Mainstreaming Disaster Risk Management, Some Possible Steps

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The evolution of disaster risk management

Societies generally began seeking to reduce disaster risk with structural measures--dykes, dams, levees, etc.—hundreds of years ago. The dykes that protect Hanoi from the Red River, for example, are four to five hundred years old. Because the structural measures would sometimes fail, however, disasters would sometimes occur and the authorities would quickly establish a committee or commission to respond to that disaster. As soon as the disaster was over, the dike would be repaired, the committee would be disbanded, and no more would be done about disasters until the next disaster occurred. We went on in this ad hoc fashion for many years--in many countries, in fact, until only about a dozen years ago.

As technology enabled us to monitor volcanic activity and predict eruptions, to map the paths of cyclones and predict landfall, and to monitor river flow and forecast floods, we were able to take some pre-emptive action--to conduct evacuations, for example--before the hazard struck. This was the start of well-organized responses, and led directly to the establishment of permanent national disaster management agencies to replace the short-lived ad hoc committees that had managed disasters previously. These agencies have many names--National Disaster Management Office in Cambodia, NDCC in the Philippines, BAKORNAS in Indonesia—but were established with a common purpose: to meet the immediate emergency needs of victims or potential victims of disasters.

The establishment of these agencies led to the strengthening of preparedness measures at the national level, including stockpiles, improvement of coordination mechanisms, improvement of communications, preparedness planning, formalized needs assessments, and so on.

National preparedness planning was soon followed by a major emphasis, particularly in the past several years, on strengthening community resilience--what is commonly called community based disaster management (CBDM). CBDM activities include organizing flood prone communities to plan how they will protect themselves against flood disasters.

Taken together, these various initiatives have had very substantial impact on the number of lives lost to disasters in Asia over the past dozen years. China, for example, lost 4,832 lives to floods between 1991 and 1994, but lost only 2,909 lives to floods between 1999 and 2002. Pakistan lost 1,910 lives to floods from 1991 to 1994, but only 286 lives were lost to floods from 1999 to 2002. Indeed, almost all Asian countries can be justifiably proud of their accomplishments during the past dozen years in preparing for and responding to disaster events.

However, statistics for the same 12-year period indicate that we have been much less successful in reducing our hazards. From 1991 to 1994, China experienced 15 disastrous floods, Thailand had 8 and Vietnam had 7. From 1999 to 2002, China had 29 disastrous floods, Thailand had 16 and Vietnam had 12. Also, economic and financial losses to disasters in Asia have increased dramatically during the past dozen years. Flood disasters alone are estimated to have cost slightly over $5 billion in damages in Asia during the past 12 years, about 63 percent of the world total and almost three times the damage caused by floods in the previous 12 years.

These statistics—fewer lives lost but more frequent disasters and much greater financial losses—are both encouraging and alarming. They indicate great progress in disaster response but also greatly increased exposure to disaster risk, and they have led leading disaster management practitioners to advocate, as a matter of highest national priority, that disaster risk management be integrated into our development efforts in order to reduce both hazards and vulnerability in our societies. Integrated disaster risk management advocates recognize that much of our exposure—that is, our vulnerability—to disasters derives from unplanned or poorly planned development activities and, as important, that many of these development activities have also actually increased hazards. Disaster

reduction must be mainstreamed into our development planning process in order to manage and reduce risks, thereby protecting our development gains and leading to sustainable economic and social development.

Integrated disaster risk management components

An integrated disaster risk management approach brings together all of the disaster mitigation and preparedness activities—from structural interventions that reduce hazards to CBDM that reduces vulnerability—and also introduces some new elements. I will not mention everything that must be included in integrated disaster risk management, but will try to touch on the main components, citing integrated flood disaster risk management as an example:

Policy and Organization are critical to successful implementation of integrated disaster risk management. National authorities must clearly state the objective—to reduce disaster risk throughout society by factoring it into all our development activities—and support efforts to achieve that objective by allocating appropriate resources and assigning responsibility throughout the system. Countries must also organize the flow of information amongst government agencies and between government and the people, so that each agency and individual has the information necessary to make informed choices about how and where to build, for example.

Climate Forecasts are a critical starting point for information flow. Great advances have been made recently in respect to forecasting hydro-meteorological events, particularly medium (up to one month) and long-term (one to three-month) forecasts. Various models have also been developed for modeling the impact of very long-term (25 to 75 years) climate change on particular areas.

Forecast Applications. Medium and long-term climate forecasts, if properly disseminated and in an appropriate format, can greatly help farmers reduce their losses during extreme climate events such as floods and droughts (and increase their yields during normal periods), and can also assist in water resource planning activities, health planning, fishing activities, etc. Very long-term climate change models must be considered in land use planning.

River Flow Monitoring. Our capacity to monitor river flow and predict river discharge is increasing all the time. China has recently installed three new river gauges on the upper reaches of the Mekong River, for example, that will help the Mekong River Commission better understand and forecast river discharge. Just in the past few months, Bangladesh has significantly increased its knowledge of river discharge on the Ganges and Brahmaputra rivers, enabling that government to predict floods many days earlier than previously.

Flood Mapping to help model where flood waters will actually flow, and to what depth, is an on-going and very expensive process. Recently, there have been efforts to involve communities in monitoring flood waters on a regular basis and in feeding that information back to the national authorities as a way of reducing costs and increasing participation in the flood mapping and modeling process.

Early Warning The best warning system is one that also warns of normal, which we almost never do. It is the system that is in place permanently, that provides useful information year in and year out, that is trusted and understood by the local community, and that also disseminates emergency early warning when required. In Indonesia last week, I was reminded that although they have flood warning systems on a number of rivers in Indonesia, only one--on the Brantas River—has successfully led to timely evacuation before a flood event. And the reason that the Brantas River Flood Warning System works is because the Brantas River system is used throughout the year to collect, analyze and disseminate information on the allocation of water for irrigation. Everyone knows it is there and they understand what the messages mean. It is a routine and trusted system, and that it is a useful thing to build upon for warning of riverine floods.

Watershed Management Forestry, water resource management, urbanization, housing, agriculture, aquaculture, etc. within a single watershed cannot be considered independently from each other, but must be integrated into an overall river basin plan. Japan has led the way in this regard, establishing a specific River Basin Commission for each river in the country, no matter how small.

Urban Planning and Zoning are not issues that have generally been considered in respect to flood disaster management in many countries of Asia, but these issues have been mentioned repeatedly in the presentations made by others today. I would just add that human settlements must be viewed not only from the perspective of their vulnerability, but also from the perspective of the hazards that they present or that they exacerbate.

Building Codes and Code Enforcement In most countries of Asia, building codes apply only to engineered structures, and not to individual homes, which I will mention in a moment. The codes that apply to engineered structures are often quite adequate, though sometimes they are not. In either case, codes have to be upgraded constantly as new information becomes available—particularly from modeling water runoff—and that is a major challenge. The greatest challenge, however, is in respect to enforcement of the building codes, particularly in those countries where corruption is endemic. Turkey, which is seismically very active, has begun taking a novel approach to address this problem of building code enforcement. Turkey has decided to outsource to private firms the responsibility for approving designs and inspecting construction practices. The private firms are insured, their employees are bonded, and the firm is financially responsible for any collapse of the structure within twenty years from the time of the construction. So the design and construction supervision firm has a vested interest to make sure that the building has been designed and constructed properly. This approach also provides an incentive—greater employment opportunities with private firms—for those engineering and architectural students who are presently choosing such courses as Modern Office Design over Seismic Design and Engineering due to their perception that the former offer greater employment prospects upon graduation

Housing Design and Finance Since individual houses are not usually covered under the building codes in Asia, it is necessary for us to find alternative ways to encourage and facilitate individual home builders to use disaster-resistant designs, materials and techniques in the construction of their homes. We need to publicize these, making people aware of what appropriate designs are. Probably, there also needs to be some incentive policies, some financial incentives that would assist people, particularly poor people or first-time home owners, to incorporate those features into their home. New families all over Asia find the way somehow to build their first homes. They may not build to the standard we wish, but they are building it to a standard acceptable to them. Prof. Arya, from Rookrie University in India, estimated that the difference between a building to a normal standard and a building to a seismically resistance standard is a difference of 4 to 8 percent in total cost. I am looking for a 4 to 8 percent solution, wherein we leave up to each family to arrange the first 100 percent but find a way of encouraging and enabling them to put in the additional 4 to 8 percent through some sort of reduced interest rate on their loan or some partial grant or partial reduction in their loan, depending on income level. A similar approach could be used to assist rural families in Cambodia raise their homes above flood level on concrete stilts.

Flood Proofing is an approach to reduce flood vulnerability that has been used in rural areas of Bangladesh and in the Mekong Delta of Vietnam. Flood proofing involves constructing earthen mounds to raise entire homesteads—the house, the vegetable garden, livestock pen, grain stores, latrine and water well--above flood level. The households (or small clusters of households) and their important assets are safe from floods as long as they plan properly.

Response preparedness planning is certainly a good part of integrated disaster risk management. Response planning, in fact, has been the focus of the disaster management community for the past dozen years, and has evolved from planning at the national level to community based disaster management, hospital disaster preparedness planning, the training of fire and rescue services, and so on. These activities, of course, must be continued and expanded.

Insurance shares disaster risk among the broader society, and makes great sense when risk has been reduced to some acceptable level; otherwise the premium is going to be so high that nobody

could pay it. But if we can do all of these other things I mentioned above, then the risk will be acceptable, the remaining risk can be shared amongst the broader population and everybody will be better off.

Mainstreaming disaster risk management into development planning

Mainstreaming disaster risk management into the development planning process essentially means looking critically at each activity we are planning not only from the perspective of reducing the disaster vulnerability of that activity, but also from the perspective of minimizing that activity's potential contribution to the hazard. For example:

Urban Settlements and Housing. We have allowed settlements to be constructed in polders, low-lying land reclaimed from lakes and riversides through the construction of levees. Much energy went into planning those levees to assure that those communities inside the polders will not be flooded, but little thought was given to the increased hazard those levees would cause to other communities through displacement of flood waters. China has now come to understand that, and is systematically dismantling polder communities along the Yangtze, a very expensive remedial action. Similarly, we routinely fail to recognize that building houses on the upper reaches of rivers and on steep slopes of valleys increases the rate of water runoff and, thus, **increases the hazard** of landslides and flash floods for the agricultural community or urban settlement down-river. There is tremendous pressure to provide adequate land for housing; the challenge is how to do this in a way that does not increase vulnerability and does not increase hazards. Japan has met this challenge by allowing construction in the upper reaches of a watershed, for example, but requiring the construction of water retention pits to offset the increased runoff. That is a good example of disaster risk management that leads to sustainable development.

Agriculture and Aquaculture programmes often take into account their vulnerability to floods, and measures to reduce flood vulnerability are often incorporated into development projects. Rarely, though, is the agriculture or aquaculture project assessed from the perspective of the increase it may cause to the flood hazard. Much of the flooding that affects large areas of the Mekong Delta, however, is now seen as being caused by reduced drainage as a result of the expansion of agricultural activities into wetland areas that previously served an important drainage function. That is, the agricultural expansion has **increased the flood hazard.** Mainstreaming disaster risk management into the development planning process would have assured that compensatory drainage was factored into the agricultural expansion plans—and that would have led to more sustainable development.

Road construction standards are generally set to protect the road from being damaged or destroyed by a 20-year or 50 year flood, depending on the road's importance. That is, the vulnerability of the road is given important consideration. But **the increased hazard** that the road may pose is rarely considered, while throughout Asia roads are constructed that impede water flow and cause deeper flood and more prolonged floods. The Mekong River Commission did a study recently that showed a certain road was impeding water flow through three channels and causing the annual flooding of about 6,000 hectares of rice fields. The MRC study further showed that if the road's 100-meter spans across the channels were increased to 300 meters, the rice fields would be saved from flooding and the production from those fields would compensate for the increased cost of the wider spans in about seven years. Designing the road to that higher standard originally would have required that the planners integrated disaster risk management into their planning—that is, they needed to think not only in terms of the vulnerability of the road to the floods, but also in terms of the road's contribution to the hazard. Mainstreaming disaster risk reduction in planning the road would have protected gains in the agricultural sector and would have led to sustainable development.

Logging activities present another example of how our current thinking is too narrow. Logging enterprises typically present plans to national governments that show how they intend to engage in sustainable logging, how they intend to replant, how many jobs they will create and how much revenue will be generated for the government. But no one is looking at how much silting will be caused in the river and how much negative (or positive) impact that will have on downstream agricultural communities. Those calculations might indicate a problem of **increased hazard.** Mainstreaming disaster risk reduction into the planning process would at least assure that

calculations of potential siltation help determine logging extraction rates, to the ultimate benefit of downstream communities and sustainable economic development.

School design and construction, like road design and construction, typically factors in vulnerability to floods and designs the schools to be raised above flood level. This often assures that the schools will not be destroyed by the floods but, unless other design modifications are made, it increases the likelihood that the school will be damaged by the flood victims. If the school is above flood level but the rest of the community is not, then the school is likely to serve as a refuge for people displaced by the flood. Instead of accommodating 300 to 400 students for six hours a day, the school may have to accommodate 1,000 people for 24 hours a day for as long as two weeks. Those people will cook, eat, drink and perform bodily functions at the school, whether the school provides appropriate facilities or not. A holistic disaster risk management design would suggest that a wider verandah (so that cooking can be done outside the classrooms), an increased number of toilets and a water source (both also above flood level and accessible from the school) are essential elements in such a school. Mainstreaming disaster risk reduction in this way would assure not only that the school serves a disaster reduction function, but also that it is protected against the consequences of a flood disaster and this development asset is preserved.

Initial challenges and some next steps

The first challenge to mainstreaming disaster risk management into the development planning process is to convince development agencies—the national planning agencies, the ministries of agriculture, construction, rural development, and so on—of the threat that disasters pose to achieving sustainable development and poverty reduction, and to convince the ministries of finance and the donor community of the need to make resources available to cover the marginal additional costs of planning and implementing projects to a slightly higher standard. Toward these ends, UNDP is collaborating with UNESCAP to introduce a methodology to Asian countries to identify and quantify disaster impact in socio-economic terms, to implement some pilot socio-economic studies of disaster impact, and to present the findings and implications of these studies to national planning and development agencies. UNDP and UNESCAP will also seek to modify on-going household surveys to identify more accurately the linkages between disaster vulnerability and poverty in selected Asian countries and to monitor whether disaster reduction significantly reduces poverty among rural households.

A second challenge is to identify and establish appropriate institutional arrangements for mainstreaming disaster risk management. To help address this challenge, UNDP in several Asian countries is implementing institutional studies and supporting international study tours by relevant government officials so that lessons learned in one country can be applied in others.

A third major challenge is to develop the skills, capacities and tools necessary to change the current focus on disaster response (which relies mainly on competencies related to logistics, commodity management, communications, etc.) to one of disaster reduction (which requires competencies relative to risk assessment, cost-benefit analysis, project planning, advocacy, networking, etc.). Toward this end, UNDP and other donors are funding the production of a Disaster Risk Management Primer that will assure a common understanding and appreciation of disaster risk management and its application to specific hazards such as floods and earthquakes. The Primer will be produced in various languages of the region and will be targeted toward all levels of current and potential participants in the disaster reduction process. In addition to disaster managers, these participants include what may be broadly defined as the development community, such as politicians, policy-makers, technical specialists, NGO personnel, civil administrators, community leaders and others. In the future, UNDP will also engage with national governments to identify capacity-building needs and to help develop plans to address those needs.