

Financing Disaster Mitigation for the Poor

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Abstract

The growing incidence of disasters correlates strongly with the increasing vulnerability of households and communities in developing countries. Socioeconomic vulnerabilities exacerbate the impact of a disaster and make the process of recovery and rehabilitation very difficult.

Poor households and communities adopt risk-reducing mechanisms to maintain their levels of income and consumption. These mechanisms comprise income diversification, credit and informal insurance arrangements institutionally supported by mutual aid groups, kinship-based networks, credit associations, cereal banks, and rural money-lenders. However, these mechanisms have not proven very effective in dealing with covariate risks of natural disasters.

Investment in mitigation and a strong commitment to the implementation of a participatory mitigation strategy can only reduce the risks and vulnerabilities of poor households. However, mitigation at the household and community levels cannot be accomplished by governments alone. It requires pooling resources, sharing knowledge on hazard mitigation, and community participation.

Providing access to resources to poor households for mitigation investment could be an important way to reduce their vulnerability. The strong potential for households, financial-sector institutions, and governments to pool their resources for risk reduction and mitigation must be explored. A number of financial services and products may be developed through market- and public-funded institutions. Built-in incentives also should be introduced. They contribute to asset building and protection, and maintain income levels

and livelihood of poor households. These instruments may not be universal in application. The specific context of hazard and local institutional and societal capabilities shape these instruments and incentives. At the same time the risk-reducing mechanisms for natural disasters can be effective only if there is a wide participation and the risk pool is sufficiently enlarged. This chapter initiates a discussion among policymakers to explore various ways to pool resources of households and communities, private sector, and governments for mitigation and developing appropriate institutional facilities to channel these resources.

Anywhere it struck, Mitch would have been deadly. But only poverty can explain why it was so deadly. In poor countries, people crowd onto marginal land, in flood plains or on the slopes of menacing volcanoes. They denude the hills, making mudslides more likely. Their flimsy houses have no basements or foundations. Upriver, dams are old, poorly built, infrequently inspected. Poor countries lack the technology to track coming storms, the communication systems to send alarms, the resources to stage large-scale evacuations. There are few helicopters, boats or bulldozers for rescue; scant telecommunications equipment to pinpoint the greatest areas of need; poor or no medical care to save the injured.

—*The Washington Post* (November 1998)
cited in *World Disasters Report* (1999)

Recent discussions in the wake of large-scale natural disasters that called for international assistance in

disaster recovery and reconstruction strongly acknowledge that investment in disaster management will not provide commensurate benefits unless it includes a corresponding emphasis on reducing vulnerability of the poor to natural disasters. An appropriate mitigation strategy for the poor calls for strong linkages with poverty alleviation and habitat programs. A sustainable mitigation strategy also requires participation of the poor in all activities aimed at reducing their vulnerability. This chapter, based on a review of relevant literature, presents a case for facilitating participatory disaster mitigation by increasing access of the poor to resources and providing them mechanisms for mitigation. A range of financial instruments could be evolved to support the communities in implementing appropriate disaster mitigation programs. At the same time the policy and institutional contexts for the development of these mitigation mechanisms are extremely important.

The chapter looks at feasibility of financial instruments and mitigation resources that the poor could access to cope with disaster, sustain their consumption levels, and undertake necessary investment in improving their habitat and environment. Since the poor are the main reference group addressed here, the chapter is structured around their risks, fears, uncertainties, losses, and deprivations. The chapter is divided into five parts. Part 1 provides global information on the disaster events and the distribution of their impact across countries and income groups. Part 2 deals with issues of poverty and the linkages between poverty and vulnerability. Part 3 discusses the concept of risk, and the role risk reduction plays in shaping economic behavior of the poor. How do the poor identify their risks, and what mechanisms do they adopt for risk-pooling and risk-sharing at the individual and household levels? Part 4 then addresses mitigation concerns of the poor. In addition to the support and assistance the poor receive from governments for vulnerability reduction, how do the poor access financial resources to reduce and mitigate risks of large scale natural disasters? What are the other mitigation instruments that governments, nongovernmental organizations (NGOs), and the private sector could evolve and implement for the poor? Part 5 presents issues for discussion among the stake-

holders comprising international organizations, governments, NGOs, and academia to advance understanding of mitigation requirements and to develop an action plan for disaster risk reduction.

Natural Hazards and Global Distribution of Disasters

In the second half of 1999 natural disasters in different parts of the world provided accounts of overwhelming human suffering and losses. In August northwest Turkey, which is most densely populated and industrialized, was hit by an earthquake of 7.4 on the Richter scale. The official death toll stands at over 17,100 plus some 44,000 people injured, nearly 300,000 homes damaged or destroyed, and more than 40,000 businesses similarly affected. A subsequent earthquake of magnitude 7.2 hit Turkey on November 12 with the confirmed death toll at 815 and 4,946 persons injured. Some 8,944 houses and 1,542 businesses are heavily or moderately damaged. The death toll from the earthquake that struck Taiwan on September 21 stands at nearly 2,300, and approximately 9,000 were seriously injured. According to official figures, the number of persons made homeless as a result of that earthquake is likely to exceed 380,000 (*Situation Reports*, IFRC 1999).

A super cyclone hit the Indian state of Orissa on October 29, causing widespread devastation across eight coastal districts. More than 10,000 people were killed. According to the latest government estimates, 1,714,000 houses and 1,678,000 hectares of cropland were destroyed, and 406,000 heads of livestock perished.

Eleven days of continuous rainfall from December 8 to 19 in Venezuela caused serious flooding and landslides in the Federal District of Caracas, and a number of states. The estimates of deaths vary from an official figure of 1,500 dead to as many as 30,000 according to media reports and other unofficial resources. Over 600,000 persons are estimated to have been directly affected. An initial assessment of damages indicates 64,000 houses damaged and over 23,000 destroyed (*Situation Reports* 1999).

These recent natural disasters continue trends that the decade of the 1990s experienced, related partially to El Nino [DD accent] climatic changes, causing weather-related hazards like floods, drought, and cyclones. The losses due to these natural disasters are mounting, as population grows and human settlements become more dense in hazard-prone areas. Moreover, global urbanization is occurring fastest in areas that are vulnerable to natural disasters. The Pacific Rim, referred to as the "ring of fire" because of its vulnerability to earthquake and volcano, is the fastest urbanizing area on Earth (*World Disaster Report 1999*).

Economic Consequences of Disasters

As the incidence and severity of natural disasters increase, the financing of disaster relief, reconstruction, and rehabilitation has become a serious concern of governments. These disasters upset countries' macroeconomic stability by compelling governments to make allocations for relief and reconstruction efforts. For smaller countries where disaster losses represent a high percentage of the GNP, the impact on the economy is very long term. When governments reallocate funds to meet the exigencies of a disaster, development priorities and allocations fixed through a planning process are thrown into a complete disarray. The support extended by the World Bank, International Monetary Fund, United Nations, and many other international agencies to the countries affected by major natural di-

sasters bear evidence to the macroeconomic difficulties governments face in the wake of these events. Table 1 shows the average estimated damage due to natural disasters by region and type over 10 years.

Human Sufferings of the Vulnerable

According to table 1, the biggest loss reporting region is Asia, followed by the Americas and Europe. The region incurring the least economic damage is Africa. However, these figures could be deceptive. Disasters such as earthquakes, floods, and high wind are estimated to have caused large financial loss, while droughts and famines, which may entail greater human suffering, have resulted in relatively smaller financial loss. These estimates are partially based on the figures provided by the insurance industry, which provides a much higher coverage of assets and properties in developed than in developing countries. In addition the financial value attached to infrastructure in the more developed nations is several orders of magnitude higher than similar structures in developing countries. If we compare the statistics of financial losses reported in table 1 with the statistics of human losses in the table 2, the anomalous situation regarding the distribution of disaster impact across regions becomes clearer.

Since the late 1980s human mortality declined with a greater access to food aid programs, reducing the severity of floods and drought. However, a comparison of these two tables establishes clearly that economic

Table 1 Annual average estimated damage due to natural disasters by region and type, 1988–1997
(thousands U.S. dollars)

<i>Types of disasters</i>	<i>Africa</i>	<i>Americas</i>	<i>Asia</i>	<i>Europe</i>	<i>Oceania</i>	<i>Total</i>
Earthquake	30,920	3,292,886	17,475,437	661,480	125,500	21,586,223
Drought and famine	9,874	314,440	10,575	218,860	520,840	1,074,589
Flood	82,747	2,878,195	8,591,254	8,999,690	34,860	20,586,747
Landslide	0	2,540	38,230	1,630	0	42,400
High wind	59,996	7,569,469	5,846,648	1,453,576	315,823	15,245,512
Volcano	0	1,800	22,089	1,650	40,000	65,539
Other	5,050	781,790	2,377,289	298,569	15,670	3,478,368
Total	188,587	14,841,120	34,361,522	11,635,455	1,052,693	62,079,378

Source: Center for Research on the Epidemiology of Disasters (CRED), Université Catholique Louvain, quoted in *World Disasters Report 1999*.

Table 2 Annual average number of people reported killed by region and period, 1973–1997

	<i>Africa</i>	<i>Americas</i>	<i>Asia</i>	<i>Europe</i>	<i>Oceania</i>	<i>Total</i>
1973 to 1977	84,413	8,519	68,454	2,318	107	163,811
1978 to 1982	1,436	3,172	16,529	1,406	35	22,579
1983 to 1987	115,269	10,853	17,073	2,302	189	145,686
1988 to 1992	12,272	5,248	63,435	2,352	138	83,445
1993 to 1997	7,919	3,065	19,078	1,996	149	32,206
1973 to 1997	44,262	6,171	36,914	2,075	124	89,546

Source: CRED, Université Catholique Louvain, quoted in *World Disasters Report 1999*.

losses and human sufferings are not directly correlated. Although Africa's economic losses are the lowest among continents, its share of human sufferings as expressed through mortality has been the highest.

Vulnerability and "Class" Disasters

Vulnerability to natural disasters thus assumes a very important dimension when we study the impact of natural disasters on people. During the 1970s a more radical interpretation of disasters emerged which suggested that economic processes could increase the vulnerability of populations to natural disasters and should be considered as causes of disasters in the same way as were the more obvious physical or environmental phenomena. There was a process of marginalization at work, which had a strong spatial implication in terms of pushing the poor into marginal places. Some of these views traced their ideological underpinnings to the dependency theory, and provided a strong critique of the relationship between relief and underdevelopment. Relief merely reinforced status quo, and produced greater marginalization and greater disaster susceptibility. Furthermore, the relief hindered adjustments to future natural hazards and increased dependence (Winchester 1992).

As the concept of vulnerability became central to explaining the incidence and impact of disasters, Westgate and O'Keefe proposed a working definition of disaster event as "an interaction between extreme physical or natural phenomena and a vulnerable human group... (that) results in general disruption and destruction, loss of life, and livelihood and injury." They also provided a definition of vulnerability "as the de-

gree to which a community is at risk from the occurrence of extreme physical or natural phenomena, where risk refers to the probability of occurrence and the degree to which socioeconomic and sociopolitical factors affect the community's capacity to absorb and recover from extreme phenomena." Westgate and O'Keefe also pointed out that the distinction between vulnerability from a hazard environment and vulnerability from socioeconomic status was a false one. They proposed that vulnerability should be a term that embraced not merely risk from extreme phenomena but *the endemic conditions* inherent in a particular society that may exacerbate that risk (Westgate and O'Keefe 1976, cited in Winchester 1992).

Vulnerabilities that manifest themselves at different levels precede disasters, contribute to their severity, impede effective disaster response, and continue afterwards. The most visible area of vulnerability is physical and material poverty. The poor, who suffer serious income fluctuations and have little savings or access to credit and finance in the aftermath of a disaster face, greater hardship than the relatively affluent. There are other vulnerabilities as well, related to social organization and attitudinal attributes. For example, communities that are well organized and cohesive cope with the impact of disaster better than those in which community-based efforts are deficient. Similarly, groups sharing a strong ideology or belief system are more resilient in recovering from a disaster than groups without such shared beliefs (Anderson and Woodrow 1998, pp.10-13).

Since developing countries typically share a greater level of economic and social vulnerabilities, the impact of natural disasters on the population and economy

of developing countries is higher compared with developed countries. Even in developing countries it is the poor who lose their lives and assets. The earthquake in Guatemala in 1976, which killed 23,000 people, became known as “class quake” because it singled out the poor communities who lived in the ravines and gorges known to be prone to landslides during an earthquake. These disparities are equally valid for the developed regions of the world. In the 1997 central European floods, Czechs and Poles living along the River Oder suffered far higher losses than their German neighbors on the other bank. Poland is poorer, and years of neglect had undermined its dykes and flood defenses. Very few Poles are insured, and the government had few resources to spare for either compensation or rebuilding (*World Disaster Report 1999*).

Among recent disasters, Hurricane Mitch illustrates how poverty compounds the worst impact of disasters. One of the most destructive storms ever experienced by Central America, Mitch brought torrential rains and mudslides over deforested slopes, leaving 10,000 people dead and eight times as many homeless. Honduras, the country worst affected by Hurricane Mitch, is also the second poorest country in the Western Hemisphere. It has a population growth of 3.1 percent a year. This increase in population combined with poverty and continuing urbanization has led many of its cities to house people in disaster-prone situations on riverbanks and hill slopes. The country's poor health service and other infrastructure and emergency services left it ill-equipped to deal with the aftermath of the disaster. The impact of Hurricane Mitch on Honduras could not therefore be dissociated from the country's development strategy.

Mary Anderson (1990) cites four special circumstances to explain why the costs of disaster recovery are higher in developing than in developed countries:

1. Losses due to disasters as a percentage of national wealth are higher in developing than in developed countries.
2. Disasters and poverty are mutually reinforcing.
3. Frequent incidences of disasters have a negative impact on investment and entrepreneurial incentives that are necessary for development.

4. Disasters have special negative impacts on the nonformal economic sector, and in countries in which this is an important sector, estimates of the costs of disasters are consistently underestimated.

Along with reduction of physical vulnerabilities it is essential to reduce social and economic vulnerabilities that exist in developing countries by building capabilities and organizational and financial mechanisms for risk reduction and risk sharing. Effective risk management implies strengthening governments and communities to grapple with disasters, knowledge of hazard mitigation alternatives, and implementation of mitigation measures. Capacity building is accomplished through public policy interventions, investment at national and community levels, and mitigation incentives. It requires a strategy in which development allocations and disaster spending reinforce each other and achieve complementary goals of poverty alleviation and vulnerability reduction. We shall refer to some of these concerns after we discuss the issues of poverty and vulnerability.

Poverty and Vulnerability

The *World Development Report 1990* (World Bank 1990) addressed the issue of poverty and poverty reduction strategy. This report defines poverty as the inability to attain a minimal standard of living. It measures standard of living in terms of current consumption (including consumption from own production) and supplements it with the quality of life indicators such as nutrition, life expectancy, under-5 mortality, and school enrollment rates. Current consumption reflects households' ability to maintain their standards of living and smooth their consumption through savings and borrowings, despite income fluctuation; therefore, it is a better measure of well-being than income. Another rule of thumb for measuring absolute poverty is per capita income of US\$1 per day. By this criterion 1.2 billion people live below the poverty line.

Until the 1970s most poverty measures simply counted the poor as a proportion of the population to derive the headcount ratio. However, this is an unsatisfactory measure of poverty for two reasons. First, it

says nothing about how far below the poverty line the income of average poor person is—the poverty gap. The headcount ratio and the poverty gap can easily move in opposite directions. A study for Bangladesh showed that the proportion of population living below the poverty line had declined, yet the remaining poor were, on an average, poorer, implying that the poverty gap had increased. Second, an increase in the income of the poorest of the poor is so important that poverty is said to decline, even if it takes place through a transfer of income from the moderately poor to the poorest (Lipton and van der Gaag 1993). Thus, while the overall number of poor does not decline, the current consumption of the poorest may improve.

Including Vulnerability

Recent attempts at measurement of poverty have therefore recognized the importance of including vulnerability factors. The Human Development Index developed by the United Nations Development Program (UNDP) has been very careful to look at all the factors that contribute to or reduce vulnerability of communities and countries. Emphasizing the distinction between poverty and vulnerability, Chambers argued, “vulnerability...is not the same as poverty. It means not lack of want, but defenselessness and an inability to cope with risks, shocks and stress” (Chambers 1989 cited in Winchester 1992). He cautioned that

failure to distinguish vulnerability from poverty has bad effects. It blurs distinction and sustains stereotypes of the amorphous and undifferentiated mass of the poor. Poverty is often defined by professionals for convenience of counting, in terms of flows of income or consumption. Anti-poverty programs are then designed to raise incomes or consumption and progress is assessed by measures of these flows. Indicators of poverty are then easily taken as indicators of other dimensions of deprivation, including vulnerability. But vulnerability, more than poverty, is linked with net assets. Poverty in the sense of low income, can be reduced

by borrowing or investing: but such debt makes households more vulnerable. Poor people with a horror of debt appear more aware than professionals of the tradeoffs between poverty and vulnerability—to make more secure—are not for one, the same as programs and policies to reduce poverty—to raise incomes” (Chambers 1989 cited in Winchester 1992).

Seigel and Alwang (1999) have developed an asset-based approach to vulnerability as suggested by Chambers above. This study distinguishes between poverty and vulnerability. Poverty tends to be an *ex post* state of being. That is, a household is poor if and only if its consumption falls below a level deemed necessary for a minimum level of well-being. A household may move in and out of poverty, but at any point in time, it is classified as poor or not poor. Vulnerability is both an *ex ante* and an *ex post* state associated with the probability of falling into a state of destitution. A vulnerable household may have a level of welfare at a point in time that exceeds the minimum level, but under a different state of nature this household will fall below this level (p. 5).

The asset-based approach to vulnerability uses a broad definition of assets covering household-owned assets, community and extra-community assets. Household assets are the stock of wealth used to generate well-being. Households pursue strategies in which their assets interact with community and extra-community assets, both at tangible and intangible levels, to enlarge their risk pool and reduce their vulnerability. The inability of vulnerable households to accumulate assets begins a vicious cycle of inefficient risk management strategy, low return, low consumption, and low saving and investment, and perpetuates their vulnerability.

Vulnerability is a broader and more dynamic concept that includes not only the poor but also those households above the poverty line who risk falling below the poverty line following major shocks. Vulnerability therefore embodies both risk and capacity of households to respond to shocks. The household's command over assets and resources is the most important set of factors influencing vulnerability. Other factors

that induce vulnerability are nature and size of shocks, timing and frequency of shocks, and multiplier effects of shocks. Losses that households suffer due to these shocks represent another set of factors. These losses are experienced through deaths, disability and illness, and destruction of assets that include house, crops, cattle, and land.

An important distinction could be made here between wealth destruction and destruction of income opportunities/livelihood, as later directly contributes to vulnerability of a household. Risk strategies available to households for adjusting to these shocks are a final set of factors influencing vulnerability (Winchester 1992). We shall deal with these risk strategies employed by households in greater detail in the part III and IV of the chapter.

A Narrative of Vulnerability

Winchester illustrated the concept of vulnerability by comparing the impact of tropical cyclone in coastal Andhra Pradesh (India) on a wealthy and poor family (cited in Blaikie and others 1994). The wealthy household has six members with a brick house, six draught cattle, and 1.2 ha (3 acres) of prime paddy land. The (male) head of household owns a small grain business for which he runs a truck. The poor family has a thatch and pole house, one draught ox and a calf, 0.2 ha (half an acre) of poor unirrigated land, and sharecropping rights for another 0.1 ha (quarter acre). The family consists of husband and wife, both of whom have to work as agricultural laborers for part of the year, and two children aged 5 and 2. The cyclone strikes, but the wealthy farmer has received warning on his radio and leaves the area with his valuables and family in the truck. The storm surge partly destroys his house, and the roof is taken off by the wind. Three cattle are drowned and his fields are flooded with their crops destroyed. In the poor family the youngest child is drowned, and they lose their house completely. Both animals also drown, and their fields are flooded and the crops ruined.

The wealthy family return and use their savings from agriculture and trade to rebuild the house within a week (cost Rs. 6,000). They replace the cattle and are able

to plough and replant their fields after the flood has receded. The poor family, although having lost less in monetary and resource terms, cannot find savings to replace their house (cost Rs. 100). They have to borrow money for essential shelter from a private money-lender at exorbitant rates of interest. They cannot afford to replace the cattle but eventually manage to buy a calf. In the meantime they have to hire bullocks for ploughing their field, which they do too late, since many others are in the same position and draught animals are in short supply. As a result, the family suffers a hungry period eight months after the cyclone.

This anecdote illustrates how access to resources varies among households, and the significance such differences in access have for potential loss and rate of recovery. Those with better access to information, cash, rights to the means of production, tools, and equipment, and the social networks to mobilize resources from outside the households are less vulnerable to hazards, and may be in a position to avoid disaster. Their losses are frequently greater in absolute terms but less in relative terms, and they are generally able to recover more quickly (Blaikie and others 1994, p. 47).

Factors Contributing to Vulnerability

A number of studies dealing with vulnerability to natural disasters have looked at individual, community and extra-community factors contributing to vulnerability of the poor. Aysan (1993) has cited the critical elements of vulnerability to natural disasters as follows:

- * Lack of access to resources (material/economic vulnerability)
- * Disintegration of social patterns (social vulnerability)
- * Degradation of environment and inability to protect it (ecological vulnerability)
- * Lack of strong national and local institutional structures (organizational vulnerability)
- * Lack of access to information and knowledge (educational vulnerability)
- * Lack of public awareness (attitudinal and motivational vulnerability)
- * Limited access to political power and representation (political vulnerability)

- * Certain beliefs and customs (cultural vulnerability)
- * Weak buildings or weak individuals (physical vulnerability).

These forms of vulnerability, characteristic of poor households, arise from the people's inability to protect their livelihood and their relationship with state or other social and political structures on which the people make claims for protection. The impact of a hazard on a person or community depends predominantly on the protection they receive through their own income levels and social and political institutions. So even a small shock or event may affect a highly vulnerable group in a very adverse way, while a low-vulnerability group is little affected by a very strong shock. Terry Cannon (1993) has described these components and determinants of vulnerability in table 3.

Modeling Vulnerability

One of the most important theoretical models of the asset-based approach to vulnerability has been provided by the concept of "entitlement" enunciated in *Poverty and Famines* (Sen 1981). Sen developed the "entitlement" approach in the context of famine, the most life-threatening situation for the poor. An individual's "entitlement set," which helps an individual to establish command over food, emanates from all

the endowments (assets) at her or his command. A loss of endowments leads to an "entitlement failure" resulting in starvation. The conceptual framework of the "entitlement set" is especially insightful since Sen argued that the entitlement failure need not arise from crop failure. An asymmetry between production and distribution of food, resulting from such seemingly remote factors as an increase in purchasing power in other regions or sectors of the economy, could also change the distribution of entitlements, thus creating a famine. Sen's work therefore focuses on "exchange" or "terms of trade relationship," which made some people and some communities more vulnerable than others. In his view vulnerability to famine is a direct function of relative poverty, and relative poverty is a direct function of a household's ownership of tangible "endowments" (assets) of land, labor, and animals and *the rate at which it can exchange these for food*. Sen supported his arguments with the historical evidence from the Great Bengal famine of 1943, the Bangladesh famine of 1974, and famines in Ethiopia and the Sahel countries in the early 1970s (Ravallion 1997, Winchester 1992).

Jeremy Swift (1989), who drew on Sen's work for providing a recent model of vulnerability, argued that the "entitlement" analysis did not explain a number of problems associated with differential vulnerability within some communities and, on a smaller scale, among households or individuals in the same house-

Table 3 Components of vulnerability

<i>Type of Vulnerability</i>	<i>Components</i>	<i>Determinants</i>
Livelihood vulnerability	Income opportunities Livelihood type Entry qualifications Assets and savings Health Status	Class position Gender Ethnicity Age Action of state
Self-protection	Building quality Hazard protection Location of home/work	Socioeconomic: as above plus technical ability or availability Hazard-specific: return period, intensity, magnitude
Social protection	As above plus Building regulations Technical interventions	As above plus Level of scientific knowledge Level (and characteristics) of technical practice Type of science and engineering used by state and dominant groups

Source: Terry Cannon 1993.