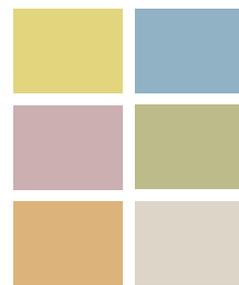


Reducing Vulnerability and Exposure to Disasters



The Asia-Pacific Disaster Report 2012





Executive Summary

The past two years have been challenging ones for the Asia-Pacific region in several respects, but 2011 has been particularly unforgettable for how it has focused the attention of so many people on the crucial matters of life, death and loss. The Great East Japan Earthquake and devastating tsunami, the ensuing nuclear disaster which it provoked, and then the Southeast Asian floods that severely affected South-East Asia, particularly Thailand, were major contributors to the staggering \$294 billion in losses from disasters suffered by States in the region during 2011. This amount was 80 per cent of the annual global disaster losses of \$366.1 billion; it is even more striking that the region's single year losses were also 80 per cent of its total disaster losses from the decade 2000-2009.

These are stark reminders of the unmitigated growth of accumulated disaster risks that affect the socioeconomic conditions of developing countries, as well as threatening the economic assets of wealthier developed economies. Many leaders and much of the public are still struggling to understand how the various components of risk - hazards, vulnerability and exposure - interact to increase the region's total risk and continue to trigger ever-greater losses. It has also become disturbingly evident that rapid economic growth alone does not result in reducing vulnerabilities sufficiently, but actually creates even greater conditions of public exposure to a growing variety of disaster risks.

Development contributes to reducing vulnerability

The Asia-Pacific region is the most disaster-prone area of the world and it is also the most seriously affected one. Almost 2 million people were killed in disasters between 1970 and 2011, representing 75 per cent of all disaster fatalities globally. The most frequent hazards in the region are hydro-meteorological, which also affect the most people. Since 2000, more than 1.2 billion people have been exposed to hydro-meteorological hazards alone, through 1,215 disaster

events, compared to the 355 million people exposed to 394 climatological, biological and geophysical disaster events during the same period.

The effects of climate extremes and variation suggest that while the number of tropical cyclones (typhoons in Asia and the Pacific) are not increasing in number, more of them are stronger, making the region more susceptible to greater potential losses. This also becomes more serious because of the human contributing factors involved, with more people being exposed to the risk of tropical cyclones.

The encouraging news is that despite the increases in both physical and economic exposure, the loss of life is decreasing from hydro-meteorological hazards in some subregions, such as in East and North-East Asia. This can be attributed to improved development conditions and shows the impact of investments made in early warning and preparedness. Unfortunately elsewhere, when equivalent development benefits either don't exist or are not sufficiently inclusive, the vulnerabilities of people continue to rise.

People and Governments alike are still struggling to understand how the various components of risk - hazards, vulnerability and exposure - interact to create recurrent disasters. The region has been slow to be concerned by how the growth of disaster risks has

been spurred by rapid economic growth, and the means to minimize those risks while also striving for sustained economic prosperity.

For example, from 1970 to 2009, the mortality due to small-scale disasters in the Lao People's Democratic Republic and Indonesia has continued to rise. In other countries with less preventive capacity, small and medium-scale disasters are equally destructive because of their cumulative effects, which can even exceed damage from single large-scale disaster events. This suggests that the intended developmental benefits from early warning and preparedness realized in some countries are not as evident in areas where capacities are more limited or without sufficient resources.

Development contributes to expanding exposure

Recent observations and a growing body of analysis are now recognizing that when combined with the demographic characteristics of the region, the main driver of risk is the growing socio-economic exposure to natural hazards. The population of the region has increased from 2.2 billion to 4.2 billion people between 1970 and 2010, but the average number of people exposed to annual flooding has more than doubled from 29.5 to 63.8 million; the number of people residing in cyclone-prone areas has grown from 71.8 million to 120.7 million.

In addition to this absolute increase in human exposure to natural hazards, economic losses resulting from disasters also continue to rise. Global GDP has more than tripled from 12.4 to 40.2 trillion dollars (in constant 2000 US dollars), while the Asia-Pacific GDP has grown by four and a half times during the same period. Trends in economic exposure are increasing for nearly all subregions and for all hazards.

While this rising economic exposure is even greater in the relative terms cited, disaster losses also grew. Relative to growth, disaster losses increased by 16 times since 1980 while GDP per capita grew 13 times over the same period. Most of the largest losses have occurred in middle-income countries and well-developed economies, which indicates that a larger proportion of the growing economies remain at risk despite the availability of more capital assets. This confirms that while rapid economic growth in the region has increased so has the prevailing exposure

to disasters. The region has yet to commit adequate resources to reduce disaster risks and protect the development gains made possible by sustained growth.

Economic exposure is particularly alarming for the frequently occurring hydro-meteorological hazards. The Asia-Pacific region experiences more than 85 per cent of global economic exposure to tropical cyclones. The economic exposure to floods in East and North-East Asia has increased ten-fold within the past 40 years, while East and North-East Asia represents 85 per cent of global economic exposure to rain-triggered landslides. These facts point to a pattern of recent growth where most new development in the region has been along coastlines and in floodplains, locations highly exposed to natural hazards.

The damage and loss assessment figures of the 2011 Thailand floods reveal that almost 90 per cent of the losses were located in floodplains along the Chao Phraya River. That river basin covers 30 per cent of Thailand's land area where 40 per cent of the population lives. As the river approaches Bangkok, it also concentrates much of the 66 per cent of the national GDP and includes the locations where 78 per cent of the people work.

The exposure and vulnerability to hydro-meteorological hazards also continue to rise for urban settlements in developing countries of the region. This has been accentuated as the population living in Asian urban areas has increased from 17 per cent of the total population to 44 per cent between 1950 and 2010. The percentage of urban population will likely reach 64 per cent by 2050. Among the 305 urban agglomerations presently in the Asia-Pacific region 119 are situated in coastal areas. Not surprisingly, the primary urban agglomerations with the highest concentrations of people mostly overlap with the areas of extreme or high mortality risk related to disasters.

Unless sustained efforts are pursued and corresponding investments made, urban growth will continue to increase disaster exposure. As an example, even though the number of reported household fires has decreased in the Odisha state of India between the periods of 1980-1990 and 2000-2010, the extent of the distribution of the fires has spread following urban growth. Although many people seek the benefits that urban life brings to them in terms of various services, the type of growth pursued by a city often creates vulnerabilities and expands exposure to disaster risks.

Investing in disaster risk reduction can reduce vulnerability

Economic vulnerability to disaster depends significantly on a country's economic structure and fiscal dynamics as well as on the overall size of the economy. Generally speaking, smaller and less diversified economies are more vulnerable to disaster risks. For example, Maldives lost more than 60 per cent of its GDP because of the Indian Ocean Tsunami in 2004, postponing its emergence from being categorized as a Least Developed Country for five years. In Pakistan, the estimated damage resulting from the 2010 floods was close to \$10 billion representing 5.8 per cent of the country's 2009/2010 GDP. The damage was particularly debilitating as at the time the country was already struggling to regain fiscal stability following multiple shocks it endured in 2007 and 2008.

A crucial question that all concerned decision makers in the region need to ask is, "Who pays for these disaster losses?" Assuming that disaster relief, reconstruction and recovery expenditures are much less than the losses incurred, it is evident that it is the private sector, and particularly marginal farmers, small-scale entrepreneurs and poor urban households, who largely shoulder the greatest losses. After Typhoon Ketsana struck the Lao People's Democratic Republic in 2009 causing \$58 million in damage, 55 per cent of the losses were borne by small and marginal farmers. In the Philippines, the same typhoon caused \$4.3 billion in damage with 90 per cent of the losses sustained by poor urban households. In Pakistan, the 2010 floods caused \$9.7 billion in losses, with 70 per cent absorbed by poor households, small and marginal farmers.

This matter of the inequitable distribution of losses from disasters highlights how closely economic and social vulnerabilities are linked. As economies falter, it is the poor and the most vulnerable segments which are further threatened, as countries are forced to balance budgets and to reduce fiscal expenditures.

Specific segments of the population are especially vulnerable to disasters. Women and children, people with disabilities and elderly members of a community are all affected to a greater degree by disasters. They have different needs, but also some unique abilities, too, which actually could be employed better to reduce disaster risks than most countries have contemplated. Typically, little concerted effort has yet been made to

address the particular needs of populations that are highly vulnerable to disasters. While some initiatives are in place to serve the needs of vulnerable people, there is much more that can be accomplished.

There are some examples in the region that demonstrate efforts to provide better social protection measures can also contribute to reducing disaster risk. They are effective, and they can also be affordable, but they are not widespread. Considering the sound macroeconomic fundamentals that are the hallmark of policy management in the region, many countries may be able to afford a minimum level of universal social protection coverage that ranges from 1 to 3 per cent of gross national income. Targeted social protection measures such as supplementary incomes, in-kind transfer programmes at times of crisis, subsidies for urgent needs or recovery efforts and labor-intensive public works programmes have shown merits for Asian and Pacific populations. Examples of these types of programmes have been implemented in Bangladesh, India, Indonesia, the Philippines and Thailand among others, but they still remain greatly under-utilized.

Rapid urbanization expands exposure to hazards, and it also increases people's vulnerability, especially among the poor. In 2011, 10 of the world's 20 megacities were located in the Asia-Pacific region. The most rapid urbanization is proceeding in some of the poorest countries with the least public urban infrastructure like drainage, disaster-resilient housing or even access for effective firefighting that are needed to minimize disaster risks. When combined with the dense spatial concentration of the poor in the region's megacities, a marked increase in vulnerability results. Case studies of the Thailand floods and the flash floods in Cagayan de Oro, Philippines found that the urban poor were overwhelmingly more affected by these urban floods, compared to the overall population.

Disasters can impede and even roll-back achievement of the Millennium Development Goals (MDGs). The years of implementing MDGs and the Hyogo Framework for Action (HFA) have resulted in considerable progress in reducing development disparities and the risk of disasters, respectively. As each agenda has matured and become more widely accepted throughout countries and across development sectors, a greater appreciation of their synergy has emerged among many policymakers. Notwithstanding this progress, there is growing evidence that disaster costs are increasing. The impacts are more direct in lower- and middle-income

countries that are affected by large-scale disasters, where disaster risks are high and progress towards MDGs is slow.

Targets can stimulate investments in disaster risk reduction

Evidence exists that investing in disaster risk reduction (DRR) can reduce vulnerability to disasters, but means to ensure that those investments are made within the development portfolios of Governments across the region remain more problematic.

Government investments in DRR actually are increasing, but the trends in the continuous growth of exposure and vulnerabilities to disasters indicate that more needs to be done. There have been some positive efforts to reconsider previous approaches with good effect. The amount of DRR investments by the Government of Indonesia have grown from less than 0.6 of the Government's total budget in 2006 to more than 1 per cent by 2012. Bangladesh has invested more than \$10 billion during the past 35 years, resulting in a current decline in disaster losses. China's Comprehensive Disaster Prevention and Reduction Plan (2011-2015) envisages increased investments to reduce disaster losses to a level of less than 1.5 per cent of GDP annually by implementing comprehensive measures across government sectors.

By setting targets, as China and Bangladesh have done to motivate measurable decreases in economic losses or reductions in vulnerability indicators, there is promise for fostering future Government investments in DRR. Measurable outcomes can assist decision makers in determining needed resources and the mix of investments to achieve particular objectives. They also allow wider latitude in considering a combination of risk mitigation, risk reduction, and risk transfer measures over a targeted period of time.

Ecosystem management, land-use planning, supply chain management, and disaster recovery have the potential to reduce exposure

The increasing disaster risks in Asia-Pacific are driven by the increasing exposure of its people and economic assets. There are many contributing factors to these developments, but five primary conditions have been considered because of significant opportunities to manage them for multiple benefits.

They address particularly the communities of practice involved with ecosystem management, spatial and land-use planning, financial investment in disaster risk management, global supply chain management and post-disaster recovery.

Ecosystem services support human life and provide the basic materials for economies, such as food, fuel and clean water. Demand for ecosystem services from rapidly growing economies and populations, and the perceived low economic value attributed to these services, have led to the increased, and often wasteful use of natural resources. For example, despite an estimated 668 million people affected by drought, the water intensity for most Asia-Pacific sub-regions far exceeds the global average.

Experience from the region shows that when resource-intensive development issues are addressed, such as by integrating ecological costs in water pricing in Singapore, the outcome is the assured availability and quality of water while effectively addressing the problem of water scarcity. Recognizing the value of ecosystem services, improving the efficiency of use of natural resources, and good land-use management and planning are mechanisms that can be used to foster the interrelated benefits of linking DRR with other development needs.

Countries in Asia and the Pacific demonstrate a high level of sensitivity to different types of risk, and there are varying degrees to which individual countries are sufficiently attentive when it comes to land use and spatial planning processes. Considering how much of an impact this has on exposing people and economic assets to risks, the actual investments in risk reduction in this area are not routinely correlated or proportionate to the relative exposure of communities. One issue that highlights this situation is the finding that in the Asia-Pacific region, most countries have not established national spatial or land-use plans; instead, countries have merely adopted a national land-use policy, legislation or only local land-use plans.

Most land-use plans are risk-sensitive with elements of hazard identification, exposure and vulnerability assessments incorporated in the planning processes. Although these plans are strong on intent, they frequently lack means to enable their implementation. For example, none of the planning documents reviewed in preparation of this report has integrated capacity assessment information as a basis for policy formulation; none of the national spatial plans has used disaster damage and loss estimation as a basis for planning.

Another driver of disaster exposure in the region is the increasing risks of supply chain disruptions caused by disasters. Driven by trade and investment liberalization and continued cost reduction pressures from customers, businesses have been extending their activities worldwide; in the process of doing so, they are also expanding their exposure to disaster risks. Disasters caused by natural hazards are one cause of disruptions to supply chains, even when the disaster may occur in another part of the world from where its impact is eventually felt. This is now understood as having the potential for serious economic impacts on another country's economy.

The Great East Japan Earthquake and following tsunami in March 2011 disrupted automobile production of neighbouring countries. As the economy of Japan is highly integrated into the world economy, both direct and indirect supply disruptions caused by the disaster were experienced elsewhere. Japanese automobile production and electrical component production declined by 47.7 per cent and 8.25 per cent respectively, and repercussions were felt in other Asian countries. The 2011 Thailand floods tripled the global cost of computer hard drives, as the reduced production capacity in Thailand caused significant impacts in other countries through global supply chains.

Other features that can reduce exposure to the risks of future disasters are various post-disaster recovery measures. Experience shows that most post-disaster needs assessments have difficulty translating risk reduction intentions into firm decisions and expedient action by individuals, businesses and various levels of government. Turning proposed agendas into practice requires that Governments and development partners maintain the commitments and sense of urgency, more typically reserved for emergency response, and apply them to recovery strategies that internalize risk reduction principles.

It is now widely recognized that disaster recovery planning can reduce exposure to future hazards. In one recent example, following the Great East Japan Earthquake, the national Government issued the Basic Act for Reconstruction and Basic Guidelines for Reconstruction. Part of these guidelines at the municipal level involves land-use planning to relocate communities, and communities rebuilt residential housing in safer areas to protect residents from future tsunamis.

Disaster recovery can stimulate efforts to revisit laws and policies, which can improve resilience. An increasing number of recovery frameworks and strategies focus on re-evaluating and strengthening

existing laws and procedural arrangements. This allows recovery efforts to address weaknesses in development processes to reduce risk for future disasters. It also encourages recovery planning to draw on changed attitudes in local government and the community itself to seize opportunities to make changes a reality. In New Zealand following a series of destructive earthquakes in the Canterbury region, the Canterbury Earthquake Recovery Authority developed a recovery strategy designed to guide the rebuilding and recovery of the city and the area of greater Christchurch with the explicit intention to reduce the risk consequences of future earthquakes.

The process to reduce disaster risks is non-linear, with explicit actions

The present report emphasizes the need to move from informed intentions to sustained actions in reducing risks from disasters. However, it is process with many specific objectives, multiple starting points and various directions depending upon the combination of actors engaged and resources that are available. In different working and implementing environments this can result in uncertainty about how actions can be facilitated and what enables them to proceed to effective conclusion. Given initial commitments, there may even be issues regarding "how to do" DRR. While the HFA provides basic foundation guidance, some of the important elements have been reviewed in this report. Primary features such as legislative and policy frameworks, decentralization of authorities and capacities, assignment and engagement with recognized accountabilities reflect the contexts and implementation particularities of countries in the region.

For legal frameworks specifically addressing DRR it is clear that so far, intentions and generalized assent has been more evident than explicit and firmly institutionalized action. For example, countries report that the first HFA priority area for action, "making disaster risk reduction a policy priority, institutional strengthening," has progressed the most. However, dealing with underlying risk factors is the weakest element of DRR laws in the region. This means that the gap between "intended policies and actual practice" may be more a matter of insufficient focus on the knowledgeable implementation of practical and local action, than being the result of a more common explanation of "administrative or bureaucratic delay".

Both policies seeking to reduce risks and adapting to climate change are becoming more integrated or "mainstreamed" into long-term development plans in

the region. Although more than a third of the countries surveyed have explicitly considered both DRR and climate change adaptation (CCA) in their respective long-term development strategies, frequently these professional domains have been treated separately. One noteworthy exception is Bangladesh's Outline Perspective Plan, which distinguishes itself by effectively integrating DRR and CCA into national development strategies as complementary and related concerns.

There is no straight or specifically patterned "direct line" in the development of DRR legislation or policy or the subject's subsequent integration into strategic national planning. Countries develop and adopt instruments that fit their specific needs without necessarily going through a sequential and comprehensive process. However, among the 47 countries and areas analyzed, only 10 countries have available laws and policies on DRR and development plans that cover both DRR and CCA. Only one of the countries reviewed, Viet Nam, has DRR legislation, a DRR plan projected over a long term, and DRR and CCA issues fully integrated into the national development plan.

Similarly, there are different approaches to risk governance in the Asia-Pacific region. In several countries, there is an evident effort to apply the benefits derived from decentralized activities into managing disaster risks. However, the intended reforms and tangible arrangements for decentralization have not yet proven to be as effective as planned. Work continues to expand the still partial reforms in policies, frameworks, legislation, institutions and financing. In some instances, this includes the lack of predictable budgetary allocations corresponding with the extent of assigned responsibilities, and gaps in knowledge and information management. Individual efforts to undertake DRR decentralization in isolation or as single projects have not proven to be effective without a more comprehensive reform agenda.

The non-linearity of how to reduce risks is also addressed in the growing practice of adaptive governance, which reflects the ability of governance systems to recover from shocks, making transformative change possible following a disaster. Adaptive governance approaches include procedural mechanisms and institutional capacities to monitor early warning indicators and the impacts of specific interventions, and to promote learning by drawing upon knowledge from different types of sources, such as those from indigenous communities and satellite systems. The growing examples from the region

focus on learning to manage new climate risks in agriculture, building sustainable human settlements, managing critical ecosystems and sharing scarce water resources.

Innovative technologies offer new possibilities to reduce disaster risks

Among a wide range of innovative technologies, information and communications technology (ICT) and space applications represent particular potential to advance DRR capabilities. These technologies reveal what is at risk within local areas as well as nationally or wider geographical areas such as river basins. Their many possible applications can address the exposure of physical economic, social, cultural and environmental assets. These techniques were used with considerable effect during floods in Pakistan and Thailand. The technology also demonstrates a unique ability to detect, evaluate and monitor hazards and localized risks in isolated or high risk areas, such as in mountainous terrain.

Innovative technology is also being used to save lives and property through early warning, crowdsourcing, and supply chain management applications. Decision makers can use satellite imagery for assessing and monitoring impending hazards and then use the information to save lives and property as the crisis escalates.

Social and networking media, and the rapidly evolving phenomenon of crowdsourcing, offer yet-unrealized opportunities for wider applications related to disaster risks and especially at times of disasters. Internet, Facebook and Twitter have all assumed extensive and previously unconsidered roles for exchanging essential information across many domains and subject interests, from the personal to the technical, in both official governmental and civil society capacities.

Access to the products and services emanating from these innovative technologies assumes increasing importance, especially in the areas of disaster preparedness, response, relief and recovery, which are all dependent on assured information access. With numerous global and regional cooperation mechanisms in place, all the major disasters that have affected the region in recent years have been monitored using near real time satellite imagery. Although the lack of resources in many low-income countries is a continuing constraint in making better use of advanced technologies, an intensified focus on developing human and technical capacities promises

more opportunities to harness innovative technologies for bridging the existing gaps between DRR planning and implementation responsibilities.

While responding to the historic floods 2011, Thailand Government and the affected communities demonstrated the effective use of innovative technologies. These ranged from applying the near real-time satellite imagery, crowd sourcing, social media, to the use of indigenous knowledge and coping capacity of the vulnerable people. As such, Thailand sets a new standard for responding to disasters in the region. The water management strategies of the Government and business continuity planning of the Private sectors, which have been taken up for reducing future flood risks, are commendable efforts.

Building regional cooperation for the effective use of technology and strengthening national capacities will improve regional capacities for DRR. The growing demand for ICT services, combined with technological innovation, growing infrastructure and falling prices allows more people to participate in the information society regardless of their physical location. Almost 90 per cent of the world's seven billion people are now connected in one way or another by information and communication technologies. As such, advances in these technologies are an easy way to improve disaster resilience of communities and people, and thus contribute to sustainable and inclusive development.

The way forward to reducing vulnerability and exposure to disasters

The primary conviction of this report is driven by a concern that people's exposure and vulnerability, experienced individually and collectively, continue to be twin challenges for the region. Faced with growing economic losses and increasingly vulnerable populations, this report has analyzed the drivers of risks and the strategies that are in place to deal with the growing risks. The report has pursued three primary questions that all dedicated collaborators in the region need to join, "How do they and the people with whom they work understand the disaster risks in the region better?", "How can all concerned stakeholders intensify their own work on vulnerability reduction in a truly concerted, consistent and sustained way?", and "What strategies are needed and can be applied to reduce socioeconomic exposure to hazards?"

Disasters are dynamic and need to be re-evaluated constantly. Socioeconomic evidence needs to become a firm foundation from which to proceed in the continuing re-evaluation of risks in the region, and the first step in building this socioeconomic foundation of evidence is the systematic recording of disaster impacts and losses through the institutionalization of national disaster inventory systems. The recording of comprehensive disaster losses and consequential impacts will enable governments to measure and quantify the socioeconomic costs of recurrent disasters. Only then can a strong case be made to justify significant and sustained investments in DRR from fiscal budgets and long-term public investment plans.

The lessons from countries and communities which have successfully reduced human vulnerability to disasters and therefore potentially mortality, need to be learned and exchanged. Experience in some high-risk developing countries demonstrates that setting definitive targets to reduce disaster losses stimulates Government decisions to make investments in DRR. Targets with specifically identified economic and social measures to reduce vulnerabilities ensure that investment attains visible and measurable results. Expanding social protection initiatives and creating targeted safety nets in times of crisis are particularly effective, with added political dividends.

Disaster risk reduction and development can support common objectives and common frameworks, with MDGs and DRR assisting countries to prioritize capacity development. The improvement of risk governance in the context of sustainable development and the need to promote more integrated approaches to environmental, economic and social aspects of development are needed to reduce disaster risks. This is consistent with key outcomes of the Rio+20 Summit on Sustainable Development held in June 2012.

Many of the approaches, which proceed to reduce vulnerability, are derived from development experience. Nonetheless, much more also needs to be done to arrest the growing exposure of people and assets to hazards throughout the region. Strategies such as land-use planning, ecosystems management, post-disaster recovery and supply chain management have the potential to reduce exposure to future disasters. Most of these strategies are already risk-sensitive, but barriers continue to exist in translating these strategies into actual investments that reduce risks. Research has disclosed that although existing

strategies are clear about their intentions for reducing disaster risks, many of them would benefit from being more explicit about their means of accomplishing DRR. There is a need to engage new stakeholders, particularly those involved in decision-making, planning and investment. There are also additional associated needs to develop requisite social demand and more government ownership for realizing DRR. It is also essential that Governments assume full ownership and responsibility for DRR as part of an inclusive and sustainable development strategy.

In acknowledging the increasing risks in the region, it is necessary to promote a more direct approach to DRR if the promise of development is not to be lost. Shortcuts do not reduce risks, but informed approaches, innovative technologies and wider popular engagement can ensure that their joint activities

can be both effective and affordable. Innovative technologies have significant impact because they surmount previous limitations and offer many new directions and opportunities to communicate, plan, analyze, and learn. They fill critical information gaps in DRR.

Experience tells us that peer learning works. When it crosses either geographical or subject boundaries, it can become even more stimulating and engaging. Therefore, for national stakeholders, the best venues for inspirational and impactful learning are regional. To accomplish this wider value, regional organization and international development agencies should facilitate and provide multi-dimensional capacity development and promote an enabling policy environment for building disaster resilience grounded within both DRR and development practices.