Briefing Paper

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AFTERSHOCKS: NATURAL DISASTER RISK AND ECONOMIC DEVELOPMENT POLICY

When and where should the 'dismal science' of economics give more attention to natural disasters? It is too soon to try to draw longer term lessons from the most recent, extreme and high profile events. So this briefing paper offers some provisional answers, drawing on the results of investigations at ODI on the economic and financial consequences of natural disasters in eight developing countries and droughts in Sub-Saharan Africa. First, an effort is required to better understand how disasters impact on national economies and financial systems. Second, that understanding should inform efforts towards 'mainstreaming', ensuring that the management of disaster risks is integrated into public and private development strategies and investment planning.*

For the moment the high and rising cost of natural disasters is not in doubt because of two of the most extreme natural events that are likely to occur in perhaps 50 years: the 9.0 Richter Scale earthquake that unleashed the Indian Ocean Tsunami with a global impact, killing over 250,000 people, and then Scale 5 Hurricane Katrina, with losses put at around US$200 billion. Then the October 2005 South Asian Earthquake centred on Kashmir killed tens of thousands and made over 3 million homeless. Meanwhile poor harvests and pests threaten famine once more in the Sahel and Southern Africa. All these events reconfirm a relatively clear picture of disaster impacts: the human suffering, the people affected, and financial cost continue to rise precipitously. From the 1950s to the 1990s, the reported global cost of 'natural' disasters increased 15-fold according to insurers. In 1995, the year of the Kobe earthquake, record losses of US$178 billion were equivalent of 0.7 percent of global gross domestic product. For an affected country the costs can be beyond the domestic revenue raising and commercial borrowing capacity of government: for example after Hurricane Mitch in 1998 in Honduras with a GNP of $850 per capita government faced reconstruction costs equivalent to $1250 per capita.

Mainstreaming: The escalating losses and associated increases in expenditure on post-disaster reconstruction have triggered a growing world-wide awareness of the potential threat natural hazards pose to both human life and development goals and objectives, precipitating interest in *'mainstreaming'* risk. Development agencies such as the Inter American Development Bank, UNDP and the World Bank are highlighting the importance of mainstreaming, and some (e.g. Asian Development Bank and UK's Department for International Development (DFID)) have gone further, approving new disaster strategies committing themselves formally to mainstreaming. Developing countries too, are beginning to move hazard risk management up the policy agenda and to explore ways of integrating risk factors into development policy. But there is a long way to go before development policy and the economic analysis that underpins it are genuinely sensitised to natural disaster risks.

Is there an adequate understanding of disasters and information on risks to underpin efforts at mainstreaming? Does the mainstreaming of disaster risk offer a real practical solution? Precisely what relevance do disasters have for sustainable economic development and achievement of millennium development goals (MDG) on poverty reduction? How will mainstreaming improve management of risks? Will it save lives? Will it reduce physical and financial losses? Can it improve livelihoods and support growth and poverty reduction? And what, exactly, would mainstreaming entail in practice? This briefing paper considers these questions from a macroeconomic or economy-wide perspective, exploring the impacts that disasters can have on both short and longer-term development and options for reducing impacts. The implications for private sector risk management investment strategies and how to address exposure, especially of poorer people to disasters risk at a personal, community level need to be addressed too.

Disasters are a multi-disciplinary issue, and so the starting point is to work with a commonly understood and agreed set of terms (Box 1).

Box 1: The Terminology of Natural Disasters

- A natural hazard is a geophysical, atmospheric, or hydrological event that has potential for causing harm or loss.
- Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences.
- Vulnerability is the potential to suffer harm or loss, expressed in terms of sensitivity and resilience or of the magnitude of the consequences of the potential event.
- A natural disaster is the occurrence of an extreme or infrequent hazard that affects vulnerable communities or geographic areas, causing substantial damage, disruption, and perhaps casualties and leaving the affected communities unable to function normally.

Do disasters inhibit development?

Major natural disasters can and do have severe negative short-run economic impacts which need to be distinguished from physical damage. Disasters also appear to have negative longer-term consequences for economic growth, development and poverty reduction, as in Malawi affected by extreme rainfall variability since 1991/2. However, some economists question whether natural disasters necessarily are adverse economic shocks and even argue the opposite – that disasters can have a positive economic impact, because of a post-impact boom in construction and upgraded infrastructure and technology. Such a debate suggests context specific outcomes that depend on the sequencing of impacts, the type of hazard experienced, the influences underlying vulnerability to a particular hazard, and other concurrent influences on economic performance.

From an economic perspective, a disaster is a *'shock'* that results in a combination of *losses* in the human, social and physical capital stock and a *reduction* in economic activity such as income generation, investment, production, consumption, and employment. There are substantial distributional implications, because the poor are likely to be worst affected. There may also be severe effects on financial flows such as the revenue and expenditure of public and private bodies.

Disaster experts commonly distinguish *direct* impacts, including physical damage (stock of capital) and some of the reduction in output as 'losses', such as crops destroyed and reduced fish catch, from *indirect* impacts, including most changes in the 'flows' of economic activity. However, many also commonly and confusingly add together damage and the indirect, immediate reduction in activity to estimate the total cost of a disaster. The most widely quoted 'cost' for Indonesia of the December 2004 Tsunami has been US$4.45 billion, which includes damage of US$2.9 billion and the *initial* reduction in economic activity estimated at $1.53 billion. However as disaster sceptics point out the net reduction in activity should take account of responses such as crop replanting and rebuilding. In Thailand the initial assessment of the tsunami's impact indicated a net increase in economic activity in the following months.

Types of natural disaster

'Natural disasters' is a composite term covering distinct categories of physical hazard that are likely to have different human and economic impacts. There are two broad categories of hazard – hydro-meteorological (floods, droughts, storms) and geophysical (earthquakes, volcanic eruptions and related tsunamis) – which are associated with distinct patterns and forms of economic vulnerability. This is in part because of differences in their frequency of occurrence and predictability.

The recognisably recurrent nature of *hydro-meteorological hazards*, associated with climatic variability, encourages adaptation in economic and social activity such as that shaping the evolution of almost all rural economies. One example is the distinctive crops and cropping patterns in flood or drought prone areas of Bangladesh, where villages are also artificially elevated on the unprotected Ganges-Brahmaputra floodplains. Climatological and hydrological records allow formal assignment of risk in investment and production decisions. If probabilities are properly calibrated this can underpin risk reduction measures, e.g. construction of storm resistant infrastructure or adoption of decision rules for water use that are sensitive to extreme rainfall variability. There is still considerable scope, however, for improvement as demonstrated by costly failures. An instructive example is the repeated hurricane-related damage to internationally funded but inadequately protected port facilities and roads in the Caribbean island of Dominica, beginning with Hurricane David in 1979 up to Hurricane Lenny in 1999, so that repair and retrofitting have absorbed a high proportion of public investment.[1] The suffering and wider economic disruption caused by poor management of southern African hydro-electric systems affected by extremely low rainfall (Kariba 1991–2) or very high rainfall (Caboro Baso in 1999–2000) have highlighted the need for improved science-based economic decision-making. Extremes of rainfall are usually slow to impact, leading to the distinction made in disaster management, because of the greater opportunities for preparedness with rapid onset events. The potential effects of climate change are now recognised as introducing an additional source of uncertainty into the very data that underpin risk sensitive decisions.

Geophysical hazards are mostly low-probability or seemingly random events (location specific annual risks of under 1 in 100 or considerably less). These risks are often almost wholly discounted unless there has been an extreme event that is recent in the public and political consciousness. Over 80% of the major volcanic eruptions in the 20th Century – from the Mont Pelé of 1902 that killed almost everyone in Martinique's capital, St Pierre, to Montserrat, ongoing since 1995 and forcing 90% of the island's population to relocate – had no precedent in historical time. [2]Yet the potential consequences need to be recognised in highly exposed areas because they can cause enormous loss of life, and massive physical damage and disruption to public infrastructure and private assets. As economies grow and mega-cities emerge, swelling numbers of people and expanding levels of capital across the globe are also at risk from earthquakes as demonstrated by the recent Marmara disasters in Turkey and Kobe in Japan. The Indian Ocean Tsunami showed that coastal locations, which have a disproportionate share of human urban activity, are vulnerable to the tsunamis that seismic and volcanic activity may unleash.

The *geo-extent* or localisation of the hazard is another purely physical determinant of an economy's relative vulnerability. A micro island economy such as Montserrat (area: 102 km^2; pre-eruption population 10,000) can be overwhelmed by an event of a scale similar to the Rabaul eruption of 1994 that is of only provincial significance in Papua New Guinea (700 islands; area: 463,000 km^2; population 4.2 million). Dominica (area: 751 km^2; population 75,000) has suffered repeated severe short-term shocks, from tropical storms that are almost annual events in the Philippines archipelago (7200 islands; area: 298,000 km^2; population 76 million), scarcely disrupting the national economy.

Economic influences on vulnerability

The vulnerability of an economy to natural hazards is determined by a complex, dynamic set of influences relating to factors such as economic structure, stage of development, prevailing economic conditions and the policy environment. Vulnerability can change quickly, in a decade or less in countries experiencing rapid growth or more obviously socio-economic decline. Where economic vulnerability to natural hazards has been reduced, this improvement can be linked to appropriate investments in disaster mitigation and favourable developments in the structure of the economy and in the wider economic environment (Box 2). Increasing sensitivity, such as that of southern Africa to climatic variability (encompassing not just drought but also erratic rainfall, extremely high rainfall, and related floods), also reflects a complex mix of factors including the HIV/AIDS pandemic and a deteriorating policy environment.[4]

Worse before it gets better?

The relationship between the *level of development* of an economy and the impact of a disaster is particularly complex. Influences include the physical infrastructure, the degree of sectoral and geographical integration, economic specialisation, the coverage and robustness of the financial sector, government revenue-raising capabilities and the openness of the economy. This complexity in part reflects the fact that development itself is a non-linear process and that there are many different paths of development.

Least-developed economies are widely perceived as most vulnerable, experiencing the greatest *direct* losses relative to a country's wealth. However, where a high proportion of impacts are on the assets and livelihoods of poor, self-provisioning households these losses were likely to be inadequately recorded. These effects are now more visible because of media coverage and the publicity surrounding humanitarian response.

In fact, economic development can *increase* vulnerability at both micro and macro-economic levels. Poor and socially disadvantaged groups can become more vulnerable: socio-economic change may lead, for instance, to the breakdown of familial support, a decline in traditional coping mechanisms and movements of people to occupy and seek livelihoods in more hazard-prone places (for example those at risk to landslides on Caribbean islands or storm surges in the Bay of Bengal). During early, rapid industrialisation and urbanisation, building and land use codes are mostly poorly enforced on the private sector and much public infrastructure is not built to disaster-resistant standards. At a macro-level, many middle income economies at an intermediate level of development are typically more integrated, both sectorally and geographically. This can increase the *indirect* macro-economic multiplier effects of adverse performance in a particular sector or regional economy. And, because of related lags in these effects feeding through the economy, *recovery* may be slower. Intermediate economies typically have more developed economy-wide financial systems for the flow of funds, including small scale private savings and transfers. As the drought in Zimbabwe in 1992–3 showed, the impact of a disaster is then more widely diffused through the flow of private funds from non-affected to affected areas. Meanwhile, the government of a middle income country is likely to meet a larger share of the costs of the relief and rehabilitation itself, rather than relying almost entirely on international assistance (e.g. the Maldives in 2005).

At higher levels of development, the financial costs of capital losses are massive (as illustrated by Kobe and Hurricane Katrina), but the economic impacts of disasters are proportionately less. This partly reflects increased investment in mitigation and preparedness measures, improved environmental management, greater access to financial resources and lower associated opportunity costs and a reduction in the scale of absolute poverty and thus of household vulnerability. A greater share of private sector economic assets is also likely to be adequately insured against disaster and the burden diffused by global reinsurance. The combined effects of changes in sensitivity (direct and indirect impacts) and the time to recover (resilience) suggest, as illustrated in Figure 1, a Kuznets' Curve or inverted U relationship between economic development and disaster vulnerability.

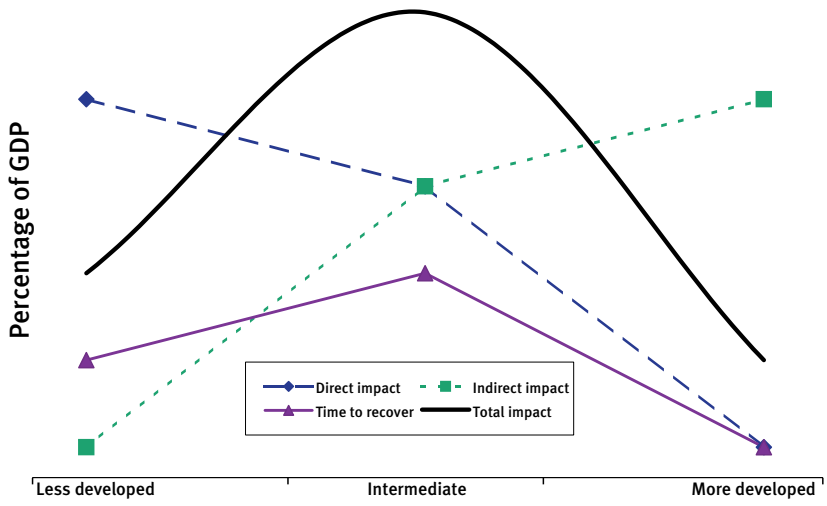
It is sometimes argued that the eventual *net* macro-economic impact of some disasters may even be positive. A major earthquake or devastating hurricane typically triggers a construction-led boom. There are significant opportunities for upgrading of infrastructure and technology, spawning growth through what Schumpeter called a process of creative destruction. In contrast, drought or erratic rainfall may cause little direct physical damage, but sharply reduced output and force affected households to dispose of assets to sustain consumption. So a drought shock increases poverty both through direct impacts on households and indirectly through reduced longer-term economic growth. The likely unequal distribution of losses and gains also have to be included in the challenging economic calculation.

Measurement difficulties complicate estimation of disaster impacts. Sensitivity to a disaster shock at a macroeconomic or sectoral level is reflected in the deviation of economic aggregates from expected trends. But an economy is also sensitive to many other influences, making it potentially difficult to isolate the specific impacts of a disaster. So assessment of the economic impacts of disasters typically concentrates on the most easily measured direct losses – the financial costs of visible physical damage. This focus reflects a drive to meet the short-term humanitarian needs of affected people in the aftermath of a disaster. There are also pressures to rapidly determine replacement investment requirements and the extent of insured losses. Often little information is available on indirect, so-called 'secondary' *flow* impacts of a disaster shock spreading through the economy, affecting, for example, output and consumption of goods and services, the balance of payments, the government budget, and, ultimately, economic growth, income distribution, and the incidence of poverty. The Bangladesh floods of 1998 show how serious can be this weakness in assessment (Box 2).

Economic and financial management of disasters

Major disasters disrupt short-term financial and economic management, creating considerable confusion and uncertainty, simultaneously necessitating perhaps substantial realignment in spending plans, adjustments in economic targets and shifts in economic policy. The budget may be revised several times, as the year unfolds. Against a background of increased uncertainty, decisions are required not only on the nature and scale of direct assistance but also on the most appropriate form of fiscal and monetary responses. Such decisions inevitably involve trade-offs, of which the relative benefits and costs have to be calibrated. Should, for instance, government expand overall credit availability to support productive recovery and refinance micro-credit or tighten monetary growth to stem inflationary pressures of post disaster food shortage and construction boom? Appropriate responses to such questions, which depend on prevailing circumstances, require reliable and up-to-date information on

Figure 1: a Kuznets' Curve or inverted U relationship between economic development and disaster vulnerability.



Box 2: Bangladesh : the dynamics of vulnerability

The Bangladesh economy's sensitivity to extreme monsoon flooding has declined significantly (Figure 2). This has been partly due to structural change in agriculture, with a rapid expansion of much lower-risk dry season irrigated rice, and partly to internal market integration and increased private food imports during disaster years. The 1998 floods were hydrologically a fifty year event. However, cereal production actually rose 5.6% in the following year compared with a government pre-flood forecast of 2.4% growth. Initial post-flood assessments, anticipating a 10–11% decline in annual output, underestimated the country's greatly enhanced capacity to increase dry season production when required and the economic impact of the disaster.

Other influences increasing resilience are the spread of formal (including micro) credit and remittances from internal and international migrants. International remittance flows have also increased post-disaster – for instance, rising by 18% following the 1998 floods – providing those affected with a new form of coping mechanism. Changes in the composition of productive activity have been another factor in Bangladesh's increased resilience to flooding: export-oriented garment manufacturing has expanded and to date has been relatively flood-proof. There has also been relative financial stability in recent years in contrast to hyperinflation in the famine haunted mid-1970s. As a reminder of the fragility of this hard won greater resilience, the hydrologically less extreme 2000 and 2004 floods demonstrated how massive poverty-related vulnerability persists that now requires more directed measures for consumption smoothing and livelihoods protection.[5]

many aspects of current and expected economic performance, as well as on the more direct costs of a disaster. Uncertainties can lead to highly cautious short-term decisions, particularly where a country is trying to satisfy aid conditionalities such as an IMF stabilisation agreement on management of the economy, and can fail to address the recessionary effect of a disaster shock.

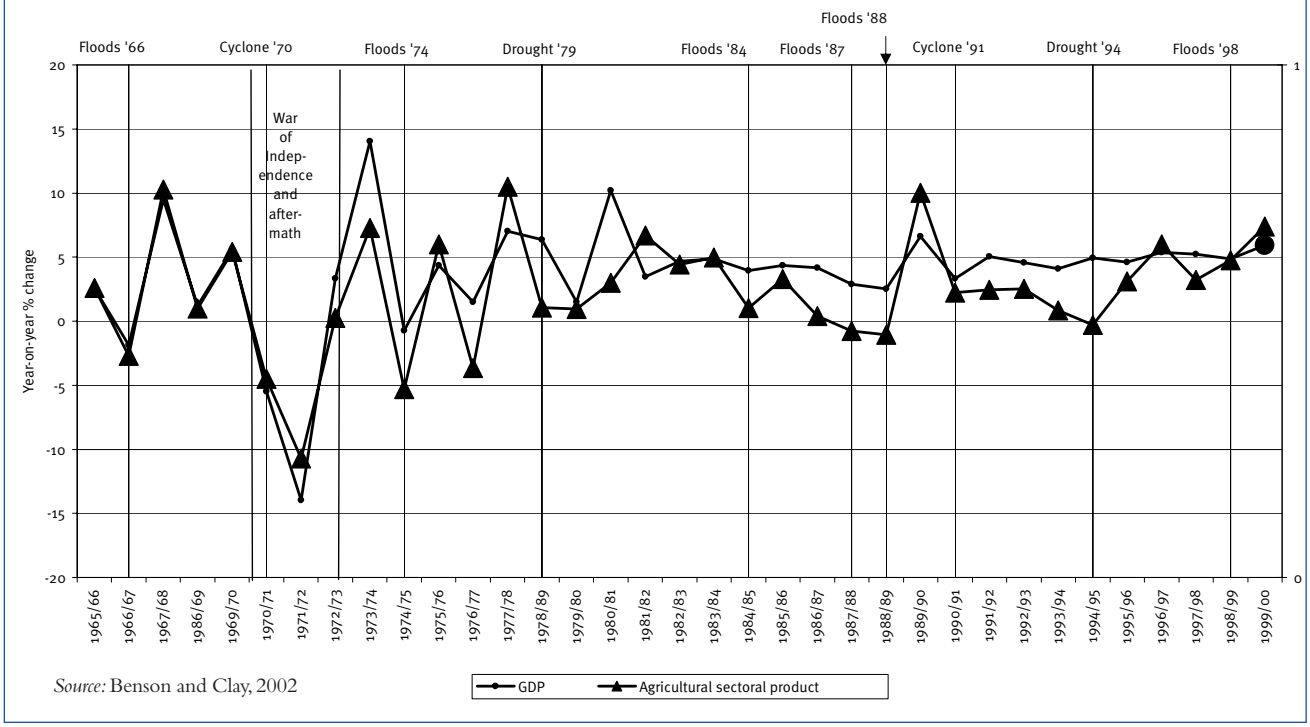
Reallocations: Disasters and related relief and rehabilitation requirements can disrupt the budgetary process. They typically impose significant pressure on public resources, with potentially adverse impacts on planned expenditure and wider long-term implications for development. Broad fiscal aggregates such as total recurrent and capital expenditure, revenue, and the budget deficit often stay close to planned levels, suggesting little discernible disaster impact. However, this apparent insensitivity is misleading, reflecting the successful efforts of governments to remain within already established budgetary envelopes. Instead, disasters often result in widespread, if largely non-transparent, immediate and inter-year reallocations of resources. The brunt of reallocations appear to fall primarily on capital expenditure. Within the capital budget, cuts are often made across the board, without protecting priority projects and programmes. There may also be considerable in-kind reallocation of human and physical resources (staff and equipment) within recurrent expenditure. Budgetary management difficulties can extend beyond the disaster year if, for instance, there is continuing uncertainty about the impact of the disaster on economic productivity and tax revenues.

Most disasters have little impact on trends in total aid flows. Many donors appear to respond to disaster crises by reallocating funds and bringing forward commitments within existing multi-year country programmes rather than by providing additional resources. If commitments jump in response to a disaster, a compensating reduction is likely in subsequent years. The 'ratchet' effect observable in overall humanitarian aid flows, which have nearly doubled in recent years as a proportion of total overseas development assistance (ODA), is largely attributable to funding for high-profile political and conflict-related emergencies.

The benefits of mainstreaming

Mainstreaming implies ensuring that proper consideration is given to potential hazard risks in planning the course of a country's development, in allocating financial resources and

Figure 2: Bangladesh - real annual fluctuations in GDP and agricultural sector



Source: Benson and Clay, 2002

setting targets, hopefully contributing to the pursuit of viable and sustainable goals. There would be more explicit decision making on acceptable risk levels and greater transparency over both the financial and human opportunity costs of investing in mitigation.

Reducing poverty: Hazard vulnerability and poverty are linked and mutually reinforcing. Poor and socially disadvantaged groups are typically more vulnerable to and worst affected by disasters. Factors such as housing location (for example on unprotected floodplains and steep slopes), occupation (such as fishermen) and lack of access to credit and insurance contribute to their heightened vulnerability. Disasters as a source of transient hardship and distress contribute in turn to persistent poverty. This is attributable not only to damage, temporary loss of income-generating opportunities and increased indebtedness, but also to the types of decisions which poorer households may make as risk minimisers rather than income maximisers. For example they may choose to forego the potential benefits of higher crop yields in favour of lower risk. They may either be forced or choose to reduce consumption in order to sustain their livelihoods beyond a crisis, but with longer term costs in human capital. Quantified evidence is rare but, for example, in Zimbabwe 1980s drought-related loss of stature in preschool children has been associated with a loss in life-time earnings of 7–12%.[6] Perhaps most at risk are those populations – such as agro-pastoralist communities in the Sahel and the Horn of Africa – which depend on livelihoods that are marginal at the best of times, and which are particularly vulnerable to income shocks and the market price fluctuations associated with production failure.

Linkages between poverty and vulnerability to natural hazards are already increasingly recognised, but less effort has been made to date to tackle hazard-related vulnerability as an integral part of broader poverty reduction initiatives. Since the late 1990s, preparation of a poverty reduction strategy paper (PRSP) or similar policy document has become a major focus of government-donor development dialogue. Exposure to risk and income shocks, including those caused by natural hazards, is identified as one of the four basic dimensions of poverty in the PRSP handbook. However, practical ways are needed to ensure that disaster risk management is effectively incorporated in the PRSP framework, for example there should be provision for protecting the most vulnerable groups and areas in the organisation of safety nets for the chronically poor.

Box 3: Prerequisites for efficient reallocation of public resources

Post-disaster reallocation of budgetary resources is often unavoidable in the event of medium and large-scale disasters. However, any reallocations should occur through a formal process, in the context of a careful strategic review of public finances. Four elements are required to ensure that this process is rational, clearly relating changes with outcomes, and cost effective:

- A clearly defined and applied policy framework, ensuring that reallocations can be carefully planned to minimise disruption to and delays in the attainment of key policies and goals such as poverty reduction. This framework should be in place prior to the disaster, facilitating a rapid response.
- An already established system of prioritisation for investment projects, ideally allowing any reallocations to entail the movement of resources away from lower-priority projects.
- Up-to-date and reliable information on the current demand for and availability of resources, including timely information on the financial status of line agencies and other public bodies, the impact of the disaster on planned spending and revenue projections (including flows of external assistance) and the new expenditure requirements generated by the disaster. Information on projected monthly, as well as total annual, flows of revenue and expenditure is critical as flows of revenue may be slow.
- A considered assessment of the broader macroeconomic impact of the event. In practice this can be particularly difficult to obtain and estimates may be revised a number of times as more reliable damage data becomes available, any shifts in the resilience of the economy since the last disaster become apparent and the extent of private capacity to recover becomes clearer. This uncertainty can create considerable difficulties for governments in deciding how to respond to disasters and plan appropriate, cost-effective responses.

Protecting physical structures: Governments and aid agencies regularly ignore potential hazard related risks in the design of infrastructure. Hazard related risks should be explicitly recognised in both the economic and social criteria by which investments are appraised and evaluated. Mitigation opportunities exist in the retrofitting of existing structures and in the design and siting of new roads, power generation and supply, telecommunications, water and sewage infrastructure, as well as health facilities and schools.

Improving public financial management: The risk of potential disasters should be a factor in the allocation of public resources and could trigger related improvements in financial planning. *Disaster contingency plans* are more important now in the light of declining aid for middle income countries and increasing losses. *Annual calamity funds* should be established and pre-designated in countries where disaster-related expenditure occurs almost every year (e.g. localised flooding in Malawi and landslides on Caribbean islands). This would at least reduce the practice of regularly reallocating resources and strengthen fiscal discipline. *Financial risk transfer instruments* should be explored for well-defined hazards in the middle-risk range with a average 10 year return period, such as regional drought in Southern Africa, extreme riverine flooding in Bangladesh or a small island suffering a direct hit from a tropical storm. These might be the answer too for low probability, catastrophic events, such as major earthquakes. They include both conventional insurance and reinsurance and newer instruments such as weather derivatives (pay-out triggered, for example, by predetermined abnormal rainfall levels) and catastrophe bonds linked solely to a most extreme event.[7] A combination of financing mechanisms for different layers of loss coverage should be tried – first, the use of calamity funds for low level losses, then a formal strategic process of reallocations for the next tier (Box 3), and then donor funding contingency facilities for the next level, and some form of internationally guaranteed insurance for the most extreme events.

Economics and disasters: the way forward

A better economic understanding of the vulnerability to specific hazards faced by developing countries is required, including

potential short and longer term impacts and knock-on or multiplier effects of a shock. *Country risk assessments* should be undertaken from a broad macroeconomic standpoint to understand the factors underlying sensitivity and resilience, including the potentially complex and dynamic interlinkages within the economy. Vulnerability implications of particular development policies – for instance, the promotion of varieties of maize highly sensitive to extreme rainfall (Malawi) or a new industry (garments for export in Bangladesh) – should be assessed. Special regard needs to be given to ways of minimising adverse impacts of disasters on priority policy areas, such as poverty reduction.

Regular re-assessment of hazard risk is also required to ensure that risk management strategies remain appropriate. Vulnerability can quickly change, particularly in countries experiencing rapid socio-economic change. These developments can also have environmental effects, again altering the nature of vulnerability. For large, climatically and physically diverse countries such as China, India or Nigeria, where nation-wide disasters are unlikely, regional analysis is more appropriate.

Improved impact assessment would facilitate better management of the macroeconomic and public financial consequences of disasters and help inform future risk reduction initiatives. The national or economy-wide disaster impacts, including total and broad distribution of financial consequences, should be reassessed as a matter of course 12 to 18 months after a major event such as the Indian Ocean Tsunami.

Better documentation of expenditure on disaster responses and measures to reduce risk helps to inform governments and the international community about appropriate spending levels on mitigation and preparedness. Total expenditure on post-disaster relief and rehabilitation is rarely reported. Reallocations, in particular, are poorly documented both by affected governments and aid agencies. This information deficit seems at last to have been recognised in the on-going official and civil society monitoring of the response to the Indian Ocean Tsunami.

Knowledge as a public good: Scientific understanding of the nature of hazards has to be continuously extended and information on hazards and related risks needs to be generated and disseminated in a user-friendly form. In reality, the quality of information is variable, both among countries and different types of hazard. These limitations in part reflect the fact that scientific research, hazard forecasting and related dissemination activities are public goods – that is, they are non-rival in consumption (users do not reduce the supply available to others) and non-excludable – and so markets fail to provide them. Knowledge is most likely to be generated and monitoring sustained where a hazard is recognised as a global issue by the international community, as is the case for climatic variability and extreme weather events such as tropical cyclones. The potential effects of climate change are now recognised as introducing an additional source of uncertainty into the information that underpins risk sensitive decisions. But positively, concerns about global climatic change are helping ensure interest in climatic processes and funding of related research directly relevant to risk assessment, for example on rising sea levels in the Caribbean Basin. The adequacy of information on geophysical hazards has been less assured because the risks are regional or country specific. Limited historical records pose a further constraint, again particularly for geophysical hazards with a longer return period. But recent events may at last be changing attitudes.

The risk society is the new modernity (Ulrich Beck). So with near instant global reporting of major disasters and their relentlessly mounting costs, governments, business, non-profit civil society and international agencies are beginning to commit themselves in principle to mainstreaming disaster risk. However, the practicalities have yet to be worked out. In many organisations the motivation to do this is still confined to a few, making it difficult to overcome institutional inertia. Within governments, there are further constraints: short terms in office, the other competing demands on limited public resources and political pressures for governments to secure concrete, visible achievements. The multiplicity of risks ensures that most commercial organisations also have short time horizons. A disaster raises awareness of the importance of risk reduction but then interest rapidly wanes, overtaken by fresh, now more pressing concerns. To prevent the disasters of 2004-2005 being just another such transient episode, considerable effort will be required to sustain awareness and understanding of the potential human, financial and developmental costs posed by disasters.

Mainstreaming implies considered and proportionate responses to natural hazard risks. Sceptics point to the problem of moral hazard, that those individuals and enterprises most at risk may be less inclined to prevent damage or losses if they are insured. Similarly local authorities and national governments may be willing to overlook risks if others have accepted the contingent liability of bailing them out after a disaster. But these are arguments for context specific and consistent informed decision-making that reflect societal and international choices about levels of acceptable risk. Successful mainstreaming of disasters will require multi-party agreements and long-term national and international commitments with transparency and accountability for both funding and over the actions of those undertaking risk reduction.

Click here (or scroll down) for Web Resources/ Footnotes

★This Briefing Paper draws on Charlotte Benson and Edward J. Clay. 2004. Understanding the Economic and Financial Impacts of Natural Disasters. Disaster Risk Management Series No. 4. Washington, D.C.: World Bank. (ISBN: 0-8213-5685-2 SKU: 15685). Tom Crowards advised about Figure 1. DFID funded publication of this Briefing Paper but the views and opinions expressed are those of the authors alone.

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