

Mitigating vulnerability for sustainable development

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Developing nations, which are constantly besieged by natural or man-made crises, commonly struggle to develop beyond their prevailing economic and living standards. The world's largest continent with three-fifths of the world's population, Asia is rich in natural resources including petroleum, forests, fish, water, rice, copper and silver. It accounts for about half of global trade and is expected to develop into a global economic powerhouse. While Asia has seen a significant decline in man-made menaces over the past decade, it faces the increasing occurrence of natural disasters such as floods, droughts, earthquakes, cyclones, storm surges and tsunamis. On average, 100,000 lives are lost each year, with more than 200 million others affected by these hydro-meteorological and geological hazards.

Hazards become disasters in the absence of development and adequate investment in risk reduction. More natural disasters and extreme weather events are anticipated due to climate change and communities must develop effective preventive and response mechanisms, incorporating adaptation to reduce the impacts.

Reducing vulnerability means improving infrastructure, education, food source, security and other factors that contribute to peace and stability for growth. More investment is needed to reduce the gap between rapid economic growth and disaster risk reduction, in order to protect social and economic assets.

The impacts of natural disasters fall disproportionately on developing communities in the region, causing loss of lives and damage to the economy and environment. This affects peace and stability and leads to severe setbacks for social development. Impoverished areas are the most susceptible to catastrophic damage from natural disasters, due to a reduced capacity to prevent damage before and during a disaster and to recover afterwards. Asia remains the most vulnerable continent, with US\$243 billion of economic losses due to natural disasters in 2011 alone. Such massive losses hinder much-needed development in the region, which has the world's largest percentage of people living in poverty.



Image: Mercy Relief

Mercy Relief's response team distributing aid to the victims of the massive Thailand floods in 2011. The country's lack of risk prevention and intervention have affected foreign investors' confidence

Case study 1: Storm Washi – Mindanao, the Philippines

In December 2011, severe tropical storm Washi struck Mindanao, bringing over 142 millimetres of rainfall within 12 hours and triggering deadly flash floods from three major rivers.

A total of 624,600 people were affected as 1,470 people died, 1,074 were unaccounted for, nearly 2,020 were injured and 430,500 were displaced. An estimated US\$39 million was required for immediate relief activities.

Within 48 hours of the international appeal by the Philippines Government, Mercy Relief (MR) was in Mindanao to help address the critical and essential needs of the affected communities. MR's five-week relief engagement included a food programme, provision of clean drinking water and tarpaulin sets to help displaced families overcome overcrowding issues at evacuation centres and avoid the risk of disease. A psycho-socio programme provided books and games to enable children to learn and play while taking their minds off the trauma.

The devastation caused by Washi had varying impacts on neighbouring municipalities. Communities in Cagayan de Oro and Iligan were badly affected, while those in Gingoog experienced minimal damage.

Gingoog's resilience was due to a community-based disaster

preparedness and risk reduction programme that had been implemented by MR in collaboration with the Citizens' Disaster Response Center, a local non-governmental organization, following typhoon Ketsana in 2009. The programme included the formation of community-based disaster preparedness committees (DPCs), educational workshops on disaster preparedness, community-wide drills and natural resource management at 24 landslide and flood-prone communities over seven municipalities and three cities, including Gingoog.

With the instilled culture of preparedness, the village DPC and residents of Gingoog continuously monitored the increasing intensity of Washi, measured rising water levels and rainfall, and rang church bells to warn villagers to evacuate to higher ground. A two-metre high breakwater, built during the CBDPRR programme as part of its structural defence, prevented river waters from overflowing into the villages so that only 100 of the 600 households experienced a mere half-metre of flooding.

The resilience of these communities illustrates the effectiveness of investment in adaptive DPRR activities, which put them in a better psychological state to manage, overcome and recover from a disaster with minimal physical and psychological trauma.

With critical factors such as rapid urbanization, environmental degradation, population growth and climate change, more communities are occupying densely-populated high-risk areas, heightening their vulnerability to disaster impacts. While governments have placed emphasis on disaster risk reduction in disaster management planning, real investments into longer-term mitigation mechanisms and activities remain insufficient and disproportionate to the scale and intensity of imminent threats. The cost of inaction or lack of investment could be disastrous for human lives and economies, both for Asia and the rest of the world. Failure to establish and ensure peaceful and stable environments not only thwarts development potential, but could also destroy what has been built.

Maintaining peace and stability

Development can be defined as providing improved access to basic human essentials including potable water and proper sanitation, basic housing, healthcare, sufficient livelihood opportunities, and structured education with emphasis on knowledge acquisition and employability.

Achieving peace and stability — the key prerequisites of development — means overcoming or mitigating the vulnerabilities that affect them, and nations that have consciously addressed these issues have gone on to develop and prosper.

A significant example is the island state of Singapore. Despite its limited size and natural resources, including lack of self-sufficiency in food and potable water supply, Singapore has seen rapid development of its people and economy — ascending from a Third World state to a First World nation within three decades of its independence.

Apart from its remarkable natural harbour occupying a prized location at the junction of communications of the Indian and Pacific

Oceans, Singapore's geographic location shelters it from most natural disasters. However, during its earlier years of nation-building, Singapore could not insulate itself from man-made menaces such as ethnic conflicts, high levels of unemployment, lack of sanitation and scarcity of potable water — all of which affect peace, stability and security, and in turn influence growth.

Major policies, strategies, mechanisms and activities were adopted and adapted to mitigate Singapore's vulnerabilities, promote peace and stability and establish foreign investors' confidence for international trade and economic development. The Government also exercises perpetual vigilance on and social discipline of its population, implementing extensive research and careful planning to preserve elements which determine its independence and development. This paired emphasis on vulnerability and excellence is the basis of the country's unique and sustained success.

Conversely, the massive floods in Thailand during 2011 affected its rice harvest by almost 6 million tons. As Thailand is the world's largest rice exporter, such losses not only impacted the country's ability to meet its export contracts, but also put further pressure on global commodity prices. The disaster also rippled through the supply chains of Japanese automobile and electronics makers in Thailand, as parts shortages affected operations across the globe. More than 200,000 workers from these industries in Thailand were affected. Thailand's

Case study 2: Japan earthquake and tsunami – Tohoku, Japan

Japan, the world's most prepared nation against natural disasters, faced a complex humanitarian crisis in March 2011. A 9.0 magnitude earthquake, the most powerful to hit the country, caused widespread destruction and triggered a tsunami of 9.3 metres, which damaged about 400 kilometres of coastline including the Fukushima nuclear power plants, exposing the world to a radiation threat.

A total of 15,845 people died, with 3,375 others missing and hundreds of thousands displaced. Tsunami waves with a run-up height of up to 40.5 metres swept through the regions of north-eastern Japan, inundating 561 square kilometres of land and requiring an estimated US\$300 billion for reconstruction.

MR deployed its first response team within 24 hours of the international appeal by the Japanese Government. Six other relief teams served in the Miyagi and Iwate prefectures in the Tohoku region over four months, addressing survival and wellness needs including food, water, fresh vegetables, establishment of cold storage facilities and a children's nutrition programme. Hundreds of radiation protective suits were provided to help local workers in their search-and-rescue efforts in and around Fukushima.

Risk mitigation initiatives were well planned and implemented by the Japanese authorities, including tsunami warning systems and solid breakwaters along most of the Japanese coastline. Unfortunately, these mechanisms were breached due to the speed and strength of the waves, but the impact could have been much more extensive had there been no structural protective measures in place. Over in Kamaishi, the locals ignored the tsunami warning and chose not to flee, believing they were protected by a world-record breakwater. The US\$1.6 billion breakwater – which took three decades of research and construction and was 2 kilometres long, 63 metres deep and 7 metres above water – gave way.

The major and costly failure of the Kamaishi breakwater and the indifference of the Kamaishi community to the tsunami warning, highlight the need for an immediate, unbiased and exhaustive assessment of Japan's comprehensive structural and non-structural DPRR initiatives, including the inadequacies of earlier research and the design, planning and implementation of the risk mitigation measures. Lessons learned from this and associated counter-measures will greatly benefit Japan and other countries with similar geographical conditions and challenges but fewer resources.

lack of risk prevention and intervention caused several major Japanese companies, Thailand's largest foreign investors, to consider diversifying investments inside Thailand and to other countries. Foreign investors' confidence waned, which will affect local economy and livelihood opportunities.

Risk reduction and adaptation

Natural disasters are no longer seen as extreme events created solely by forces of nature, but as manifestations of unresolved development problems. In any vulnerability analysis there are no straightforward solutions. Multidimensional approaches and innovative institutional arrangements are required to reduce the risks of future harm or loss and threats to planned development. Hazard assessment must include economic, physical, social and political risks.

Despite rapid economic growth and structural transformation in Asia, poverty remains high and the poor are the most vulnerable to natural disasters. In order to ensure cost-effective, well-paced continuous development, developing nations must create a peaceful, safe and secure environment conducive to uninterrupted growth. This is especially so for disaster-prone nations, as the threat and extent of disasters are difficult to anticipate. The process of managing disaster risk effectively begins with risk identification and hazard mapping, which comprise an understanding of the vulnerabilities to determine potential impacts and devastation. Vulnerabilities that threaten growth and development must be adapted and mitigated, if not eliminated.

There is widespread emphasis on post-disaster relief and support for economic recovery such as livelihood regeneration, as governments curb risk mitigation initiatives and divert funds towards reconstruction and recovery efforts, which require extensive resources and time. Given the increasing occurrences of natural disasters, it is imperative that national strategists and humanitarian implementers put in place critical processes and capacity-building strategies, driven by disaster preparedness and risk reduction (DPRR) and adaptation initiatives to prepare vulnerable communities for future calamities.

DPRR can be defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

DPRR propagates a set of activities to minimize vulnerabilities and disaster risks in society, and to avoid and limit the adverse impact of hazards within the broad context of sustainable development. It is imperative that community-based DPRR (CBDPRR) interventions build resilience among vulnerable and disadvantaged communities in a sustainable manner that integrates participation across different demographics within targeted societies.

Case Study 3: Mount Merapi eruptions – Central Java, Indonesia

Mount Merapi, Indonesia's most active volcano, started erupting in October 2010 with continuous eruptions thereafter.

The eruptions took 386 lives and displaced more than 300,000 people as thick ashes, boulders and rivers of hot mud destroyed farmlands as far as 20 kilometres from the volcano, causing US\$781 million in financial losses.

MR was on site within 48 hours of the first eruption, supporting the evacuation of tens of thousands of villagers, setting up a central kitchen to feed the survivors and providing respiratory care equipment at local medical centres. The ensuing rehabilitation and reconstruction efforts included a comprehensive disaster risk mitigation programme focusing on structural and non-structural components, and developmental projects including the rehabilitation of community water systems and provision of further respiratory care equipment for three health centres where medical personnel were trained on first response and respiratory care management. Merapi tends to erupt every four to five years, hence two large multipurpose halls were constructed at schools in the Dukun and Muntilan sub-districts, for conversion into relief evacuation centres in future emergencies. An early warning system was established and educational workshops and disaster preparedness drills were held to prepare communities for future eruptions.

MR partnered with the local government and community to introduce adaptive DRR activities through a full-scale disaster preparedness exercise for the Magelang district, involving an emergency response specialist agency, Singapore Civil Defence Force.

Although there was an existing framework for disaster management within the villages near Mount Merapi, it was found to be insufficient during the response as allocated evacuation centres did not have adequate water and sanitation facilities, and the scale of eruption was more severe than anticipated.

MR's integrated DRR programme included activities with longer-term



development goals and the strengthening of core public institutions during peace time. It emphasized the need to customize DRR based on geographical, cultural and awareness aspects with alternative contingencies and complex emergency crisis management planning, and the sharing of experience and expertise by specialized international organizations. DRR adaptation in both structural and non-structural components is critical to effective emergency responses, including cultivating community resilience. Its effects await discovery at the next eruption of Merapi.

Development of a nation and DRR initiatives must run simultaneously. But what mechanisms should be put in place? Which sectors require priority focus? And how much should be invested in these initiatives? All of these call for an integrated approach incorporating adaptation and effective advocacy plans with extensive research and careful planning for effective cooperation and communication within communities, to address prevailing and unique sets of challenges and constraints. This must be accompanied by master prevention plans and robust crisis management systems.

Focus on communities

Effective DRR requires an integrated stakeholders' approach where strategies and policies are appropriately adapted at all levels. There must be greater and immediate focus — in terms of attention and resources — on communities where prevailing and unique challenges and the threat of disasters are imminent.

Adaptation of DRR must be in consultation with local communities, enabling them to share their experiences, concerns and knowledge of the local terrains, culture and history with planners and policymakers. Local governments should invest more in vulnerability assessments based on geographical, cultural and awareness levels as part of capacity-building initiatives. For central governments, adaptive DRR activities should be set as development criteria to allocate funds to local governments for area development. Development agencies should incorporate adaptive DRR activities in their development and capacity-building programmes, and disaster relief agencies should include longer-term development and risk reduction goals in relief and reconstruction programmes.

There is also a need for critical supply chain management of acute disaster relief items, including optimized stockpiling of survival essen-

tials. Coupling community-based DRR and development projects will aid the sustainability of disaster-resilient communities as economic development is directly linked to structural resilience measures, and investment in non-structural DRR measures would be beneficial. International donors should share their expertise and provide funding for appropriate DRR adaptation activities through development projects, setting them as a priority.

Forward-looking measures

Budgeting for DRR is generally less popular as the benefits are less visible and only seem useful to the local population upon realization of the anticipated risks. On the contrary, the willingness and ability to implement forward-looking measures by local governments and communities to prevent, and secure their area from, menaces to peace, stability and security may lead to increased confidence from domestic and foreign investors. This in turn would lead to resources being injected into local economies. Sustainable development hinges on proper planning and real resources.

As climate change creates more uncertainty in weather prediction, there needs to be a change of mindset from government agencies, decision makers and the public. Nature is a powerful force and there are limits to engineering solutions. Hence, community resilience is crucial. More focus and effort must be channelled to strengthen public awareness and a culture of preparedness. Communities must not only try to overcome the power of nature, but also learn to cope with it.