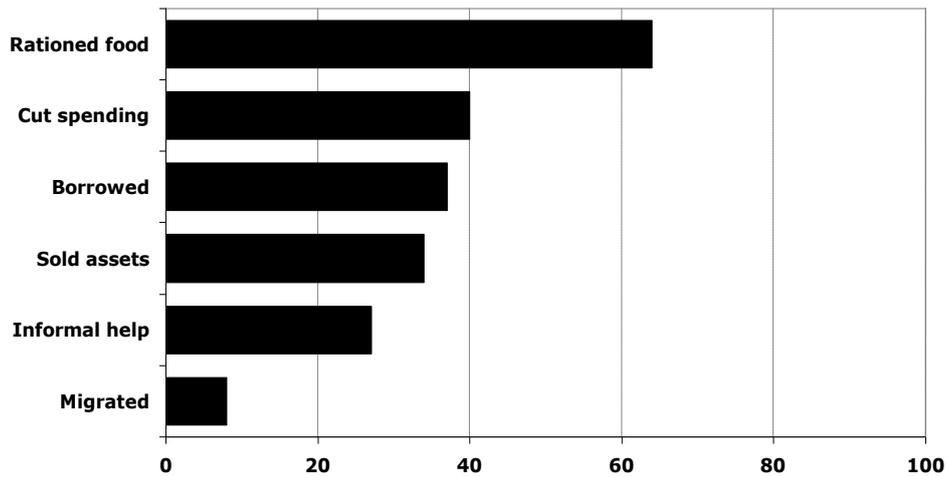
Similarly, resilience to HIV and AIDS and its impacts are not wealth or gender neutral. Shocks affect poor families more than the rich because of their limited financial and physical asset base and their lack of insurance. Compounding this, poorer vulnerable groups are often excluded from institutional access and have little political voice. All this together with their lack of human capital leads to further poverty and higher susceptibility to HIV infection, either because they need to resort to lifestyles that make them more vulnerable (e.g. transactional sex, or unprotected sex due to lack of access to condoms), or because they are malnourished – evidence confirms a strong link between malnutrition and susceptibility to infection by the HI virus. Furthermore, inadequate nutrition of mothers can raise risks of mother-to-child-transmission via pregnancy, birth or breast feeding. Women are also more susceptible to HIV infection than men, due to both biological and cultural factors. This shows that the impacts of generic hazards are modified by social position and other context-specific variables.

1.4 Coping with hazards

As noted above, rural households respond to seasonal food insecurity and livelihood shocks by adopting a range of behavioural adjustments that are collectively known as ‘coping strategies’. These strategies either secure additional food (by selling assets, begging, borrowing or buying food) or adjust to having less food (by rationing or diversifying diets) – but they have economic, nutritional, social and environmental costs. Typically, the adoption of these strategies follows a predictable and logical sequence, starting with low-cost strategies that are easily reversed, such as mild rationing, cutting back on non-essential spending, or selling livestock off-take to buy food. These are followed by strategies that have higher cost and are less easily reversed, such as selling breeding livestock, or borrowing at high interest rates, or begging from friends and neighbours (which has ‘social costs’ in terms of lost social status and self-respect). Finally, once these strategies are exhausted, families must sell their key productive assets (such as farmland) and migrate to survive.

This sequence has been observed and recorded in many countries during many hungry seasons and famines. The example below comes from the southern African drought of 1992 (Figure 1.4). Affected households in Namibia immediately rationed their food consumption. When more drastic action was needed they cut non-food spending, borrowed food or cash to buy food, and sold or bartered their assets for food. Asking for help was a last resort before migrating in search of food or work elsewhere.

Figure 1.4 Coping strategies during a drought in Namibia, 1992



Source: Devereux (2007)

The crucial point about these coping strategies is that they are responses to poverty and food insecurity that actually exacerbate poverty and food insecurity. In fact, severe coping strategies represent a failure of coping with hazards. Households that are forced to sell their assets for food are consuming their wealth. Converting future streams of income into consumption goods is impoverishing and undermines future livelihood viability. So these responses to shocks help households to survive in the short term but at the cost of leaving them more vulnerable to future shocks. The literature on coping strategies reveals that poor households living in hazardous environments are well aware of these trade-offs between short-run and long-run survival, and their behavioural adjustments do everything possible to minimise the long-run damage of responses to immediate threats. However, some strategies, especially those that are environmentally damaging, inadvertently magnify future hazard levels. Examples include cutting firewood and burning charcoal for sale, two livelihood activities that are widely adopted by poor people but can destroy vegetation and contribute to soil erosion. Overgrazing has similar consequences, while over-extraction of groundwater that lowers the water table can also raise the risk of future agricultural droughts.

1.5 Conclusion

As illustrated by the examples of seasonality and AIDS, the relationship between rural poverty and hazards is complex and interconnected. Exposure to a hazard undermines livelihoods, simultaneously causing and exacerbating poverty. On the other hand, a hazard is more likely to impact negatively on an already compromised livelihood system, because resilience and ability to cope are diminished. In other words, the impacts of a hazard are unequally felt across different wellbeing maps, with poorer people and households more likely to experience negative and more severe impacts from a hazard than better-off groups. Poverty is itself hazardous. Low incomes raise vulnerability to hazards, because the poor are less able to cope effectively with shocks to their fragile livelihoods.

2. Contribution of Rural Poverty to Vulnerability

Above we examined how hazards and stresses impact on rural livelihoods. In this section we discuss what we mean by vulnerability and examine how rural poverty contributes to, and exacerbates, a variety of vulnerabilities and hazards.

2.1 Vulnerability

Vulnerability is often conceptualised as a product of two components: **exposure** to hazard (a shock or process) and **resilience**, or the ability to manage a hazard. From the perspective of the rural poor, hazards could include natural shocks such as drought, economic shocks such as currency depreciation, or epidemic diseases such as HIV and AIDS. Resilience is related to

‘coping strategies’ at the individual, household, community and group levels. People can protect themselves against the risk that a hazard will undermine their livelihoods by drawing on savings, diversifying their livelihoods to spread risk, building social networks that pool risk and provide informal assistance in times of need, and so on. When all these defensive risk coping mechanisms fail, people become acutely vulnerable, even to minor shocks. At this point, they become dependent on public risk management or ‘risk coping’ interventions, such as emergency food aid. Importantly, resilience means the ability to cope with shocks and hazards without compromising the viability of the household. If coping mechanisms are adopted that erode the key productive resources of the household, resilience against future shocks and hazards will be reduced. Conversely, if effective safety nets or social insurance mechanisms are in place, damaging coping strategies can be avoided and poor households can protect rather than lose their assets. This is why the rapidly evolving social protection agenda has enormous potential for addressing both poverty and vulnerability.

Understanding vulnerability in two-dimensional space is important as it illustrates the very different policy responses that should be taken in relation to what constitutes the vulnerability of any one person, household, community, or ‘vulnerable group’. It is particularly useful for acute situations requiring an immediate response. That is, at any one time it is possible to construct a static vulnerability profile that indicates whether the **hazard exposure** or the **(in)ability to cope** is the main determinant of vulnerability. Policies appropriate to the composite nature of the vulnerability can then be designed. However, to fully understand vulnerability it is not enough to simply take a one-period view – we also need to know what will happen in the next period. Vulnerability needs to be forward-looking, as it makes a prediction about future poverty (or other negative outcomes). Vulnerability does not simply refer to those who are likely to become poor in the future due to an unexpected shock, but also to those who will remain poor, those who will fall deeper into poverty and those who may fall into poverty due to predictable fluctuations, such as seasonality. This disaggregation is important as the policy responses are very different for these different groups and causes.

An understanding of vulnerability is further complicated by the notion of ‘ability to manage.’ Ability to manage shocks or hazards is a complex function of existing behaviour, reflected in livelihood profiles that themselves represent long-term or structural adaptation to predictable shocks; crisis response behaviour (such as the ability to rely on formal and informal insurance and networks in times of crisis), which is constrained by established livelihoods; and by external (policy) response to a predicted and actual crisis.

Vulnerability is a broader concept than poverty in at least two ways:

1. The non-poor are also vulnerable to future poverty (some definitions of vulnerability refer to people whose income is within, say, 20% of the poverty line).
2. Vulnerability is a dynamic concept that is both forward-looking and constantly changing, while poverty is a static concept that measures proxies for wellbeing at a point in time.

Policy implications of vulnerability are also broader than efforts to reduce poverty – although it is true that wealthier people tend to be less vulnerable, because they have more income and assets to buffer them against hazardous shocks and adverse processes. Policy interventions to manage vulnerability can either aim to reduce or spread risk (e.g. by supporting livelihood diversification), or to strengthen resilience (e.g. by introducing social insurance mechanisms such as weather insurance for farmers). In the absence or failure of these measures, public interventions need to deliver safety nets (e.g. food aid) and other forms of social protection (e.g. orphan carer grants) to those affected by shocks and processes that they are unable to cope with unassisted (see Box 2.1).

Box 3 Reducing vulnerability through employment guarantees in India

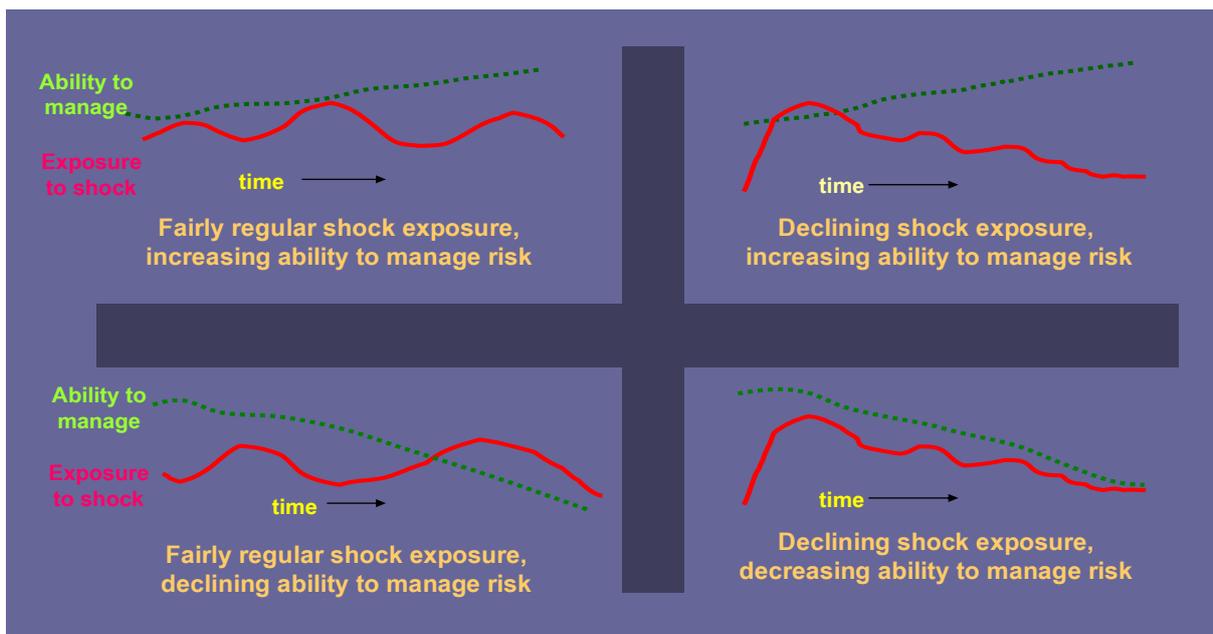
The most effective safety nets against disasters are those that are guaranteed to be activated when disaster strikes. Private insurance mechanisms are one option, but these are usually unaffordable and inaccessible to the rural poor. So the responsibility for providing social protection for the poorest falls on the state. In 2005, India passed into law the National Rural Employment Guarantee Act, which entitles every rural Indian household to 100 days of work at the minimum wage every year, or an unemployment allowance if work cannot be provided within two weeks of a request for employment. This is a unique demand-driven 'right to work', which makes the NREGA a highly effective instrument in the fight against seasonal hunger and famine. Evidence from Maharashtra, which has run an Employment Guarantee Scheme (EGS) since the 1960s, confirms that the EGS has successfully prevented famines in drought years.

Source: Devereux, Vaitla and Hauenstein Swan (2008)

2.2 Vulnerability scenarios

The above conceptualisation of vulnerability as having two distinct and dynamic dimensions can be illustrated in relation to the 'vulnerability scenarios' presented below.

Figure 2.2. Vulnerability scenarios for Malawi



Source: Sabates-Wheeler and Haddad (2005)

The stylised scenarios in Figure 2.2 highlight a few possibilities of dynamic situations. The bottom left-hand quadrant illustrates a slow-onset crisis, where management of risk is gradually eroded in a context of regularly repeated shocks (for instance, chronic poverty and the run-down of assets in response to annual and cumulatively devastating hungry seasons). At the extreme left-hand side of the diagram we see that shocks and management ability are mutually exclusive. As we move to the right-hand side, shocks begin to erode the ability to manage, however, the latter dominates the former. Over time the shock increasingly interact with and erode ability to manage, to a point when the effects of the shock overwhelm ability to manage. The top left-hand quadrant highlights a situation where public and private actions combine to improve the ability to manage risk, despite continued exposure to shocks (e.g. certain effective AIDS management policies).

The bottom right-hand quadrant describes a scenario where both exposure to shock and ability to manage are decreasing. This is a less intuitive scenario. An example may be a land-grab from a recently widowed woman. This would be a major shock to the widow and her children, stripping the family of important productive assets and undermining their ability to manage future hazards and shocks. Even if they do not experience substantial future shocks, it is possible that their ability to manage will be further undermined by discriminatory social practices that alienate her from social networks, non-land assets and alternative possible livelihood opportunities. The top right-hand quadrant is a 'best case' scenario – exposure to shock is reducing (e.g. by moving homes away from flood-prone areas) and ability to manage risk is increasing.

Clearly the severity and frequency of shocks are crucial factors in determining the ability to manage. Many different scenarios are possible, depending on the nature and severity of hazards (a single devastating disaster such as an earthquake, a number of moderate shocks such as a sequence of poor harvests, or a persistent process such as falling farm sizes over many years); whether shocks are multiple and simultaneous, or individual and occasional; whether shocks are totally unexpected (such as a tsunami) or regular and predictable (such as the annual hungry season). But vulnerability not just a phenomenon that corresponds to shocks striking people at random, it is also socially constructed, being related to structural rigidities and inequalities that perpetuate disadvantage, exclusion and marginalisation of certain groups of people in the long-term. Certain types of vulnerabilities are established and reproduced through socio-cultural norms, various forms of discrimination, and differential access to political power. These factors are unlikely to present themselves as shocks, but rather as declining long-term trends in ability to manage.

2.3 Vulnerability – poverty linkages

Poor rural people's livelihoods are complex, diverse and risk-prone, with inherent seasonal instability. Vulnerability not only affects people's welfare, it also reduces growth, directly by destroying assets, and indirectly as the threat of shocks and stresses diverts assets from more productive activities to those that reduce vulnerability, and returns.

It is intuitively obvious how risk (and the associated vulnerability) contributes to poverty. For instance, poor farmers in hazardous (e.g. drought- or flood-prone) environments tend to be risk averse, because their capacity to absorb economic losses is extremely low. So they respond to hazard, risk and uncertainty by adjusting their livelihood strategies, for instance by concentrating on low risk and diversified activities, and foregoing higher returns from specialisation, in order to reduce their exposure to hazards and vulnerability to stresses. Though entirely logical, this behaviour undermines investment and pro-poor growth. For example, farmers with insecure land tenure do not invest in land improvement; families from ethnic minorities with limited access to formal employment prefer to send their children to work rather than to school; and entrepreneurs without access to microfinance or insurance will not undertake potentially lucrative but risky activities. These responses to risk come at a high cost, in terms of reduced average returns and, therefore, the perpetuation of long-term poverty (see for example Dercon, 2002).

It is less obvious how rural poverty contributes to risk and vulnerability, and the linkages are more difficult to establish empirically. This is because poverty (or an absence of wellbeing) reflects deficits across the full range of components that make up people's livelihoods. When 'deficits' in wellbeing exist, in other words, when people live in poverty, livelihoods are undermined and the 'ability to cope' largely defines their level of vulnerability. As discussed above, vulnerability is a function of resilience (itself a function of poverty status) and exposure to shock. Furthermore, poverty and exposure to shock interact such that poorer people and groups are often more likely to be exposed to hazards. This fact allows the identification of a range of 'adverse synergies' between poverty and vulnerability (see Box 2.3).

Box 2.3 Vulnerability to floods, disease and poverty in Bangladesh

There is a direct link from natural disasters to destitution, through loss of productive assets. There is also an indirect link, through the costs of addressing the health shocks that natural disasters often bring in their wake. So natural disasters, ill-health and poverty are interrelated. Floods and tsunamis, for instance, expose the poor to health risks associated with losses of shelter, clean water, sanitation facilities, firewood and fuel. Many diseases flourish after the floodwaters recede. In Bangladesh, the incidence of water-borne and other diseases such as cholera, diarrhoea, dysentery and measles are all higher than average in years of major flooding. The poor have fewest resources to protect themselves against these health risks. Nonetheless, the increase in spending on health costs after flood events in Bangladesh is highest among the poorest, and they spend a higher proportion of their income on health than do non-poor groups. This can divert scarce household resources from other basic needs, including food, and from investment in income-generating activities such as farming and micro-enterprises.

Source: Sinha, Lipton and Yaqub (2002)

First, there are spatial correlates between poverty and vulnerability: poor people tend to get pushed into marginal areas, where they struggle to make a living from tiny plots with degraded soils, on hill-slopes, or in areas vulnerable to monsoon flooding (e.g. in Bangladesh), volcanic eruptions and earthquakes (the 1975 earthquake in Guatemala City was memorably described as a 'classquake' (Bankoff, *at al.*, 2004)). Second, lack of productive resources not only traps poor people in poverty, it also raises their vulnerability – for example, smallholders who depend on rainfall face more variable harvests and greater risk of hunger and destitution than do farmers who have access to irrigation and drought-tolerant improved seeds. Third, in the labour market, poorer people are more likely to work in the informal sector where health and safety hazards are more prevalent, as the work environment is unlikely to meet minimum health and safety standards – and poor workers also have less power or voice to mobilise and demand that minimum standards are met. Finally, both poverty and vulnerability are related to levels of infrastructure –in China and India, vulnerability to famine declined rapidly as road and rail networks spread in the early twentieth century, but people living in sparsely populated regions of the Horn of Africa and the Sahel (not yet reached by transport and communications infrastructure) remain acutely vulnerable (Devereux, 2008).

2.4 Assets, poverty and vulnerability

Nothing exemplifies the complexity of the relationship between poverty and vulnerability than the role of assets in reducing poverty and protecting household vulnerability to shocks and hazards. According to Caroline Moser's 'asset-vulnerability framework' (Moser 1998), households with more assets are less vulnerable, because their assets provide 'buffers' against shocks. For instance, a rural family that owns many livestock can sell some animals to buy food if a drought devastates their harvest. The solution to reducing poverty and vulnerability, therefore, is to accumulate assets – not only physical assets like land and livestock, but also financial assets like savings, or 'human capital' assets like marketable skills, or 'social capital' assets like networks of influential friends.

However, while the relationship between assets and **poverty** might seem straightforward enough, the relationship between assets and **vulnerability** is not always this simple. One complicating factor is 'covariate risk'. The same drought that destroys a family's field of crops can also kill their livestock, leaving them impoverished and highly vulnerable. This explains the paradox of why the people who produce food (farmers) are also the people who are most vulnerable to food crises – because rural sources of food and income are so interconnected, most livelihoods depend directly or indirectly on a single and unreliable input (rainfall).

Secondly, shocks can affect the functioning of markets in ways that diminish the value of assets that are held as buffers against shocks. If food is scarce and rural households are

forced into selling assets to finance food purchases, the likely consequence is that food prices will be forced up (excess demand) while asset prices will be forced down (excess supply). Amartya Sen (1981) calls this 'exchange entitlement decline', while Jeremy Swift writes about a 'terms of trade price scissors' (Swift and Hamilton, 2001). During a food crisis in Malawi in 2002, desperate rural families sold off their most valuable possessions – livestock, radios, furniture, kitchen utensils – at 'distress prices' that averaged less than half their replacement cost. A bicycle was bartered for a bag of cassava; while one woman exchanged some of her clothes for a small plate of maize (Devereux and Tiba, 2007). This is commonly observed during food crises, and it is a polarising mechanism because it enables wealthy households to accumulate assets at undervalued prices.

Thirdly, certain sources of vulnerability actually intensify as asset holdings increase. During civil conflicts, for instance, assets such as livestock and granaries are often targeted for confiscation or destruction by militia groups. In south Sudan, wealthy households have been systematically targeted by cattle rustlers and counter-insurgency groups since the 1980s, and their cattle herds have been decimated. Luka Deng labels this phenomenon 'the curse of assets during civil war'. Deng (2007: 250) found a "strong and significant positive correlation ... between famine mortality in 1998 and initial wealth". Similar trends have been reported in other societies dominated by pastoralism or agro-pastoralism and characterised by civil insecurity or violent conflict, such as northern Uganda and parts of Kenya, Ethiopia and Somalia. In these circumstances, assets do not reduce vulnerability – quite the opposite.

2.5 Conclusion

Poverty and vulnerability reinforce each other. Everyone is vulnerable to food insecurity, social exclusion, natural disasters and other hazards, but the poor are more vulnerable because they are more exposed to these risks and are more likely to experience a larger and more prolonged (even irreversible) impact due to their limited (physical, financial, social and political) assets. Assets usually reduce both poverty and vulnerability to livelihood shocks. In some perverse cases assets can increase vulnerability, but these are unusual circumstances. The importance of voice and influence over people with power cannot be overstated; it is critical for determining whether poor people must attempt to cope with hazards on their own or can count on external assistance in times of stress. When such assistance is guaranteed – for instance, where predictable and social security systems provide effective safety nets against shocks – the catastrophic consequences of hazards can be substantially contained.

3. Influence of Rural-Urban Linkages on Extensive Rural Disaster Risk

This section examines how the processes that link rural to urban and vice versa, either produce or reduce disaster risk for poor people living and originating from rural areas. In particular, the section looks at how the processes of migration and government decentralisation influence level of vulnerability and exposure to hazards. The section does not explicitly cover the wider literature on disaster impacts, for example on disaster-induced migration, unless this directly affects endogenous rural risk-poverty profiles over extended periods.

3.1 Research on Rural-Urban Linkages

While past approaches to development studies have tended to focus on either urban or rural spaces (Lynch 2005), rural-urban interactions are becoming the focus of an increasing numbers of researchers and are the subject of a number of volumes of development literature (e.g. see Tacoli 2006, *Environment and Urbanisation* Vol 10, 1 1998, STEPS Centre research programme). This reflects a shift in development paradigms to focus on flows and networks and signals a move away from characterising rural-urban linkages as only being inscribed by migration and its associated 'push and pull' factors.

Undoubtedly, rural and urban areas are closely linked - 'rural areas have long been a source of food, raw materials, and labour for cities. So too, are cities places of opportunity for rural dwellers, providing markets for agricultural products, specialised services and sources of temporary employment and shelter' (id21 *Insights* 2002). While oversimplified, two-dimensional and characterising cities and countryside as separate, Lynch's diagram of rural-urban interactions show in figure 3.1 highlights the diversity of rural-urban and urban-rural flow of people, food, money, ideas and nature.

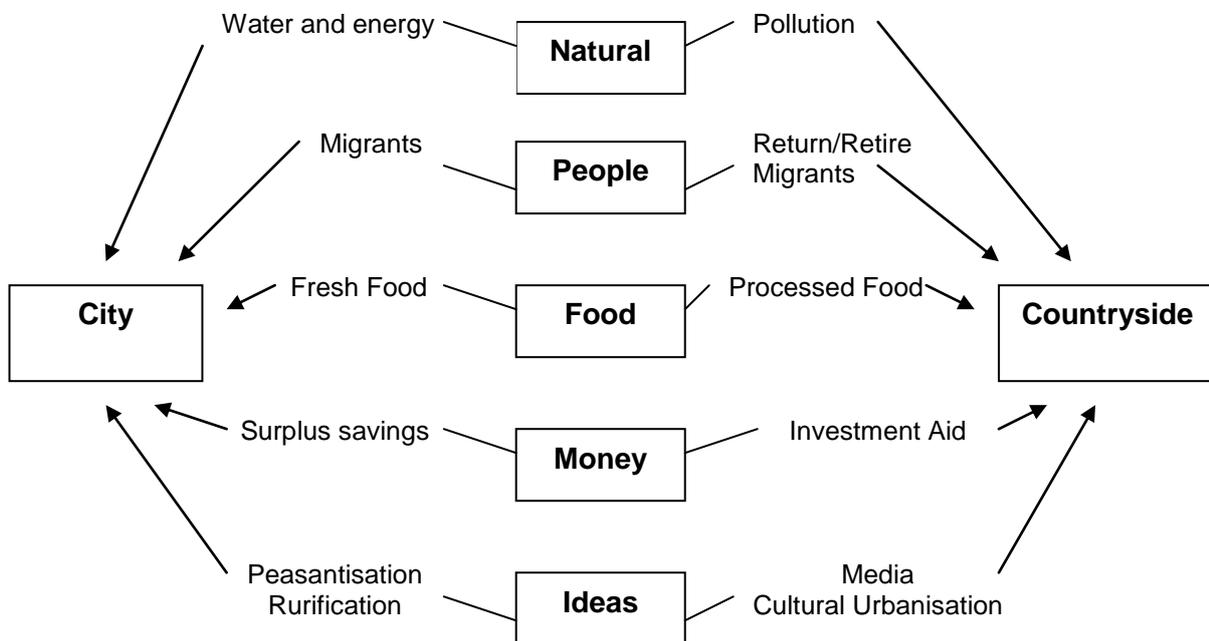


Figure 3.1 Rural-Urban Linkages - Reproduced from Lynch (2005, 6)

With the study of rural-urban processes as one of flows and networks being relatively recent, limited effort has been placed on assessing how rural-urban and urban-rural processes shape disaster risk (Smith 2004). For example, Tacoli's reader on *Rural-Urban Linkages* omits any mention of either risk or disasters, though it is legitimate to claim that these issues are handled implicitly through discussions of the livelihood transformations and the ecological footprints of different poor groups. Similarly Lynch's (2005) monograph *Rural-Urban Interaction in the Developing World*, limits discussion of disaster risk to how urban areas displace environmental burdens and therefore environmental risks, such as air pollution or water resource extraction, to surrounding peri-urban and rural areas. In this regard, Lynch notes that there is evidence to suggest agglomerating in urban centres offers added protection from flooding or drought as 'social and political systems ... provide the resources for reconstruction or establishment of preventative measures' (p.72). However, he also notes that gathering in urban areas generates other kinds of risks, such as the health risks associated with the transmission of infectious diseases. Issues relating to the production or reduction of extensive disaster risk in urban areas are dealt with by Satterthwaite *et al.* in their chapter on 'urban poverty and extensive disaster risk' (ref. IIED chapter).

The limited number of studies conducted on rural-urban interactions and disaster risk tend to focus on the production of risk in peri-urban areas, but more usually informal settlements on the fringes of large cities (e.g. Napier and Rubin 2002; Santosa 2002; Bustillos *et al.* 2002; UNDP 2004; Parker *et al.* 1995). These studies tend to focus on particular geographically bounded area rather than on how rural-urban processes produce risk themselves and dynamically shape these spaces.

Rural-Urban Linkages and Disaster Risk

Rural-urban interactions can be defined as 'linkages across space (such as flows of people, goods, money, information and wastes) and linkages between sectors (for example between agriculture and services and manufacturing)' (IIED 2008).

This section claims that extensive rural disaster risk is inherently a function of rural-urban interactions, particularly in rural hinterlands around urban centres and is specifically tied to the following development rural-urban development processes:

- economic change (industrialisation, agricultural decline, changes in location of markets),
- livelihoods change (leading to migration, increased commuting),
- changes in the flow of goods and money (transport links, banking, investments) and
- changes to spatial manifestation of political power (rights, access, changing distribution of government responsibilities).

Cities themselves depend on the effective functioning and productivity of rural systems (Revi 2007), and when either rural or urban areas are affected by disasters then there is an indirect effect on the other. Conversely, as detailed above, the existence and growth of cities significantly modifies the rural and peri-urban hinterland and the risks faced by people living there – through landfill sites, air and water pollution, mangrove destruction, watershed destabilisation and changing drainage patterns (UNDP 2004). Simply, cities generate rural extensive disaster risk through negatively impacting the environment around them. However, the picture is complicated by the fact that a growing city also creates opportunities for reducing or increasing the vulnerability of the rural poor by the way rural-urban processes shape livelihoods and poverty dynamics.

Urban-Rural Markets

For example, a growing city forges new markets and economic opportunities for rural food producers and service providers – potentially increasing rural household incomes and even lifting rural households out of poverty and reducing extensive risk (IFAD 2002, Rengasamy *et al.* 2003). This depends on the rural poor being able to access urban markets, given that they may live far away, cannot afford transportation or lack road networks, might not understand

the way markets operate (price fluctuation, consumer preference) and may be excluded for social, political or cultural reasons (IIED 2008). Furthermore access to labour markets, as well as urban goods markets for example, is constantly changing as globalisation influences their operation, location and focus – this greatly affects how different groupings (gender, age, migrant status, ethnicity, wealth and location) benefit or become excluded from urban markets (IIED 2008).

Additionally, urban areas commonly play a critical role in the livelihood strategies of the rural poor – low-income rural dwellers often rely on urban-based non-farm jobs and on remittances and other transfers from migrant relatives, whereas urban migrants rely on rural relatives to support the household (IIED 2008). Income from migration is therefore part of a rural household's livelihood diversification strategy (UNDP 2004), one that spreads livelihood and income risk (Tacoli 2003), and may help to reduce disaster risk (Sabates-Wheeler *et al.* 2008). As UNDP (2004, 66) note, 'in Haiti, less than 30 percent of income in rural areas is derived from agriculture, instead rural dwellers depend on complex livelihood strategies, including seasonal migration or inputs from remittances sent from relatives in cities or overseas'.

Furthermore, Revi (2007) points to increasing conflict over water extraction and rights, as cities are drawing their water from rural areas, where water is already in short supply and also discharging its pollution in the same areas – thus decreasing poor rural dwellers access to clean water and increasing extensive disaster risk.

3.2 Migration

Evidence tends to suggest that disasters themselves accelerate rural-urban migration and then subsequently, poor rural to urban migrants are subjected to disproportionate disaster risk as they live in exposed locations and have limited access to livelihood assets and infrastructure (DFID 2004). 'The functioning of land and property markets and inability of land-use planning to cope with rapid population growth means migrants frequently locate in hazard-prone locations. For example, in peripheral squatter settlements located in ravines, on unstable slopes or in flood-prone areas, or else in dense inner city slums' (UNDP 2004, 60). With agrarian systems increasingly under threat due to climate change, rurally-focused disasters and shifting markets, rural-urban migration is likely to increase even in the areas where it has been reasonably limited (Revi 2007). However, as detailed below, migration, being the most visible form of rural-urban interaction comprises sets of complex processes and considerations that can either produce or reduce extensive disaster risk.

Migration as an adaptive livelihood strategy

Migration is a livelihood strategy of poor people and a way that people may choose to adapt to degraded or risky rural environments (Siddiqui 2003), meaning depopulation of rural areas in favour of alternative locations may reduce extensive rural disaster risk and reduce rural poverty (Sabates-Wheeler *et al.* 2008). The link between migration and environmental degradation and perceived disaster risk is increasing being drawn (Gemenne *et al.* 2006), with migration being the result of cumulative increases in environmental stress, possibly related to climate change, as much as single disaster events. However, the linkage between environmental stresses or disruption and migration is rarely direct and can be difficult to identify its significance among a range of complex socio-economic factors (Gemenne *et al.* 2006). In this context, migration is a coping strategy, a routine livelihood mechanism to cope with scarcity and stress, and a mechanism that can reduce extensive disaster risk. More and more, migration is being discussed as an anticipatory adaptation to climate change, possibly incentivised or assisted in some way through social protection measures, given knowledge that rural communities are unsustainable over extended time periods in certain bio-regions (Davies and Leavy 2007).

In addition to the likely hazard exposure of recipient communities, it is also important to recognise that the migration itself can be a source of vulnerability, as travel can be difficult and

risky, the migrant may lack access to key livelihood assets in the host community and employment conditions are often unregulated (Rafique *et al.* 2006). The further a poor rural migrant has to travel from their family, the less likely they are to be supported by rural-urban food transfers tied to land ownership and reciprocity exchanges (Mougeot 2005). Furthermore, migrants themselves are not the poorest or most vulnerable rural dwellers. For example, in the seven countries of Central America, about half the population now lives in urban areas, though most of the poor still live in rural areas; and rural people are twice as likely to be poor as urban dwellers. Migration from rural areas has made a big contribution to rural poverty reduction, up to 75% of the latter by some estimates' (ODI 2003). However, the people now living in rural areas are disproportionately likely to be poorly educated, live in large families, belong to minority group and vulnerable to rural violence and disasters (ODI 2003) – they have low mobility as their ability to migrate may well be hampered by illiteracy, disability and their ethnicity.

Social Relations

Much has been written about the value of enhancing and protecting social capital (friendships, kinships, patron-client relationships etc.) as a way of reducing disaster risk (FAO 2003; UNDP 2004), but much less on how migration affects social capital. UNDP, 2004 discusses how migrants are often excluded from participatory decision-making processes in their host communities, though Schneider (1999) points out that few migrants move to cities alone, retaining some form of social network with the people they are migrating with – whether friends, family or people from the same area as them. However, Schneider's research in Thailand and the Philippines tends to suggest that more and more migrants are moving alone, either temporarily or permanently, and leaving their families behind due to increasing livelihood pressures on households. This trend is also supported by evidence from India (Mitchell *et al.* 2007), where there has been a rapid increase in the number of female-headed households, as men migrate to cities in search of employment. This trend points to the erosion of social networks in both the host and feeder communities as individuals become dislocated – indirectly increasing extensive disaster risk.

Remittances

Some work has looked at the role of remittances from migrants and diasporas for financing disaster relief, such as in the Pakistan earthquake and Hurricane Mitch (Suleri and Savage 2006; Kidder ?; Clarke and Wallsten 2003); but less has focused on the role remittances play in allowing recipients to invest in actions that reduce disaster risk (Suleri and Savage 2006; Wamsler 2007). Suleri and Savage (2006, 21) suggest that strengthening and promoting remittance flows should be a priority for DRR. 'Remittances are an important way of reducing risk from local disasters, and also provide an insurance mechanism that can, to a limited extent, cover losses'. In their study they found that households living in exposed regions, when receiving remittances, made sensible, risk reducing investment decisions, such as stronger housing. Remittances may be invested in more diverse rural livelihoods, reducing extensive disaster risk. Woo (2006) even mentioned the possibility of taxing remittances at 1% to help pay for DRR programming.

Urban-rural post disaster migration

In the post-Hurricane Katrina period, increasing attention is being given to the production of rural extensive disaster risk following urban disasters or linked to urban evacuations (Meit *et al.* 2007), a trend that is likely to continue given the increasing number of urban dwellers exposed to climate change-induced disasters. Meit *et al.* (ibid) observe that rural infrastructure cannot cope with the pressures of urban evacuees on sanitation, food, water and fuel resources, and cannot provide enough permanent or temporary livelihood opportunities to sustain large influxes of people. These urban-rural population shifts, however temporary, are likely to elevate extensive rural disaster risk because the short-term pressure on resources, particularly on ecosystem services, may be enduring after the majority of the temporary migrants have returned home or moved elsewhere. For rural areas to cope with these

pressures, Meit *et al.* call for rural planners, particularly rural disaster managers, to be involved in urban DRR and preparedness.

Migration to small towns

Atkinson (2000) finds evidence that the majority of recent rural-to-urban migration in the Philippines is to the smaller towns and regional centres rather than the bigger cities and that wider migration patterns are characterised by step-wise (village-town-city) or cyclical processes (seasonable variations in labour demands) (Lynch 2005). This has implications for disaster risk management (DRM) and extensive disaster risk, as greatly swelling towns are less likely to have the DRM experience or the social and political resources of large cities to protect even some of its citizens.

3.3 Decentralisation and Rural Local Government

Multi-lateral and bilateral donors have been actively supporting fiscal, administrative and political decentralisation for over two decades, transferring responsibility from urban centres of power to local governments in rural areas. The rationale for decentralisation is that local governments can relate to local needs more sympathetically and accurately (Faquet 2002), deliver public services in a more targeted manner (Litvack and Seddon 1999) and reducing corruption through improved accountability (Fisman and Gatti 2002). Similarly, decentralisation of responsibility for managing disaster risk to local governments has been advocated for by a number of authors and institutions (e.g. Twigg 2007; ISDR 2007). The rationale for this is based on similar reasons as those given above; but as yet, there has been little critical evaluation of the link between decentralised disaster risk management and its impact on disaster risk.

More widely, proponents of decentralisation claim that it can have a considerable impact on reducing rural poverty and thereby greatly decreasing extensive disaster risk (e.g. ADB, UNDP, CIFOR, World Bank). While the picture is extremely mixed, a major evaluation of decentralisation of democratic responsibility conducted by the OECD (2004) found that decentralisation generated little discernable impact on levels of poverty. This view is backed by Crook (2003), who found that decentralisation delinked from wider processes is likely to be unsuccessful in tackling poverty. Jütting *et al.* (2004) studied the impact of decentralisation on rural poverty in 19 countries, finding that it varies distinctly between countries depending on their rate of economic growth. They also found that 'where the state lacks the capacity to fulfil its basic functions, there is a definite risk that decentralisation will increase poverty rather than reduce it' (2004, 5). Conversely they found that where central governments were committed to the process, decentralisation increased the participation of different poor groups and enhanced the targeting of service provision.

OECD (2004) suggest that decentralisation must be accompanied by capacity building and matching resources, and should seek to support local civil society organisations at the same time, because stronger civil society through accountability pathways, promotes more effective local government.

Governance of Rural-Urban Linkages

Local governments tend to divide rural and urban responsibilities and national governments rarely directly address urban-rural linkages (IIED 2008). This is despite countries being increasingly concerned about striking a balance between populations and resource pressures in rural and urban areas by instituting large scale rural development plans.

This is important for a number of reasons. Hodder (2000, 80-82) argues that there is a close link between urban industrial growth and a thriving rural agriculture sector. This is because:

- agriculture depends on manufactured good to transform production (e.g. farm tools, machinery and inputs)

- more technologically advanced agriculture reduces labour inputs, providing labour forces for urban industrial sector.
- agriculture provides raw material for manufacturing – e.g. sisal and cotton.

Furthermore, it is important to strike a balance between income, prices and taxation between rural and urban areas, so as to provide incentives for rural farmers but not to increase prices too much for urban consumers. Additionally, ensuring food security in rapidly urbanising regions is dependent on effective agricultural production, which is threatened if there is an ever decreasing rural labour force.

Effective local government in managing rural-urban relationships is vital. Local government plays a crucial role in determining access to natural resources for poor people, through their support of certain land tenure systems, their prioritisation of different users and in developing regulatory frameworks. Tacoli (2004) describes an effective local government as accountable with adequate resources and strong capacity, as able to identify and respond to local needs and priorities, as supporting forward and backward linkages between agriculture and services and industry located in local urban centres and as able to regulate local natural resource management. Conversely ineffective local government is unaccountable, has inadequate resources and capacity and is not integrated with national planning (Tacoli 2004).

DRR and Transfer of Responsibility to Rural Local Government

As DFID's DRR Policy (2006, 12) observes:

'work to define institutional and legal mechanisms for DRR in many developing countries, including the Maldives, Sri Lanka and Pakistan, has shown a clear trend towards empowering local governments. Local governments and communities are the first line of response in any emergency: disaster risk reduction can therefore be a strong incentive for decentralisation. Local government also plays a crucial role in facilitating bottom-up planning and empowering local communities through knowledge transfer. The challenge is to match this with a delegation of resources, as well as to better understand and mitigate the potential for corruption at local level, for example in the enforcement of building codes and land-use planning permission.'

Twigg (2007) agrees, arguing that 'devolution of responsibility (and resources) for DRR planning and implementation to local government levels and communities, as far as possible, backed up by provision of specialist expertise and resources to support local decision-making, planning and management of disasters' is part of the enabling environment which helps to foster disaster resilient communities. However, he also highlights that to be effective, local governments must recognise the rights to safety, participation and equitable vulnerability reduction of all sections of society. Additionally, in calling for DRR to be mainstreamed into National Poverty Reduction Strategy Papers (PRSPs), UN-ISDR (2007) advocates for PRSPs to 'decentralize, empower and allow fiscal autonomy to address risk at the local government level; for example enact laws to ensure security of land right as incentives for risk-reducing investments'.

In many poor rural areas, local governments may be unable to provide the services needed that help to reduce extensive disaster risk, either because of the reduction in central government public investment or because it fails to generate sufficient revenue at the local level. And whilst local decision making, supported by adequate resources, can support positive rural-urban linkages, wider issues such as land tenure systems, institutional structures of markets and broader national development strategies are likely to affect local initiative. Better integration of local development and disaster risk management strategies in national planning is therefore crucial. Finally, especially in nations where decentralization is relatively recent, substantial efforts are necessary to ensure the legitimacy and the capacity of local institutions to carry out their new functions (UNDP 2004).

Again, as with the findings of the OECD evaluation (2004), effective decentralisation of disaster risk management responsibilities will also require parallel support to local civil society as well. In some cases, these local NGOs may populate a risk management void where rural local governments are ineffective at tackling disaster risk and will help to hold them to account on their national and international commitments. Much anecdotal evidence suggests that local governments in poor rural areas are particularly ill equipped to reduce disaster risk, lacking resources, skills and knowledge and simply do not see DRR as a priority over land acquisition and transfer and tackling rural poverty.

As UNDP (2004, 89) suggest 'there is a need for institutional systems and administrative arrangements that link public, private and civil society sectors [associated with DRR] and build vertical ties between local, district, national and global scale actors'. However, the question remains as to whether it is more effective to concentrate disaster risk management expertise and service delivery in particular centres of excellence or should responsibility be decentralised to local government. Ideally, strength at all scales is desirable, but often not realistic given resource constraints and a lack of political will.

3.4 Conclusion

This section highlights that migration is a complex process that has both positive and negative impacts on the levels of extensive disaster risk, that households are increasingly becoming multi-spatial, with members living in a number of different urban and rural locations and deriving income from diverse livelihoods. Migrants from rural to urban areas need to be specifically targeted by disaster risk management programmes as they lack social networks, are excluded from host communities and lack access to infrastructure and basic assets – they also tend to locate in the most hazard prone locations. Additionally, the households and communities they have left should not be forgotten and must be targeted for risk reduction programmes that link rural to urban. These programmes must recognise the role of remittances and potential increases in household income as well as the likely greater prevalence of female-headed households and the specific considerations these require.

The existence and growth of urban areas themselves generates extensive rural disaster risk, and this is likely to accelerate given the pressures of climate change on agrarian systems, which will force more people into urban or peri-urban environments. Conventional DRM focuses either on urban areas or rural communities, but, due to increased integration or urban and rural, risks embedded in cities are also embedded in the countryside and vice versa (Revi 2007). Integrated rural-urban risk management programmes must take into account these linkages, the co-production of risk and different sectoral investments and regional processes.

While decentralisation of poverty reduction and DRM has benefits in participation and recognition of local needs, many local governments in rural areas are ill-equipped to promote rural development or to tackle disaster risk as they lack skills and resources. There is very limited evidence to suggest that decentralisation either reduces poverty or enhances effective disaster risk management. To improve this, local government DRM must be integrated within national or regional risk management frameworks and development programmes and municipal disaster management must include the governments/people in the surrounding peri-urban and rural hinterlands. Further, decentralisation of disaster risk management and poverty reduction responsibilities to rural local governments must be accompanied by a transfer of capacity and resources, along with parallel support to civil society organisations who are well placed to hold local governments to account and to fill voids should government fail.

4. Climate Change: Threat and Opportunity for Rural Poverty

This section examines potential threats and opportunities posed by climate change for poor people in rural areas.

4.1 Impacts of climate change on rural populations

Global climate change is receiving unprecedented attention in the international community, and linkages between climate change and poverty have gathered pace since the turn of the millennium (AfDB *et al*, 2003; Adger *et al*, 2003; UNDP, 2007; Tanner and Mitchell, 2008). There is now overwhelming evidence that the global climate is changing and strong evidence to suggest that human-cause emissions of greenhouse gases into the atmosphere are largely to blame (IPCC, 2007). While these will continue drive gradual shifts in average temperature, rainfall and sea-level, they also have significant implications for the distribution, frequency and intensity of extreme weather events that can cause disasters. This has implications in the short term for the ability of communities to absorb or adjust to extreme events, and may threaten the productive base of society, particularly in natural resource dependent economies in the longer-term (Parry and Carter, 1985).

The trend for hydro-meteorological disaster events is rising, and the recent 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concludes that:

“The type, frequency and intensity of extreme events are expected to change as Earth’s climate changes, and these changes could occur even with relatively small mean climate changes. Changes in some types of extreme events have already been observed, for example, increases in the frequency and intensity of heat waves and heavy precipitation events.” (Meehl *et al*, 2007:783).

Some of the major projected impacts of changes in extreme weather and climate events are outlined in Table 4.1a.

These impacts of climate change are not evenly distributed, in part due to the differentiated nature of hazards in different parts of the globe, but also due to differences in the ecological and socio-economic environment, which mediate these hazards and determine the severity of impacts. As outlined in Section 2, vulnerability is determined both by exposure to the climate-related hazards, and by ability to manage the risks.

Generally, poor groups in developed countries are likely to be hardest hit by the effects of climate change, and the rural poor are particularly vulnerable (UNDP, 2007). Poor and rural populations tend to rely more heavily on climate-sensitive sectors such as agriculture and fisheries, meaning that variations in climate have a highly tangible and often immediate impact on livelihoods and well-being. This is compounded for poorer citizens as they tend to be located geographically in marginal areas that are more exposed to climatic hazards, such as flood plains, drylands, mountains, or on nutrient-poor soils (Mitchell and Tanner, 2006).

The multiple dimensions of poverty constrain the ability of rural populations to respond to the impacts of climatic variations due to limited human, institutional and financial capacity. Aspects of poverty related to rural livelihoods outlined in previous sections are therefore important determinants of *adaptive capacity*, or “the potential, capability, or ability of a system to adapt to climate change stimuli or their effects or impacts” (Smit *et al*, 2001:894). Broader determinants of this capacity include technology, information and skills, infrastructure, institutions, and equity. Lower adaptive capacity combined with a greater hazard burden will be particularly problematic in the least developing countries (LDC) and low-lying small island developing states (SIDS).

Table 4.1a: Examples of possible impacts of climate change due to changes in extreme weather or climate events

Table SPM.3. Examples of possible impacts of climate change due to changes in extreme weather and climate events, based on projections to the mid- to late 21st century. These do not take into account any changes or developments in adaptive capacity. The likelihood estimates in column two relate to the phenomena listed in column one. (Table 3.2)

Phenomenon ^a and direction of trend	Likelihood of future trends based on projections for 21 st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems	Water resources	Human health	Industry, settlement and society
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	<i>Virtually certain^b</i>	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snowmelt; effects on some water supplies	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	<i>Very likely</i>	Reduced yields in warmer regions due to heat stress; increased danger of wildfire	Increased water demand; water quality problems, e.g. algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Heavy precipitation events. Frequency increases over most areas	<i>Very likely</i>	Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	<i>Likely</i>	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases	Water shortage for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	<i>Likely</i>	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; potential for population migrations; loss of property
Increased incidence of extreme high sea level (excludes tsunamis) ^c	<i>Likely^d</i>	Salinisation of irrigation water, estuaries and fresh-water systems	Decreased fresh-water availability due to saltwater intrusion	Increased risk of deaths and injuries by drowning in floods; migration-related health effects	Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above

Notes:

- See Working Group I Table 3.7 for further details regarding definitions.
- Warming of the most extreme days and nights each year.
- Extreme high sea level depends on average sea level and on regional weather systems. It is defined as the highest 1% of hourly values of observed sea level at a station for a given reference period.
- In all scenarios, the projected global average sea level at 2100 is higher than in the reference period. The effect of changes in regional weather systems on sea level extremes has not been assessed.

For the rural economy, water and agriculture are two of the most critical sectors, particularly in areas of rainfed agriculture, and where assets and investment are low, markets are poorly developed, and communities do not have adequate formal or informal social protection mechanisms. While climate change impacts will vary geographically and over time, some examples of projected changes on water and agriculture at a continental scale are presented in Table 4.1b.

Table 4.1b: Examples of projected climate change impacts in Africa, Asia and Latin America Latin America (from IPCC, 2007. All statements are made with very high confidence or high confidence.)

Africa	<ul style="list-style-type: none"> ○ By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress due to climate change. ○ By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.
Asia	<ul style="list-style-type: none"> ○ By the 2050s, freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease. ○ Coastal areas, especially heavily populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers.
Latin America	<ul style="list-style-type: none"> ○ By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation. ○ Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security. In temperate zones, soybean yields are projected to increase. ○ Changes in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation.

4.2 Reducing climate change risks: Disaster risk reduction and adaptation

These projected impacts of climate change will be overlaid onto existing patterns of climate-related hazards and the natural variability of the climate, and are in turn part of a much wider range of hazards affecting rural livelihoods such as seasonality and HIV/AIDS (see Section 2). In the face of these challenges, a growing body of work and international implementation has formed around adapting systems to prepare for and respond to climate change. This process is known as **adaptation**, defined by the IPCC as:

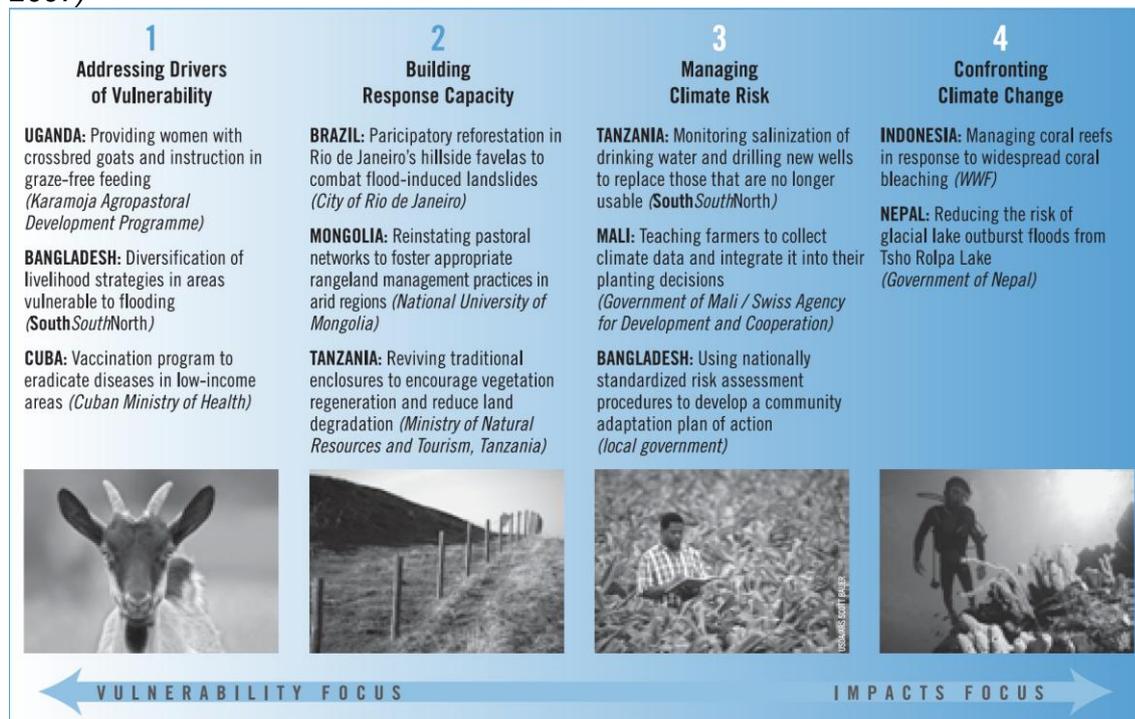
‘Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities’ (McCarthy et al, 2001).

Top-down approaches to adaptation have largely been based on modelling to ascertain future climate changes and secondary impacts (e.g. for crops or water availability) (McCarthy *et al*, 2001). Results can be applied to wide areas and provide quantified estimates for decision-makers, but such approaches are complicated by the inherent uncertainty of predictions and tend to favour technical analysis and adaptation options rather than socio-political factors affecting vulnerability (Klein *et al* 2007). In contrast, a more poverty-centred approach has been pursued by the development community which regards coping strategies for existing climatic variations as the first stage in building in adaptation to future changes (Burton and van Aalst, 2004). This more dynamic approach draws on field assessments of existing vulnerability and coping mechanisms and is more likely to identify the underlying causes of vulnerability, including structural factors that can cause and entrench poverty, such as access to natural resources or services, insecurity, poor governance or an absence of markets (Mitchell and Tanner 2006; Klein *et al* 2007).

This latter approach inextricably links adaptation with development processes, calling attention to the needs of the global poor on the basis of equity and justice. However, poverty-adaptation linkages have to date focused largely on the aggregate level, highlighting vulnerable nations or regions, in part due to the scales of debate internationally. More recently, there has been increased interest in differentiating adaptation needs for different livelihood strategy and poverty characteristics (Tanner and Mitchell, 2008a).

Adaptation thereby encapsulates a wide variety of related development activities that moderate harm from climatic impacts and effects, and to take advantage of potential benefits. Adaptation activities can usefully be viewed in the context of a continuum of adaptation activities (McGray *et al*, 2007), some of which are based on broader processes reducing vulnerability to a wide range of shocks and stresses, such as education and health programmes. Others activities may provide the enabling environment and response capacity through which climate-focused adaptation processes can occur, but again build the ability to adapt to multiple aspects of a changing environment. These include building effective planning systems or improved natural resource management. Adaptation may also relate more to specific climate impacts, incorporating climate information into decision making including through disaster management plans, changing crop-types or improving infrastructure resilience. At the extreme, there are actions that almost exclusively confront the new challenges of climate change, such as glacial melting, sea-level rise, or coral bleaching. A variety of examples of such activities in rural areas are shown in figure 4.1.

Figure 4.2a: Examples of rural adaptation activities across the continuum (from McGray *et al*, 2007)



Disaster risk reduction (DRR) is increasingly contributing to adaptation as the disaster management debate moves beyond core humanitarian actions of emergency response, relief and reconstruction towards prevention, preparedness and mitigation of disaster events (UN/ISDR, 2004). As figure 4.1 demonstrates, DRR activities focused on extreme events have a key role in contributing to adaptation. Nevertheless, these widespread overlaps at the practical level masked by poor interaction and institutional overlap among the communities of practice around disasters, climate change and development (Sperling and Szekely, 2005; Schipper and Pelling, 2006).

The structural conditions underlying poverty and vulnerability are also likely to constrain opportunities for climate adaptation, but it is increasingly acknowledged that as well as generating potentially increased risks, climate change may also lead to more favourable circumstances which can provide opportunities for poverty reduction (Kates, 2000; Tanner and Mitchell, 2008a). These include potentially beneficial agricultural conditions through higher temperatures, increased atmospheric fertilisation rates, and more favourable rainfall. The processes of facilitating adaptation may also generate enhanced opportunities for livelihood enhancement, as demonstrated in the Vietnam case study in Box 4.2. Enabling poor people in rural areas to take advantage of these opportunities is crucial as a counter measure to offset detrimental impacts, especially as recent research suggests that the impacts of such gradual changes on production will be outweighed by the increasing frequency of crop loss due to extreme events, such as droughts and heavy precipitation (Easterling et al, 2007).

Box 4.2. DRR and Adaptation in coastal Vietnam

An environmental preservation project conducted by the Vietnam Red Cross addressed two issues affecting the people living on the coast in Thai Thuy district of Thai Binh province. With eight to ten typhoon storms striking the coast of Vietnam annually, tidal flooding often breaches sea dykes and causes economic losses to the local population engaged in aquaculture. With climate change, the intensity of these storms is likely to increase and the breaches become more serious. The Red Cross project involved creating 2,000 hectares of mangrove plantations, which serve two important purposes. Firstly, the trees act as a buffer zone in front of the dykes, reducing the water velocity, wave strength and wind energy. This helps protect coastal land, human life and assets invested in development. Secondly, the new mangroves contribute to the production of valuable exports such as shrimp and crabs, high-value species of marine fish, mollusc farming, and the culture of seaweed for agar and alginate extraction. This offers new employment opportunities to help what was a vulnerable population improve their livelihoods.

Source: IFRC-RCS, 2002

4.3 Limiting climate change: Mitigation and rural poverty

There are also risks and opportunities for rural poverty presented by the efforts to slow and/or reduce the negative effects of climate change by slowing the further build up of greenhouse gases in the atmosphere, a process known in the climate change community as *mitigation*. Agriculture and forestry sectors have played a major role in contributing to the emission of anthropogenic greenhouse gases, constituting over 30% of total anthropogenic GHG emissions in 2004 (IPCC, 2007). These sectors will therefore be crucial for the future mitigation of climate change, with resultant risks and opportunities for rural poverty.

Mitigation policies and measures that have significant impacts on rural areas include emissions trading projects under the formal Clean Development Mechanism and informal markets, the production of biofuels, and the emerging role of Reduced Emissions from Deforestation and Degradation (REDD) within the international climate change negotiations. While these instruments are likely to generate additional flows of finance and investment, they are also all likely to enhance demands for scarce assets in rural areas, particularly land and water. Ensuring that national mitigation activities do not conflict with food security and rural poverty reduction is therefore one of the most pressing agendas of the climate change and development nexus. The need to boost agriculture production and maintain a balance between biofuel and food production has become a pressing need in the context of soaring global food prices (FAO, 2008).

Climate change policies will also have implications for access to energy by the rural poor. At a basic level, this may involve ensuring the sustainability of fuelwood supplies, and gradual replacement with fuel sources that are less destructive to the local and global environment. Potentially, climate change policies can encourage more widespread shifts from large grid-based carbon intensive energy systems towards decentralised and renewable energy may

help improve access and enhance adaptive capacity and poverty reduction (Venema and Cisse, 2004). Such shifts are likely to depend on strong market signals from climate change regulation at international and national level, as well as international flows of finance and technology.

The joint challenges of mitigation and adaptation in the rural context are highlighted by the case study from Senegal in Box 4.1. This shows how adaptation and mitigation can be usefully combined in a way that enhances incomes and diversifies livelihoods of the poor, while also securing benefits for biodiversity, gender equality and carbon sequestration.

Box 4.3. Adaptation and Mitigation Through 'Produced Environments': The Case for Agriculture Intensification in Senegal

A pilot farm in Niayes, Senegal, launched in the 1970s, has evolved over time to address significant variations in climate change. The Sébikotane programme has had to adapt to successive droughts, a drying climate and a growing population increasingly gravitating to urban centres. Planting dense perennial hedges that act as windbreakers helps to generate an agriculturally conducive microclimate. Traditional predominantly rain-fed forms of agriculture have been replaced by irrigation-based commercial crops. The windbreakers fight wind-related soil erosion and desiccation of crops, which had not previously been addressed. They also provide valuable fuelwood for cooking, lessening the burden on girls and women to collect wood. The use of windbreaks to 'produce the environment' has led to increased production of fruit and vegetables for commercial sale in domestic and high-value export markets as well as demonstrated carbon sequestration benefits. It also provides employment for young people and has helped train a new generation of farmers. The innovations and adaptation practises used in Sébikotane have been taken up nationally and supported internationally as being relevant to other sub-Saharan countries, as they illustrate an innovative, integrated way of managing the environment to provide adaptation and mitigation benefits locally as well as globally.

Source: Seck *et al* 2005.

4.4 Conclusion

The impacts of climate change on rural livelihoods will be overlaid onto existing variability in the climate and the multiple shocks and stresses faced by rural communities. Rural poverty will also face both potentially positive and negative impacts from efforts to mitigate the climate change problem. While climate change is commonly presented as a gradual shift in climatic trends, its impacts will be most strongly felt by poor rural communities through changes in the distribution, nature and magnitude of extreme weather events.

There is consequently an emerging debate around poverty and climate change based on applying a social justice and equity lens to consider how adaptation and mitigation can be 'pro-poor' in reducing relative levels of absolute poverty and vulnerability. Simply, the poor must suffer less from climate change than the rich. This raises questions about how addressing climate change might involve the redistribution of assets and enable genuine reverses in inequality.

Adapting to these changes will require bolstering DRR as a first line of defence, including disaster prevention as well as response. However, it will also require actions to reduce vulnerability to the wider set of structural conditions underlying vulnerability in rural areas in addition to those targeted specifically at the impacts of climate change. At the same time, poor rural populations must be given greater attention in efforts to tackle mitigation. This includes both safeguarding that their livelihoods are not threatened by actions such as biofuels, forestry or renewable energy development, and in ensuring that these actions can provide genuine co-benefits for poverty reduction.

5. Approaches to co-managing rural poverty and disaster risks

This section sets out different approaches to managing rural poverty alongside disaster risk, focusing on measures that can help reduce vulnerability to both. First poverty impacts of disasters are outlined, followed by short case studies of measures used to co-manage rural poverty and disaster risk including a detailed exploration of the scope of social protection for dealing with poverty impacts of disasters. The section concludes with a discussion of how we can ensure national, sustainable and holistic approaches in the co-management of poverty and disaster risk through linking social protection with DRR.

5.1. Poverty impacts of disasters

The increasing threat of disasters are changing and deepening the risks already faced by poor and vulnerable people in rural areas. This has profound implications for the security of their livelihoods and for their welfare. There are clear overlaps between poverty and disaster risk, with poverty reduction policy/ planning and disasters each potentially impacting on the other. As discussed in section 2, and again in section 4 in relation to climate change, hazard impacts at microeconomic (household livelihoods and human development) and macroeconomic levels – with both short term and longer-term effects on economic growth, development and poverty reduction - can increase risk and susceptibility to further disaster risk, exacerbating and creating poverty, and undermining overall efforts to meet the Millennium Development Goals (see, for example, the study of economic and financial consequences of ‘natural’ hazards by Benson and Clay, 2004).

Poorer households are typically less equipped to deal with shocks and disasters, and informal insurance arrangements are likely to be seriously limited especially for shocks that are covariate among all members of formal or informal insurance networks. National-level statistics of numbers below poverty thresholds following a disaster suggest that the number of people in poverty increases. For example, Ecuador experienced an increase in poverty headcount from 34 percent in 1995 to 46 percent in 1998, due to the effects of El Niño in 1997-1998 on the climate, combined with an oil shock. Hurricane Mitch in October 1998 caused widespread losses of agricultural output in Honduras; the overall poverty rate increased from 43 to 46 percent, with rural households experiencing greater poverty impacts (IMF, 2003:66).

Coping strategies in response to shocks in agriculture/ rural areas tend to fall under the following areas:

1. reducing consumption
2. working longer hours
3. running down savings
4. external support, NGO, gvt etc
5. loan default
6. crop/ livelihood diversification
7. sale of assets
8. taking loans
9. cutting down on input use

Development failures may increase peoples’ exposure and vulnerability to natural hazards and disasters, creating risk through reducing the effectiveness of established coping mechanisms and by generating new hazards. In some cases, actual responses to disasters and attempts to reduce risk, when poorly planned, can lead to new hazards and vulnerabilities. A three-stage process of collapse in coping strategies, as assets are eroded by subsequent disaster impacts, has been suggested by Adger (1996). In the first stage people offset disaster effects using available insurance mechanisms (for example selling ‘luxury’ items or taking out loans).

In the second stage, households are subsequently forced to sell key productive assets (land and housing rights, livestock, machinery) to survive. In the final stage the household is forced to disband, with people joining other households, embarking on distress migration or becoming destitute.

Poor households forced to sell their productive assets, such as draft animals, may never be able to replenish their stocks. This can see them remaining in poverty permanently, or for many years after the shock, and can have a 'poverty ratchet effect' as coping strategies become exhausted both at an individual and community level. People may have to turn to other less productive livelihood strategies, or even become destitute, making recovery from the shock difficult (discussed also in section 1.3). Strategies such as reducing investment in child health and education may transmit poverty from current to future generations. When hazards are frequent and affect whole communities they can turn into chronic crises where effects of disasters can seem permanent (see, for example, Sharp *et al.* 2003 on chronic food insecurity in Ethiopia).

There are, therefore, potential gains in incorporating DRR into poverty reduction policy, and vice-versa. For example, asset enhancement, income generating and livelihood diversification programmes have the potential to provide immediate and effective relief to households affected by the disaster while at the same time contributing to poverty alleviation in the long run. The following section sets out case studies of poverty reduction and disaster risk management.

5.2. Case studies of co-managing poverty reduction and disaster risk

Projects and programmes with poverty and disaster risk overlaps either tackle poverty reduction *post* disaster impact or address poverty reduction *with* DRR. This section focuses on the latter – examples of co-managing poverty reduction and disaster risk.

Projects, programmes and policies that co-manage poverty reduction with disaster risk encompass: i) livelihoods and asset-based approaches; ii) local/'traditional' coping strategies; iii) community-based approaches to managing common property and other resources; iv) conservation approaches; v) local and national government policy formulation and implementation; vi) DRR approaches including early warning systems; and vii) social protection. The section first describes briefly initiatives that fall under the umbrella of the first six categories listed above, before focusing on social protection measures in combination with DRR. The potential of such an approach to co-managing successfully poverty reduction and disaster risk is demonstrated through case studies on weather-indexed crop insurance, cash transfers, and starter packs and seed fairs.

Livelihoods and Asset-Based Approaches

Livelihoods approaches to poverty reduction and DRR focus on developing 'capitals' – human, social, political, financial, natural. This encompasses asset-based approaches that seek to strengthen household asset portfolios by increasing expected returns so that assets are more useful for risk management, especially in the face of disasters and shocks, and also to provide a broader range of instruments for risk management. Instruments include those focusing on: natural resource conservation, investments in social and physical infrastructure including transport infrastructure, market development, improved information flows, investments in agricultural research and extension to stabilise yields.

One five-year pilot project focusing on livelihoods in the Jhang District in the Punjab has consequently improved economic opportunities for households and communities, as well as developing practical innovations for disaster preparedness. Because the area is prone to recurrent flooding, livestock was frequently moved a considerable distance from the communities otherwise the animals would face inadequate food supply during many weeks and months of high water and perish. This pilot included developing a new form of solid, high-

nutrient feed block for livestock, each block feeding one animal for one month. As a result, the risk of loss of cattle through drowning or theft during the move to far-flung higher pasture-land has decreased. Further, there are positive food-security effects on flood-affected families: because villagers were now able to keep cattle with them during flooding, they could now access milk and other dairy products during the flooding season (DFID, 2006).

Local/'traditional' coping strategies and community-based approaches to managing common property and other resources

Case studies show that climate change is already having serious impacts on peoples' livelihoods. Communities in coastal areas (islands, tropical forests, drylands) in particular have had to adapt to a wide variety of hazards. These practices can potentially allow households to manage effectively adverse impacts of disaster risk as well as allowing them to capitalise on new opportunities. However, adaptability and the degree of vulnerability to disaster risk can be unevenly distributed between different ethnic groups and even within communities. Examples of traditional and innovative adaptation practices include:

- shoreline reinforcement, coastal protection;
- improved building technologies;
- rainwater harvesting and using supplementary irrigation;
- traditional farming techniques to protect watersheds;
- changing hunting and gathering practices to match new seasonalities;
- crop and livelihood diversification;
- use of new materials;
- community-based DRR.

Bangladesh is expected to be one of the countries most heavily impacted by sea-level rise caused by climate change, due to its geography. Coastal peoples, whose livelihoods mainly depend on resources such as fisheries and mangroves, are expected to be severely affected by the effects of climate change and natural hazards. In this context, people principally use traditional strategies in response to disaster. Strategies include strengthening housing conditions, sheltering on higher ground, sale of land, developing fuel and dry food storage, and changing diets (Srinivasan, 2004).

Conservation approaches

Measures to protect and improve the natural resource base can help to address overexploitation of resources, strengthen livelihoods management as well as mitigate against disaster risk. One initiative that does just this is a Warwick University project aimed at improving affordable, domestic rainwater harvesting technology for the very low cost market in Ethiopia for drinking and perennial crop cultivation. The project, which ran from 2001-2003 and funded by DFID, included models for rainwater harvesting ranging from simple opportunistic practices (for example where the water catchment may be a tree, the conveyance a banana leaf and the storage an earthen-ware pot) to highly sophisticated, electronically monitored systems (DFID, March 2006).

Early Warning Systems

The use of climate data in early warning and information systems is a key tool for mitigating disaster impacts that also enable better livelihood management and poverty reduction by averting or alleviating food security shocks.

The Famine and Early Warning System Network (FEWSNET) is an initiative covering 17 countries in Sub-Saharan Africa, as well as Afghanistan. A range of information products, tools and services provide decision-makers with up-to-date information necessary to forestall or mitigate the impact of food security shocks. Areas of assistance include early warning

techniques and tools encompassing analysis of remotely-censored and ground-based early warning data and capacity-building for national and regional early warning systems; food security and vulnerability assessment methods, updates and briefings, contingency and response planning.

At a national level, Mali has one of the earliest established services for providing climate-related advice and recommendations directly to rural people, especially farmers, to help enable rural communities to manage the risks associated with rainfall variability. Since its launch over 25 years ago by the national meteorological service, the project has evolved and is now an extensive and effective collaboration between government agencies, research institutions, media, extension services, and farmers. One highly innovative element of the project present from its inception has been to help farmers to measure climate variables themselves, enabling them to incorporate climate information into their decision making, as well as supplying climate-related advice and recommendations directly to farmers.

Role of government

Local and national governments have a key role to play in policy formulation and implementation, including service and infrastructure provision, to ensure poverty reduction with disaster risk management. One route is through embedding policy within the PRSP, integrating poverty reduction with disaster risk management efforts, and ensuring effective implementation.

Table 5.2 Poverty-focused DRR embedded in selected PRSPs

Country	PRSP focus in relation to disaster risk	Measures proposed
Ethiopia	Reducing vulnerability to drought in the longer run. National Policy on Disaster Prevention and Management as a new approach to tackling recurrent food emergencies through linking relief resources with development interventions.	Water resource development improved agricultural technology, resettlement of people from densely settled food-insecure areas water sector strategy: measures to reduce the risks of flooding. Disaster Response capacities to be boosted through improved early warning systems, emergency food and cash reserves, and studies of vulnerability in food-insecure districts.
Malawi	The impact of weather-related calamities on the poor and the need to put in place adequate disaster management measures.	Preparedness measures to focus on improving or using established global, regional and national early warning systems. Department of Disaster Prevention, Relief and Rehabilitation will be responsible for Emergency Relief Operations and rehabilitation projects. Safety nets programme to address chronic and 'transient' poverty through combination of welfare transfers, targeted nutrition intervention, public works and targeted agricultural input provision.
Vietnam	By 2010, to reduce by half the number of poor people falling back into poverty due to disasters and other risks.	Integrated approach incorporating employment generation for vulnerable people; support to improve school attendance of children in vulnerable families; fitting existing and new schools for seismic resistance; development of an Emergency Relief Fund.
Bangladesh	Integrated approach placing disaster risk management within mainstream development planning and programme/project design.	Disaster risk management through comprehensive risk reduction: (i) effective EWS; (ii) institutionalised triggering mechanism for response during and after the disaster; (iii)

		networking among public institutions, NGOs, community and individual household for integrated planning and coordination with decentralised responsibility to implement actions by actors before, during and after a disaster; and (iv) development and deployment of institutional, logistical and human capacity and skills through training, research, upgrading and regular maintenance of facilities for damage mitigation.
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Source: DFID (2004); Bangladesh PRSP (Government of the People’s Republic of Bangladesh, 2005)

5.3 The Role of Social Protection⁸

This section examines opportunities for linking social protection and DRR exploring whether linking these approaches will help enhance resilience to shocks and stresses in rural communities vulnerable to disaster events. This involves examining firstly, how social protection can provide DRR with a preventative and holistic approach to poverty reduction. Secondly, we consider how, social protection can be disaster proofed through a long-term and inclusive approach in the context of disaster risk. The study does this by (i) reviewing the similarities and differences between DRR and social protection, by (ii) examining evidence from case studies of social protection interventions that co-manage rural poverty and disaster risks, and by (iii) highlighting the opportunities and requirements necessary to support DRR and social protection interventions in the future.

Social Protection and DRR: Similarities and Differences

The context

Social protection has become a key policy response to risk, poverty and vulnerability in rural areas. For the purposes of this study social protection describes: *all initiatives that transfer income or assets to the poor, protect the vulnerable against livelihood risks, and enhance the social status and rights of the marginalised*. Its overall objectives are to extend the benefits of economic growth and reduce the economic or social vulnerability of poor, vulnerable and marginalised people. (IDS 2006; Devereux and Sabates-Wheeler 2004).

This definition is useful because it allows the distinction between four categories of objectives: *provision measures*, which provide relief from deprivation; *preventive measures*, designed to prevent deprivation; *promotive measures*, aimed at enhancing income and capabilities; and *transformative measures*, which seek to address concerns of social justice and exclusion (Devereux and Sabates-Wheeler, 2004).

Disasters can have a huge impact on livelihood opportunities and on people’s ability to cope with further stresses. Impacts such as loss of assets can lead to increased vulnerability of poor people and a “downward spiral of deepening poverty and increasing risk” (PLOW, 2007). DRR aims to make livelihoods more resilient to the impacts of disasters, hazards and shocks before the event.

Linkages

Social protection, and DRR have much in common, but have developed as separate disciplines over the last two decades (see table 5.3a below). They both seek to mitigate risks faced by poor people, they tackle the impact of and seek to build resilience against shocks

⁸ Research and examples cited in this section are drawn from the paper Davies, M., Guenther, B., Leavy, J., Mitchell, T., and Tanner, T., 2008 ‘Climate Change Adaptation, Disaster Risk Reduction and Social Protection: Complimentary Role in Agriculture and Rural Growth?’ Brighton Institute of Development Studies, Centre for Social Protection and Climate Change and Disasters Group.

and stresses on livelihoods and they are all in relatively formative stages of development and testing, rather than established components of development and poverty reduction. The following examples demonstrate how, by linking the disciplines, weaknesses that exist when they work in isolation are addressed and, the potential they have to co-manage disaster risk and poverty reduction is utilised.

Table 5.3a: Key Characteristics of Social Protection and DRR

	Social protection	DRR
<i>Core disciplinary grounding</i>	Development and welfare economics	Physical sciences
<i>Dominant focus</i>	Implementation of measures to manage risk	Prevention of disaster events
<i>Main shocks and stresses addressed</i>	Multiple, idiosyncratic and covariant	All natural hazard-related, including climate and geophysical
<i>International coordination</i>	Informal, OECD task group	UN-ISDR Hyogo Framework for Action
<i>Main Funding</i>	Ad hoc multilateral and bilateral	Coordinated international funding: ISDR, GFDRR Ad hoc civil sponsored and bilateral

Towards addressing structural constraints around poverty through social protection

In the disasters field, the bulk of efforts and resources have been within relief and recovery designed to smooth the social impact of shocks. Despite renewed momentum and commitments, far less emphasis has been placed on preventative approaches associated with DRR that tackle disasters from a holistic perspective.

Social protection has much to offer in helping the poorest reduce their exposure to current and future disaster shocks (table 5.3b). Joining these related agendas therefore means looking beyond simply protecting the most vulnerable to the impact of shocks and stresses, and towards prevention and promotion to address structural constraints around poverty.

Table 5.3b: Promoting DRR and adaptation through social protection

SP category	Examples of SP instruments	DRR benefits
<i>Protective</i> (coping strategies)	-social service provision -basic social transfers (food/cash) -social pension schemes -safety nets -public works programmes	-protection of those most vulnerable to DRR with low levels of resilience
<i>Preventive</i> (coping strategies)	-social transfers -livelihood diversification -weather-indexed crop insurance	-prevents damaging coping strategies as a result of risks to weather-dependent livelihoods
<i>Promotive</i> (building adaptive capacity)	-social transfers -access to credit -asset transfers or protection -starter packs (drought/flood-resistant) -access to common property resources -public works programmes	- promotes resilience through livelihood diversification
<i>Transformative</i> (building adaptive capacity)	-promotion of minority rights -anti-discrimination campaigns -social funds	-transforms social relations to combat discrimination underlying social and political vulnerability

Timeframe and limits: Driving longer term perspectives on social protection

Many social protection interventions are planned over relatively short time frames. More recent social protection policies and programmes refer to the need for ‘long-term’ interventions. Nevertheless, how this will be achieved, and analysis of how long-term they need to be to achieve stated objectives, is rarely fully considered. Considering DRR in the context of social protection provides a strong incentive for developing longer term perspectives.

DRR highlights the importance of considering how prevailing and future trends in disaster risk might affect the effectiveness of social protection measures, as well as how they might contribute to reducing vulnerability to shocks and stresses caused by disasters. Linking with the DRR agenda, therefore, exposes social protection to issues around its ability to support productive livelihoods in a face of increased disaster risk.

People-centred and social aspects

The social protection agenda based on a dominant safety net-based risk management approach has tended to focus on economic aspects of protection, in part a legacy of the World Bank’s risk management framework. There is a consequent danger that by focusing on economic mechanisms rather than development objectives, social protection interventions have not fully addressed social poverty and social vulnerability including marginalisation and exclusion.

Social aspects of vulnerability in DRR have similarly been challenged the dominance of physical science disciplines that have not engaged extensively with social development agendas. Opportunities are evident however, as recent disasters discourse and practice has started to pay greater attention to social and institutional aspects of DRR in the growing focus on community-based DRR and in the development of tools and methods to assess human vulnerability (Adger, 2003; Wisner *et al* 2004; Huq, 2007; IFRC 1999, Chiwaka 2005).

Institutional capacity and coordination

DRR and social protection share a need to link policy and actions with wider aspects of human development and economic growth. If social protection is to produce positive social and economic outcomes, synergies need to be made with other disciplines that address the multiple dimensions of poverty. At country level, social protection policies are often implemented in isolation, not within poverty reduction frameworks or growth strategies. Ministries responsible for implementation (e.g. Ministries of social welfare) are commonly poorly resourced and marginalised and are poorly placed to provide the necessary links.

DRR is often found in response or disaster management agencies, rather than as part of development or mainstream politics. This has frustrated the cross-sectoral links necessary for work on the multi dimensions of poverty reduction as these focal point ministries tend to be poorly resourced and relatively weak within the government system.

Instrumentalism vs. rights based approaches

Social protection has been crudely divided into two approaches (Devereux and Sabates-Wheeler 2007). The first is underpinned by *instrumentalist* arguments for social protection to efficient delivery of the MDGs. Social protection thereby puts in place risk management mechanisms where they are temporarily missing due to poverty and the absence of private institutions.

Within DRR a similar rationale can be identified in risk management based approaches where risk reduction is seen as means to an end, and economic analysis builds the evidence base to advocate for DRR as cost-effective means of preventing future negative impacts on development investments (Stern, 2006).

The *activist* arguments underpinning social protection as an inviolable right to combat social injustice and inequality also have parallels with DRR debates. Social protection rationale is informed by the ideal of a guaranteed 'universal social minimum' based on citizenship rather than philanthropy or self-interest (Devereux and Sabates-Wheeler 2007). Approaches to DRR in the context of adaptation reflect these arguments. Here, adaptation in poor communities is regarded as a necessary response to a problem caused by richer people globally but with impacts felt most severely by poorer citizens who have contributed least to the problem (Paavola and Adger 2006).

A key implication for designing and implementing social protection in the context of disaster risk extreme is therefore likely to be an enhanced engagement with rights and equity based arguments around disaster risk.

5.4 Linkages in Practice

Country experiences of social protection instruments - weather-indexed crop insurance, cash transfers, free input distribution and seed fairs - reveal how these measures can enhance the resilience of vulnerable communities and point to ways in which social protection measures could be more resilient to current and future disaster related shocks. In the context of agriculture, where links between the two disciplines are more developed, we consider both the potential for expansion along with the challenges that are needed to be overcome.

Weather-indexed crop insurance

As disaster impacts become increasingly critical to agriculture production in developing countries, insurance is likely to play a greater role in absorbing shocks and spreading risk. Weather-indexed crop insurance develops a contract written against a weather index, and farmers collect immediate insurance compensation if the index reaches a certain point or "trigger", regardless of actual losses.

The pilot project undertaken by the Government of Malawi, the World Bank, International Research Institute for Climate and Society (IRI) and the National Smallholder Farmers Association of Malawi (NASFAM) provides empirical evidence of the use of weather-indexed crop insurance for groundnut production in a DRR context. Through the scheme, farmers entered into a loan agreement with an interest rate that includes a weather insurance premium. The loan enabled households to access an input package which included improved groundnut seed. In the event of a severe drought (as measured by the rainfall index), the borrower would pay only a fraction of the loan due, while the rest is paid by the insurer directly to the lender. The insurance guarantee against the loan allows high-risk and low-income farmers to obtain credit to invest in seeds and other inputs for higher yielding crops (Helmuth, et al 2007).

In India, a local micro-finance institution, BASIX, and an insurance company, ICICI Lombard along with the Commodity Risk Management Group and the World Bank have pioneered a rainfall insurance scheme in Andhra Pradesh. Similar to the Malawian scheme, the contracts ensured a prompt payout when rain falls below a crop-specific rainfall index. ICICI Lombard underwrote the insurance policies and reinsured the risks with an international reinsurance company. Individual farmers and self-help groups articulated product satisfaction in all of the pilot areas. Prompt settlement of claims in 2004 won the appreciation of the farmers who expressed their willingness in becoming repeat customers in 2005 (Manuamorn 2005).

The weather-indexed approach guards against problems of adverse selection and moral hazard because regardless of whether the insurance is paid out or not, farmers still have an incentive to make productive management decisions (Helmuth et al 2007; Hess and Syroka 2005). The timeliness of payouts means that farmers are not forced to adopt costly coping strategies, such as the sale of productive assets, and are able to smooth their consumption by providing liquidity following crop losses (Murdoch, forthcoming). Where well designed, they

may also strengthen resilience and support productive enterprises through greater risk taking experimentation in agriculture practices that was not possible in crop-insurance schemes. As insured households and farms are more creditworthy, insurance can also promote investments in productive assets and higher-risk/higher-yield crops (Mechler *et al* 2006). Despite these advances, key challenges facing the expansion of weather-indexed insurance in light of DRR include (Mechler *et al* 2006; Hellmuth *et al* 2007; Holmes *et al* 2007):

- Difficulties in targeting those most vulnerable to drought and food insecurity, engaged in non-commercial marginal agriculture;
- Failure to tackle differentiated gender impacts;
- High premiums may preclude involvement of very poor groups, who often live in areas of high climate risk;
- Capital costs such as the construction of weather stations must be funded by either the public or private sector to ensure broad coverage;
- Climate change presents significant uncertainty in predicting long-term weather patterns making it difficult to accurately assess financial risk;
- Increased climatic variability and occurrence of extreme events may result in larger and/or more frequent insurance payouts resulting in the possible insolvency of the insurance provider or higher premiums from re-insurers which may be inaccessible to the poor.

Cash transfers

Cash transfer programmes are gaining momentum as both a disaster risk and an overall poverty reduction strategy (see Barrientos 2006). Redistributive cash transfers can help raise incomes and smooth the consumption of the poor, allowing them to engage in moderate risk-taking, and to protect rather than erode their asset holdings when confronted by livelihood shocks (Devereux and Sabates-Wheeler 2004). Furthermore, cash transfer programmes may contribute to asset-building as well as the generation of economic multiplier effects, through the generation of local employment (GTZ 2005; Mattinen and Ogden 2006; Slater *et al* 2006; DFID 2004; Devereux 2006).

Predictable cash transfers could play an important role in mitigating the vulnerability of the chronic poor who will increasingly be exposed to disaster related shocks and stresses. Preliminary lessons from Ethiopia's Productive Safety Net Programme (PSNP) reveal a positive effects on household food consumption as well as the protection of household assets (Devereux *et al* 2006; Slater *et al* 2006; Vaitla 2006). The PSNP contributed to a reduction in 'distress selling' of assets, provided an opportunity for households to create assets, and contributed positive impacts on human capital through increased school enrolment and access to health services (Slater *et al* 2006).

Repeated transfers at predictable and regular intervals allow recipients to spread risk and to plan spending and investment behaviour over longer timeframes. Larger and continuous cash provisions are more likely to lead to the asset accumulation and poverty reduction (and therefore risk reduction) than occasional or erratic transfers (Devereux and Coll-Black 2007; Marcus 2007). Although potentially offering important opportunities to address multiple dimensions of poverty and support DRR, the long-term impact requires some caution. Many cash transfer programmes in the context of DRR have been implemented quite recently or over a short-time frame. Lack of available evidence on the impact over a longer-time frame is therefore, limited. Finally, in addressing the multi-dimensions of poverty and achieve wider development outcomes (e.g. growth, health and education), cash transfer need to be placed alongside, and support, other complimentary interventions.

Starter packs and seed fairs

In response to calls to develop and distribute crop varieties that are drought and saline resistant, programmes for distribution of free inputs or inputs-for-work have become increasingly popular, especially across Africa. Input distribution has been a common response amongst development agencies in response to production failure resulting from drought and

enhancing access to seeds and fertiliser. The distribution of fertiliser and seeds for free is intended to enhance food security by boosting food production among farmers who are unable to obtain such inputs. Evaluation of starter pack programmes in Malawi reveal success in boosting food production at the national level and household level food security (Devereux and Coll-Black 2007).

While popular among donors, critics argue that inputs sourced through commercial seed and fertiliser companies are often inappropriate to local cropping patterns and agro-ecological conditions, can potentially distort local seed markets, and reduce crop diversity. Other critics of input distribution argue that such measures misdiagnose the *inaccessibility* of inputs with *unavailability*, and fail to assist in keeping seeds stocks year on year (Barahona and Cromwell 2005; Orindi and Ochieng 2005; Thompson, *et al* 2007; Devereux and Coll-Black 2007).

As an alternative to traditional input distribution programmes, a seed voucher and fair programme was developed in Kenya's semi-arid region in response to prolonged drought. Farmers were encouraged to bring their surplus seeds to fair sites where voucher holders were able to select seeds of their choice. On completion of the seed fair, seed retailers redeemed their vouchers for cash.

In contrast to the package of inputs approach which risks undermining biological diversity and leads to mono-cropping, seed vouchers and fairs have encouraged farmers to maintain crop diversity on their farms, contributing socio-ecological resilience. Seed voucher and fairs programmes have been found to be substantially more cost-effective than traditional input distribution approaches, as well as providing an opportunity for greater information sharing among farmers (Orindi and Ochieng 2005).

Other examples include a Practical Action supported pilot in post-tsunami areas of Sri Lanka to trial 10 traditional saline-resistant varieties which had been present before the introduction of higher yielding varieties. These help increase resilience in light of sea-level rises in low lying areas. The RVCC programme in Bangladesh has similarly encouraged the planting of saline tolerant non-rice crops such as maize and grass during season when rice cannot be grown, increasing soil nutrient levels and providing fodder for cattle.

Traditional input transfer programmes may be a tempting method to distribute crop drought- or saline-tolerant crop varieties; however, such programmes can undercut local seed markets and ignore indigenous knowledge. Furthermore, such free input distribution may in fact increase vulnerability to disasters by ignoring particular agro-ecological contexts and undermining crop diversity. However if, in the design of seed vouchers and fairs, these factors are considered and mitigated, they present a cost-effective way to assist post-disaster recovery and enhance resilience by promoting crop diversity and information sharing between farmers.

5.5 Conclusions

This section of the report illustrates how, by taking care to manage rural poverty alongside disaster risk, poor and vulnerable people in rural areas typically less equipped to deal with shocks and disasters can withstand the increasing threat of disasters on their lives and livelihoods. This can be achieved by focusing on measures to help reduce vulnerability to both. These can be extensions of approaches already taken in relation to strengthening and diversifying livelihoods and asset bases, protecting and preserving the natural resource base and rooted in coping strategies already adopted by local people. The use of climate data in early warning and information systems is an important and established mechanism to mitigate disaster impacts that also enable better livelihood management and poverty reduction by averting or alleviating food security shocks.

Further, by linking social protection with DRR, clear poverty and disaster risk overlaps are made. Case studies demonstrate how social protection interventions can provide DRR with a preventative and holistic poverty approach. In protecting the most vulnerable and poor, and prevent damaging coping strategies, it can promote resilience in the face of disaster risk. Finally, if a broader approach to social protection is implemented, it can extend beyond income poverty and transform social relations to combat underlying and social vulnerability. To enable social protection to achieve these objectives, we emphasised how social protection through a DRR perspective provides it with a longer-term and inclusive approach to poverty and vulnerability. National political ownership provides the greatest opportunities to support this partnership. Here, linkages can be operationalised by building on existing political acceptance and ownership around the disaster risk and poverty reduction agenda, embedding policy integrating poverty reduction with disaster risk management efforts within the PRSP and ensuring effective implementation. The policy implications of this approach are discussed in section 6.

6 Summary and Recommendations

The first section considered the complex relationship between rural poverty and exposure to hazards, by analysing the specificities of rural dimensions of poverty and by examining sources and impacts of hazards and stresses on poor rural people's livelihoods. By reflecting on examples of seasonality and AIDS, the section concluded that the relationship between rural poverty and hazards is complex and interconnected.

- Exposure to a hazard undermines livelihoods, simultaneously causing and exacerbating poverty.
- A hazard is more likely to impact negatively on an already compromised livelihood system, because resilience and ability to cope are diminished.
- The impacts of a hazard are unequally felt across different wellbeing maps, with poorer people and households more likely to experience negative and more severe impacts from a hazard than better-off groups.
- Poverty is itself hazardous.
- Low incomes raise vulnerability to hazards, because the poor are less able to cope with shocks to their fragile livelihoods.

The second section discussed what is meant by 'vulnerability' and how rural poverty contributes to and exacerbates a variety of vulnerabilities and hazards. The section concluded that poverty and vulnerability reinforce each other. We also found that:

- Everyone is vulnerable to food insecurity, social exclusion, natural disasters and other hazards, but the poor are more vulnerable because they are more exposed to these risks and are more likely to experience a larger and more prolonged (even irreversible) impact due to their limited (physical, financial, social and political) assets.
- Assets usually reduce both poverty and vulnerability to livelihood shocks.
- In some perverse cases assets can increase vulnerability, but these are unusual circumstances.
- The importance of voice and influence over people with power cannot be overstated; it is critical for determining whether poor people must attempt to cope with hazards on their own or can count on external assistance in times of stress.

The third section explored how the processes that link rural and urban either produce or reduce disaster risk for poor people living in rural areas. By analysing how migration and decentralisation influence levels of vulnerability and exposure to hazards, the section found that these processes have a profound affect on both rural poverty and disaster risk, concluding that:

- migration is a complex process that has both positive and negative impacts on the levels of extensive disaster risk
- the existence and growth of urban areas themselves generates extensive rural disaster risk, and this is likely to accelerate given the pressures of climate change on agrarian systems, which will force more people into urban or peri-urban environments.
- While decentralisation of poverty reduction and DRM has benefits in participation and recognition of local needs, many local governments in rural areas are ill-equipped to promote rural development or to tackle disaster risk as they lack skills and resources.
- There is very limited evidence to suggest that decentralisation either reduces poverty or enhances effective disaster risk management.

Section four examined the potential threats and opportunities posed by climate change for poor people in rural areas. It concluded that:

- The impacts of climate change on rural livelihoods will be overlaid onto existing variability in the climate and the multiple shocks and stresses faced by rural communities.
- Rural poverty will also face both potentially positive and negative impacts from efforts to mitigate the climate change problem.
- While climate change is commonly presented as a gradual shift in climatic trends, its impacts will be most strongly felt by poor rural communities through changes in the distribution, nature and magnitude of extreme weather events.
- Adapting to these changes will require bolstering DRR as a first line of defence, including disaster prevention as well as response.

Section five sets out different approaches to managing rural poverty alongside disaster risk, focusing on measures that can help reduce vulnerability to both. It examined a series of short case studies, exploring the scope of social protection for dealing with the poverty impacts of disasters. It concluded that:

- When external social protection assistance is guaranteed – for instance, where predictable and social security systems provide effective safety nets against shocks – the catastrophic consequences of hazards can be substantially contained.
- By linking social protection with DRR, clear poverty and disaster risk overlaps are made. Case studies demonstrate how social protection interventions can provide DRR with a preventative and holistic poverty approach.
- Finally, if a broader approach to social protection is implemented, it can extend beyond income poverty and transform social relations to combat underlying and social vulnerability.

As a set of summary recommendations, policy interventions to tackle rural poverty and disaster-risk need to reduce or spread risk or strengthen resilience. This can be achieved through:

- Building the asset base of poor rural people
 - Supporting the diversification of their livelihoods
 - Providing social insurance mechanisms
 - Making climate change and seasonal forecast data available to farmers in suitable formats
 - Supporting social safety nets
- Mainstreaming DRR into PRSPs
 - Integrating local government disaster risk management within national development programmes and supporting the capacity of civil society to hold local governments to account.

Asset-based policies need to:

- encompass measures to build up the asset base of (poor) people in rural areas to act as buffers against shocks and help reduce vulnerability to hazards. These include measures that not only strengthen existing asset bases but also those that enable people to create/ access assets such as essential inputs for farming, irrigation;
- maintain access to assets and minimise disruption in event of hazard/ disaster. Where livelihoods are fragile this will better enable rural people to manage new types and sources of change, and enhance ability to smooth income and consumption without resorting to 'distress' sales of assets when faced with impact/ risk of hazards;
- if households do resort to these kinds of coping strategies, policy should enable them to rebuild assets in a timely way so as to avoid 'poverty ratchet' effect, so keeping poor rural people above asset thresholds.
- enable poor people in rural areas to adopt coping mechanisms that preserve the key productive resources of the household to improve resilience to future shocks and hazards and build the ability to adapt to multiple aspects of a changing environment, for example through improving access to affordable, domestic rainwater harvesting technology.

DRR must form a closer relationship with social protection. In the context of national ownership, Programmes featuring a partnership between the two disciplines should include:

- An emphasis on transforming productive livelihoods as well as protecting, and adapting to changing climate conditions rather than simply reinforcing coping mechanisms.
- Grounding in an understanding of the structural root causes of poverty in a particular region or sector, permitting more effective targeting of vulnerability to multiple shocks and stresses.
- Incorporation of entitlements-based rationale for action that addresses social exclusion, stressing equity and justice dimensions of poverty and DRR in addition to instrumentalist rationale based primarily on economic efficiency.
- An enhanced role for research from both the natural and social sciences to inform the development and targeting of social protection policies and measures in the context of the burden of both geophysical hazards and changing disaster risks.
- A longer-term perspective for social protection policies that takes into account the changing nature of disaster shocks and stresses.

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