Investing in innovative solutions to manage cascading disaster risks

Key takeaways for stakeholders

Policy Study (3/2020)
Asia Pacific Disaster Resilience Network
Executive summary

At present, South Asia is amongst the sub-regions where the spread of COVID-19 transmission is peaking. The ESCAP report - COVID-19 and South Asia: National Strategies and Sub-regional Cooperation for Accelerated Inclusive, Sustainable and Resilient Recovery presents a comprehensive situation analysis.

While the region is no stranger to disasters, COVID-19 has upended ‘business as usual’ in an unprecedented way. The intersection of the pandemic with the monsoon season has created challenges that sub-region has not dealt with before. This is evident in places like North-eastern India and Nepal where nearly 4 million have been displaced by heavy flooding with the death toll rising to almost 200 people. In Assam, for example, almost 22 thousand Covid-19 cases have been recorded; with the heavy monsoon flooding affecting 28 districts and uprooting over 51,000 people, Assam had the highest single-day spike of 1,218 cases during the heaviest floods. The complexity in responding to the multiple challenges of cascading disasters are great — lockdowns have made it difficult for relief to get through and COVID-19 care centers are doubling as shelters where ensuring social distancing and wearing masks are difficult.

The risk transmission pathways of COVID-19 and extreme climate events are very different, but many communities are exposed and vulnerable to both. For example, cyclone and flood shelters are designed to house hundreds and thousands of at-risk communities who are evacuated to save their lives. In some cases, these communities are also located in COVID-19 risk zones; they will not be able to practice social distancing and the necessary hygiene standards to prevent transmission. Furthermore, the number of mosquito-borne Dengue fever cases often greatly increases, during floods and cyclones. The interaction among climate emergencies and COVID-19 responses could magnify the negative impacts in some countries. Implementation of response strategies and preemptive actions that factor into the current pandemic are needed to protect the vulnerable community exposed to extreme climate events from becoming new epicentres of the pandemic. ESCAP’s policy brief, When crises converge: Responding to natural disaster in South Asia during COVID-19 and the policy study, Protecting the most vulnerable to cascading risks from climate extremes in South Asia present cascading risk scenarios vis-à-vis policy relevant messages.

Understanding the links between epidemics and disasters requires innovative solutions. A wide-range of risk analytics such as impact forecasting and risk informed early warning, indexing and creating risk matrix to target at risk communities have been developed and put to use in response to the COVID-19 pandemic and its intersection with extreme climate events. Recognizing that innovations are key to protect the community, there is a need to enhance our knowledge and understanding on outstanding challenges and emerging opportunities towards operationalizing the risk analytics for intelligent crisis management solutions in specific context of cascading disasters. In the era of COVID-19, these experiences can form the basis for the next generation of integrated risk analysis to build back better to the cascading crises.

This issue brief on COVID-19 focuses on the innovations which are protecting communities from cascading hazards, the challenges, and opportunities therein, and offers policy guidance to shape the future management of cascading hazards.
Innovations in decision making for cascading disasters: Successes and challenges in South-Asia

Innovations in risk analytics, assessments, and related technologies

The unprecedented collision of pandemic and weather events is turning South Asia into a hot spot of cascading risks. However, the sub-region has successfully utilized a number of innovative and disruptive technologies which supported response processes to deal with the impacts of cascading disasters and will continue to support recovery and future preparedness processes.

One of the great successes in South Asia has been the response efforts to the recent cyclones, Nisarga and Amphan where the pin-point accuracy of early warning systems was key in saving lives. The technological advances in risk analytics, remote sensing and geoinformatics culminated in a substantial lead time and enabled governments and on-ground responders to repurpose evacuation shelters along diverse stratified community-risk profiles. The accuracy of early warning systems was crucial in adopting a composite risk matrix to address the complex evacuation plans needed to respond to both cyclones and COVID-19 simultaneously.

Another key technological innovation has been the COVID-19, open source, contact tracing app in India known as “Arogya Setu.” As the world’s most downloaded contact tracing COVID-19 application, it has helped the government determine infection clusters. Along with Google A.I. systems’ machine learning model running hundreds of flood simulations on its machine learning model to predict flooding with better accuracy, the technologies together can provide stratified risk information on potential evacuation and social distancing efforts.

Bangladesh also has numerous examples of social entrepreneurs using cutting edge technology in the development fields of health, gender, disasters, and environmental management to build resilience and can provide a success model for the sub-region.

As these biological hazards and concurrent disaster risks continue to intersect, more complex and integrated solutions that are driven by technological innovations will be needed. Here, advanced systemic risk assessments along with complex risk scenario planning is crucial and these must be developed and operationalized. These complex scenarios need to account for not only the vulnerability, exposure and impacts of both natural and biological hazards but also the non-linear transition of biological hazards from one phase to another. This is critical in identifying the most vulnerable populations during concurrent crises including volunteers, local government officials, and relief workers. In addition, scenario planning will need to be more multi-disciplinary with a range of stakeholders who provide much needed information and perspectives. can be vital to preparedness efforts in providing proper safety measures, address privacy issues, determine the number of shelters and alternate shelters need, and health monitoring in the middle of multiple and cascading crises. Thus, the next generation of scenario planning will need to be more multi-disciplinary with various stakeholders providing much needed information and perspectives.
The community is at the frontier of disasters—thus empowering communities to understand complex hazard information, utilizing these in an optimal manner, and developing localized interventions using community knowledge is urgent. While technological advances have helped save lives and livelihoods, without the support of the communities at all levels, technology cannot be operationalized in a meaningful way.

Within the realm of technology, the primary concern is breaking the digital divide and bringing these new technologies to empower communities. Countries in South Asia have had some success in this aspect with Bangladesh, being a model of success in using advanced technology for community empowerment. The country’s cyclone evacuation program for example, takes advantage of the ubiquitous use of mobile phones to empower vulnerable communities to track cyclones, make decisions on evacuations, and provide preparedness training.

**Innovations in community empowerment using digital technologies and social innovations**

A large number of India’s urban poor live in informal settlements like slums. With the looming monsoon season with it are the usual problems that the urban poor have to put up with every year - the waterlogging, vector-borne diseases as well as floods, they will have to brave it all with the added threat of a deadly virus this year. When cascading disasters such as the current floods along with the COVID-19 pandemic hit these populations, they become exponentially vulnerable as their homes are devastated by natural disasters and they cannot practice social distancing, a necessity to disrupt the transmission of the COVID-19. Along with the daunting task of facing extreme poverty and large-scale unemployment, people living in these settlements are now facing a plethora of challenges. Thus, multiple innovations are needed in terms institutional arrangements to support these extremely vulnerable populations.

One of the success stories in delivering institution innovation in this time of crisis has been the the Indian government’s response in Dharavi, one of the largest slums in the world, to combat the multiple threats. The slum has received considerable attention from the government, BMC (Brihanmumbai Municipal Corporation) authorities, NGOs, media as well as public, during the pandemic. While the slum reported one of sharpest spikes of COVID-19 cases in April, it is also the area where people are being proactively tested. Each person in Dharavi is being tested with a large number of people going to quarantine centers for testing. The BMC has stationed many mobile dispensaries in Dharavi to screen residents and doctors are distributing zinc and vitamin tablets to people in the slum to boost their immunity.

In addition, the government has set up an innovative institutional arrangement with community health practitioners, where practitioners without the necessary qualifications are recruited for further training and dispatching into communities in Dharavi. Here, building alliance with community health practitioners has amplified health and social innovations to contain the spread of the virus while responding effectively to the natural hazards.

The scale at which communities can appropriate technologies and use it to manage their risks is enormous. For instance, in Bangladesh during the most recent cyclones, people used cyclone tracker apps to track the cyclone by themselves in real time. It led them to understand how long the cyclone would take to reach their villages so that they can evacuate on time. With information given by technology, people are proactively taking actions to lessen the damage and minimize the impact of the risk (Figure 1).

In addition, countries and communities have recognized that each disaster provides new facets of learning and using iterative methods for policy development is critical. Establishing good feedback loops that evaluate the impacts and determine the intended and unintended consequences of policies has several benefits including building a notion of ownership among the community. The cyclone evacuation programme in Bangladesh again shows a success case. The programme, which has been developed over time, used the iterative process and feedback loops to develop multi-purpose shelters. Using this process, the government was able to provide evacuation shelters which accounted for the needs of the community including, building shelters on hilltops which allowed for the accommodation of livestock, providing separate facilities for women, and building accessible paths for disabled populations.

Prioritizing investments in these social innovations is critical to future preparedness for cascading disasters and to empower communities to become more resilient.

**Figure 1: An integrated system for resilience, inclusion, and empowerment**

![Figure 1](image)

Source: UN ESCAP, Asia Pacific Disaster Report 2019

**Innovations in financing disaster risk reduction**

Disaster risks (from both natural and biological) are outpacing resilience in South Asia. Thus, integrated solutions for financing the impacts of cascading disasters are critical to build long term resilience of economies and livelihoods.

There have been major successes in this arena in South Asia. The technological innovations in remote sensing, modeling and GIS-based applications have propelled understanding, management, and pricing of disasters risks. To this end, the creation and deployment of parametric insurance has enabled
better financing capacity for communities at risk. These models need to be scaled up for multiple and concurrent disasters.

A successful example of deploying parametric insurance for cascading disasters can be seen in Nagaland, a landlocked state in north-eastern India. The state has invested in developing and scaling up of index-based solutions for multiple perils. In conjunction with the International Water Management Institute (IWMI), Nagaland’s government supported developing index-based parametric insurance plans for drought, hailstorms, humidity, and floods. These plans use advanced computation modeling, remote sensing, geospatial-gridded datasets for multiple hazards, and crowd sourcing technologies.

To scale up the insurance plans, the government partnered with insurance providers such as Tata AIG and Swiss Re to provide a parametric insurance disaster risk financing mechanism that covers the entire state during the monsoon season. This innovative insurance solution has the potential to be scaled up to strengthen disaster resilience, and when combined with a gender sensitive response and risk strategy, can help people become more effective in managing their own risk.

Now, flood and drought prone states in India like Bihar are also adopting these insurance plans and using similar models to design index-based financing products that support communities manage their risks throughout the disaster cycle.

The Index-Based Flood Insurance (IBFI) developed by IWMI for multiple hazards, can also potentially be combined with pandemic insurance. For example, a key challenge in the agriculture sector has been the impacts of COVID-19 on farmers where the lockdowns have led to farmers missing harvesting and sowing seasons. This has the potential to drive large-scale fluctuations in food security and nutrition. In lieu of the current and future cascading risks, expanding innovative insurance programmes will have positive knock-on effects on the Sustainable Development Goals and will also contribute to poverty reduction in the sub-region.

Insurance alone, however, is not sufficient and will need to be combined with other initiatives to be effective. In addition to insurance, access to seeds, climate information, and increased communication between farmers, government and various stakeholders should also be implemented to manage risks effectively. Lastly, the COVID-19 fiscal stimulus packages can be used to prioritize financing for both pandemic and natural disasters and build resilient livelihoods for the future.

Scalining up good practices and investing in innovative solutions: Six key takeaway messages

**Message 1: Invest in complex risk scenario planning supported by systemic risk assessments for multiple hazards**

Developing various and complex scenarios to account for cascading events such as the current COVID-19 pandemic and natural hazards is crucial for future preparedness and response efforts to disasters, especially in the realm of evacuation and shelter management. Here, understanding and assessing the systemic risks in both health and disaster reduction sectors (Figure 2) is critical to developing cascading risk scenarios.
In addition, sectors such as the agricultural, social, and infrastructure are engaged in working on methods to reduce the effect of disasters but may not address biological risks. Planning for these systemic risks can support integrated health and disaster risk management approaches, inform existing Standard Operating Procedures (SOPs), and support development of new SOPs that will be able to deal with dynamic situations where multi- and cross-sectoral interventions are needed.

**Message 2: Promote disaster risk reduction measures as a public good**

Aspects of disaster risk reduction such as early warning systems and investing in resilient infrastructure are public good and should be promoted as such. The Global Commission on Adaptation notes that strengthening early warning systems and making new infrastructure resilient provides a benefit-cost ratio of 10 to 1 and 5 to 1 respectively.

Early warning systems, in particular, are an essential and cost-effective component of an integrated national disaster reduction approach and should be financed by public investment to optimize the monumental returns for society in building resilience, minimizing loss of life, and accelerating recovery.

Message 3: Democratize technology using open science policy and forums

To harness the full benefits of digital technologies, there should be greater emphasis on democratization of technology. Digital technologies for disease surveillance, testing, contact tracing, and quarantine have been integrated into government-coordinated mitigation processes of COVID-19 and are accessible to many people. These, in turn, have helped facilitate effective pandemic responses.

Given that knowledge is universal, part of the democratizing technology should also embrace the exchange of knowledge and information through empowering local people and building on aspects of ‘citizen science’. Empowering communities also offers an opportunity for regional collaboration on areas such as training, sharing timely information and acting based on that information, as well as learning from the successes and challenges to adapt accordingly.

Message 4: Build financial resilience through scaling risk financing, insurance and risk transfer for natural hazards and pandemics

Despite the enormous impacts of disasters in South Asia, only a fraction of the losses are covered by insurance. Scaling up of parametric and index-based insurance, therefore, can not only prevent economic hardship during and post disaster, but can also speed up rebuilding and recovery and promote disaster risk reduction through funding for hazard mitigation incorporated into rebuilding efforts. In the era of COVID-19 and future pandemics, it is critical that disaster risk financing include pandemics as a risk factor for insurance pricing. Here, the The Index-Based Flood Insurance (IBFI) developed by IWMI for multiple hazards and already used by multiple states in India, can also potentially be combined with pandemic insurance to cover a gamut of disasters.

Message 5: Build a regional social innovation ecosystem that links the multi-sectoral approaches for disaster risk reduction

Social innovations, both digital and non-digital, can be scale up by establishing a regional social innovation ecosystem (Figure 3). This ecosystem can harnesses the potential of and deepen ties among diverse stakeholders, include regional and sub-regional organizations, academia, private sector, SMEs, communities, and local governments, can exponentially augment the benefits of technological and social innovations. Using open source, open data, citizen science, and crowd funding, a regional innovations ecosystem framework can bring new technologies to at-risk communities and peoples who can use it in unique and customized ways.
As the concurrence of the pandemic, floods, and cyclones have shown, disasters know no boundaries.

Transboundary hazard threats are particularly acute in the Ganga-Brahmaputra and Meghna river basin where floods impact millions of poor and vulnerable people in India, Bangladesh, Bhutan, and Nepal. In the foreseeable future, the impacts will be greater as COVID-19 lockdowns constrain the usual measures of containment. Unlike the well-established regional cooperation on tropical cyclones under the WMO/ESCAP Panel on Tropical Cyclones, there is no formal regional cooperation mechanism to address shared vulnerabilities of floods and drought in South Asia.

The recent floods during the peak of COVID-19 shows the need for increased regional cooperation and ESCAP with partners has begun to operationalize the framework in this area. ESCAP’s Asia-Pacific Disaster Resilience Network is building partnerships with various stakeholders including the WMO, UK Met Office and the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) to establish a multi-hazard approach to manage cascading risks and impacts of multiple disasters. In December 2019, the third South Asia Forum on the Sustainable Development Goals requested ESCAP to develop an action plan to enhance resilience to disasters and climate change under the South Asia Hydromet Forum. ESCAP will support its member countries to tackle the challenges of cascading disasters through operationalizing integrated regional cooperation mechanisms for preparedness, better recovery, and resilience (Figure 4).
Figure 4: ESCAP’s Regional Cooperation Mechanisms for pandemic preparedness, better recovery and resilience

Six takeaways to scale up innovative solutions

1. Invest in complex risk scenario planning supported by systemic risk assessments for multiple hazards

2. Promote disaster risk reduction measures as a public good

3. Democratize technology using open science policy and forums

4. Build financial resilience through scaling risk financing, insurance and risk transfer for natural hazards and pandemics

5. Build a regional social innovation ecosystem that links the multisectoral approaches for disaster risk reduction together

6. Deepen regional cooperation for integrated disaster early warning systems in South Asia
Acknowledgement

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Additional Resources


References


