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STRENGTHENING DISASTER RESPONSE AND COOPERATION IN SOUTH ASIA

Natural disasters such as floods, tsunamis, cyclones, and earthquakes have been a regular threat to people's lives and property throughout history. Today, Asia is the most disaster-prone region on the planet, with South Asia's large coastal population and monsoon and cyclone weather patterns creating a particularly vulnerable combination. As populations continue to grow in low-lying areas and a warming climate leads to rising seas and more intense storms, a coordinated, multilateral approach to disaster management is needed to meet this challenge.

While many initiatives, such as the South Asia Association for Regional Cooperation (SAARC) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), include efforts to improve regional cooperation on disaster management, progress either has been disjointed or has left key stakeholders out of the process. Hurdles also exist in the implementation of disaster resilience, around sovereignty concerns, in the need for better infrastructure (both physical and digital), and in the expenditures associated with these demands.

Despite these difficulties, there are substantial benefits to disaster management cooperation. Through the coordination and sharing of information, expertise, and resources, countries can help one another during the critical 48 hours following a disaster, when a country's ability to respond and provide aid on its own could be crippled. In addition to the direct benefits of saving lives and property, cooperating on humanitarian assistance and disaster relief (HADR) operations and response plans can build confidence and improve diplomatic ties in the region.

The Covid-19 pandemic, however, has further complicated cooperation on disaster management. Many Asian countries were forced to handle traditional disasters and the pandemic simultaneously, which highlighted a lack of regional preparedness. The past two years have underscored the importance of involving health experts, national governments, international organizations, NGOs, and community members in the planning process going forward.

With this in mind, the National Bureau of Asian Research (NBR) engaged stakeholders from across South Asia and the broader Indo-Pacific to identify opportunities for cooperation in disaster management and response. A year of virtual working-group sessions and interviews with leading experts from across the region culminated in a two-day workshop in September 2021, which aimed to improve capacity, coordination, and regional connectivity for disaster management efforts. NBR would like to thank the American Consulate in Chennai for funding this program and is also grateful to senior advisors Tariq Karim and Nilanthi Samaranayake for their insights and guidance.

This report brings together the findings of this project. The first section draws on interviews and working-group discussions to better understand the current disaster management situation and identify key shortcomings of existing approaches. The second section presents specific recommendations on the four phases of disaster management from experts in academia, NGOs, and government who participated in the workshop. The report concludes by drawing key takeaways from project activities, including an analysis of the importance of terminology in establishing an all-hazards vernacular and a roadmap for improving future cooperation on disaster management.

THE CURRENT STATE OF DISASTER MANAGEMENT

NBR interviewed experts from different disciplines across the Indo-Pacific for insights on the current situation in South Asian disaster management. Interviews and virtual working-group sessions examined disasters through four lenses: security and geopolitics, technology and communications, energy and climate change, and health and human impacts. To facilitate frank discussion, the interviews and working groups were held under Chatham House Rule, where participants may use the information received, but neither the identity nor the affiliation of participants may be revealed. Findings are therefore presented here without attribution.

Early interviews and the first working-group sessions began with an overview of disaster management as a process. This process is often categorized into four distinct sectors: response, recovery, mitigation, and preparation. Response efforts begin immediately following a disaster and focus on saving lives; recovery efforts take place over the medium to long term to restore normalcy. For disaster risk reduction, mitigation efforts focus on avoiding the effects of a disaster, while preparation seeks to reduce impacts that cannot be completely avoided. Experts noted that disaster management is a continuous process and that risk-reducing measures, such as mitigation through better planning or preparation through training, can help a society become more resilient.

Further, there is an important distinction between a "hazard" and a "disaster." Earthquakes, large storms, and volcanic eruptions are hazards and only become disasters when they harm people or property. Participants also pointed out that not all disasters are natural (e.g., oil spills or acts of terrorism). Of particular concern are multi-hazard situations, when the health and safety measures of one disaster (e.g., moving vulnerable populations to shelters during a storm) directly conflict with those of another (e.g., maintaining social distancing to avoid the spread of the coronavirus).

As part of the project's regional focus, experts emphasized the importance of place-based planning policies and pointed out the similarities between many South Asian countries in terms of shared natural hazards and vulnerabilities and the resulting auspicious opportunities for collaboration. They noted that the private sector has thus far been underutilized and that public-private engagement in disaster management can be improved. There are still clear hurdles, including a lack of trust between countries, possible duplication of efforts, and an aversion to data sharing brought about by concerns of sovereignty. Sovereignty issues framed the first subject-matter working group on security and geopolitical concerns around disaster management.

Security and geopolitics. Natural disasters are not a question of "if" but "when." Competitive and complex geopolitical realities provide the backdrop to response networks, which has made cooperation in South Asia difficult. Countries must balance the challenges of both current perceptions and historical precedents, and the tradeoffs that they can lead to diminished trust.

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Given the rapid-response ability of military forces, operational commanders are often tasked in the immediate aftermath of a disaster to deliver relief. Intervention abroad, however, depends on an invitation from the impacted nation, and not all are willing to invite foreign military forces into their territory. For instance, working group participants noted that India's operational reach is well-remembered by smaller South Asian nations. The prospect of military intervention in the aftermath of a natural disaster could put these countries on the defensive. Two such examples were discussed. When Cyclone Sidr struck Bangladesh in 2007, the country was hesitant to accept aid from India; although aid was accepted in Chittagong port and Dhaka airport, Bangladesh declined India's offer of helicopter assistance. A similar instance happened in Southeast Asia when Cyclone Nargis struck Myanmar and U.S. and other aid ships sat off the coast, never able to deliver supplies.

Several experts also noted China's changing role in the region. China has been scaling up its presence in the Indo-Pacific with implications for both disaster response and maritime security. Although the extent of China's role and willingness to provide disaster relief—or countries' receptiveness to it—is not yet known, there will need to be coordination and communication between all stakeholders.

Technology and communications. Technology can help automate the process of managing the various disciplines and overlapping concerns when dealing with disasters, such as the use of machine learning to process large amounts of data quickly and the establishment of a centralized/accessible database for both public and private stakeholders. Experts noted with excitement the possibilities of transferring technology solutions developed in the United States to South Asia, with the caveat that the region's language barriers will be particularly difficult to overcome. It is important that preparation and mitigation efforts aided by technology are easy to read, understand, and implement.

Technology can also be integrated into existing city and state administrations to help bridge gaps in expert knowledge. Especially when there are overlapping jurisdictions of state, federal, and city ordinances and incoming information needs to be processed quickly, data sharing becomes important. Without access to the appropriate information, private and proprietary data can obstruct public emergency managers from meeting the needs of a disaster situation. This critical data is a key area to improve cooperation between the public and private sectors. At the international level, there are also opportunities for increased data sharing and collaboration across the Indo-Pacific to improve disaster response and preparation.

Yet experts repeatedly emphasized that while technology holds great promise, it cannot be used as a substitute for human decision-making. Instead, it helps make those decisions easier. Additionally, they highlighted the importance of informed consent when using technology. For example, there has been considerable global debate on the role of cell-phone tracking data as a means of monitoring and controlling coronavirus outbreaks. Public messaging is key to ensuring not only buy-in from stakeholders but also the efficacy of the technologies applied.

Energy and climate change. Incorporating climate change into disaster management strategies is essential for policy planners and other stakeholders. Weather events are intensifying because of climate change. The number of extreme high-temperature events (hot and cold) has increased, and average temperatures are shifting higher. With this shift, there is greater probability of weather-related disasters, and events that were previously thought to be rare are now becoming commonplace. The world must expect the unexpected.

In the coming decades, a gradual temperature rise will increase evaporation rates, resulting in more droughts. Additionally, more atmospheric water vapor means more extreme rainfall, leading to increased flood rates and flash floods followed by long months of no rainfall. This has serious implications for agricultural sectors worldwide. Within South Asia, for example, the Indian monsoon season is becoming less predictable. Historically, the monsoon season provided India with 70% of its annual rain in dependable stages, but now farmers must expect floods in the dry season and droughts in the wet season. In addition, sea temperatures are rising around the globe, leading to an increase in marine heatwaves. Ordinarily, heatwaves would occur for a total of 30 days annually, but future projections estimate an increase of 4°C in some areas, resulting in certain parts of the world experiencing marine heatwaves 320 days a year. Elsewhere in the region, even a small rise in sea level could render coastal areas of Bangladesh or Maldives uninhabitable due to saltwater intrusion, coastal flooding, and persistent threats from worsening cyclones.

Current disaster management plans are not fully considering the impacts of climate change. Enhancing climate resilience will need to become a part of preparedness strategies, with long-term recovery plans considering climate security and sustainability against future risks such as sea-level rise, marine heatwaves, and increased flux between floods and droughts. Climate change is a cross-border issue, making regional cooperation even more important. As the Indian Navy is the primary responder in the Bay of Bengal, it needs to cooperate with other navies. The region also must increase its collective capacity to record, map, and predict climate-induced changes to better inform disaster mitigation and adaptation strategies, which can be done through increased investment in research and monitoring efforts.

Human impacts. As noted above, the Covid-19 pandemic has highlighted the challenges of dealing with multiple disasters simultaneously, such as how to safely implement social-distancing measures at evacuation centers. Additionally, the economic impact of the pandemic could decrease funding for disaster risk reduction at a time when preemptive investment is critical to disaster recovery. The Sendai Framework for Disaster Risk Reduction 2015–2030 needs to be reassessed and implemented. The framework was adopted at the 3rd UN World Conference on Disaster Risk Reduction in 2015 and outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks. One way to improve the effectiveness of disaster recovery through incorporating lessons learned from the pandemic would be to increase input from health experts and combine their consultations with disaster experts.

Increased data sharing and collaboration between India and Japan could also benefit the Indo-Pacific region within this context. Particularly as technology is increasingly emphasized within recent disaster risk reduction frameworks, data-based strategies could become more useful in the future.

CORE PROJECT AND WORKSHOP FINDINGS

Terminology. A critical aspect of the project interviews and workshop discussion was to clearly define relevant terminology. Although there is general consensus about the four key phases of disaster management—mitigation, preparedness, response, and recovery—each term can be associated with different operations and timelines (see **Table 1**). This causes overlap between phases and can make it difficult to define responsibilities. Even though a critical goal of disaster management is to eliminate a siloed focus, experts repeated that it is important to have clearly defined roles and responsibilities in different phases of the overall process. Mitigation, preparedness, and recovery all have a similar overarching goal: to strengthen community and national resilience in the face of disasters.

Workshop discussion. On September 8–9, 2021, NBR convened a workshop on "Nontraditional Security Challenges in South Asia: Improving Disaster Management Cooperation." Over the course of two days, 39 experts and stakeholders participated in on-the-record panel discussions covering all four phases of the disaster management process and incorporating views from academia, government, and NGOs across South Asia and the greater Indo-Pacific region. Representatives from India and

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Bangladesh were joined by experts from the United States, Taiwan, Japan, and Singapore, with organizations such as the Observer Research Foundation, the National Maritime Foundation, and various universities present.

The U.S. consul general of Chennai, Judith Ravin, opened the workshop with remarks on the important roles that the United States and India play in international HADR efforts. Especially given the difficulties of the past two years with the ongoing pandemic, she emphasized the importance of agencies such as USAID, which flew supplies to India during the country's devastating Delta wave in April 2021. In India, state governments are building out multisectoral, multi-hazard strategies, and the national government established the Coalition for Disaster Resilient Infrastructure (CDRI) to foster resilient infrastructure around the world. The consul general closed by highlighting the importance of cooperation in these efforts: "Given the huge and transnational nature of disasters, it is crucial for international and regional cooperation to continue to identify new ways to address these crises and respond in an efficient, effective, and comprehensive manner, using time-tested methods as well as modern technology, innovation, and transparent communication."

The commissioner of the Greater Chennai Corporation, Gagandeep Singh Bedi, followed Consul General Ravin's remarks with the keynote address. His experience in disaster management spans many years and disasters in Tamil Nadu, including the 2004 Indian Ocean tsunami and several cyclones that made landfall. He observed that the true strength of an organization is tested during disasters, and that response to a catastrophe is often the most important job of a city or state government. Mr. Bedi then laid out his thoughts on the rescue, recovery, and rehabilitation phases following a natural disaster.

The rescue phase covers the first 48 hours of response after a disaster and is in many ways the most crucial. Mr. Bedi commented that succeeding in this phase means succeeding at half of the entire disaster management process. In order to prevail during these crucial hours, city governments in particular must always be prepared with robust infrastructure,

Table 1

Terms	Definition	Time Frame	Examples
Response	Process of ensuring safety and beginning to restore necessary supplies and resources to impacted communities	Hours (48–72) post-event	Search and rescue; providing emergency supplies like food, water, and temporary housing
Recovery	Process of improving livelihoods through a sequence of operations and activities to restore and rebuild the community	Weeks to months post-event	Repairing public infrastructure; expansion of public services (i.e., electricity and water)
Preparation	Measures taken to reduce the effects of disasters by predicting and possibly preventing them, lessening their impact on vulnerable populations, and addressing their consequences	Years, both pre- and post-event	Forecasting disasters and installing early warning systems; developing emergency operation plans; increasing general awareness among the public
Mitigation	Long-term steps taken before a disaster strikes to ensure available infrastructure and services and avoid the worst impacts of a natural hazard	Years, both pre- and post-event, with plans being updated every 5 years to account for changes in climate, technology, or other factors	Upgrading outdated infrastructure and systems; developing integrated strategy for public policy, financing, education, and risk assessment to build long-term resilience

including proper community training and drilling and the readiness of necessary equipment such as boats, machinery, and emergency lighting. Recovery begins once the injured are treated, roads are cleared, and other immediate needs are met following a disaster. This includes providing adequate food, water, shelter, and temporary housing for those worst affected. Mr. Bedi stressed that this stage is paramount to protecting underprivileged and marginalized groups in society. Though these measures are often completed between two weeks to a month after a disaster, this phase requires adequate preparation. Rehabilitation encompasses the return of society to normal while ensuring that future disasters will not as severely affect the region. This is the phase where lessons learned from shortcoming in the previous two phases must be taken into account, such as designing resilient buildings and constructing emergency shelters.

In closing, Mr. Bedi left participants with a final message informed by years of experience about the required mindset for all planners, city officials, and first responders: "We should never consider ourselves to be fully equipped for any disaster." This helps keep all stakeholders open to the learning process and allows for continual improvement to the best practices in disaster management.

Panel 1: Response. The first 48 to 72 hours after a disaster are the most critical, and ensuring the mobilization of resources and response strategies during this time was the opening panel's focus. It featured remarks from Sarabjeet Parmar of the National Maritime Foundation and Alistair Cook of Nanyang Technological University.

Captain Parmar stressed the need for normalcy, mobility, and adaptability. One of the first goals in the aftermath of a disaster should be to restore some semblance of normalcy in the midst of a traumatic and stressful situation. A first wave of medical relief and responders can provide this by signaling that help has arrived and there are professionals working to reduce negative consequences.

The key to achieving normalcy is mobility, which relies on both preparedness and trust. In 2004, already mobilized Indian naval ships were able to arrive in Indonesia within 24 hours once a request for assistance was received following the earthquake and tsunami. Naval vessels are also able to adjust relatively quickly for HADR or evacuation missions, as they are required to have emergency response equipment for more common crises. They can quickly arrive in disaster-struck areas and drop "disaster relief bricks," modular containers with food, water, and medical supplies. Other mobilized supplies include shelters that can keep evacuation areas dry after a flood and the right type of food and clothing for the region where aid is being provided. However, it is imperative that countries are able to trust those providing aid. Disaster response is all about international cooperation, and countries need to identify what actors have the capability and capacity to respond as well as feel confident in asking for help.

Finally, it is imperative that all response plans are flexible and that first responders are ready to assess the situation and adapt to realities on the ground. Each disaster has a learning curve and will not exactly mirror past experiences, so strategies must be versatile in their execution. It is also important to consider that priorities and needs may vary across districts or towns within one disaster. Thus, response plans must also be capable of reorganization.

The importance of adaptability was echoed by Dr. Cook, who noted that anticipatory action is needed and bridges all phases of disaster management as well as numerous scenarios. The Pandora Cell created by the Danish Emergency Management Agency is one example of how strategic foresight can be used in response planning. The project looks at immediate alternative futures and outlines factors that could compound a disaster so that policymakers and other stakeholders can prepare for worst-case scenarios when resources are already stretched thin.

Dr. Cook also remarked that response plans can be strengthened by improving data sharing. An explosion of information has raised questions about how to identify and use the most helpful data in a crisis situation. Concerns regarding privacy and security can cause important information to be

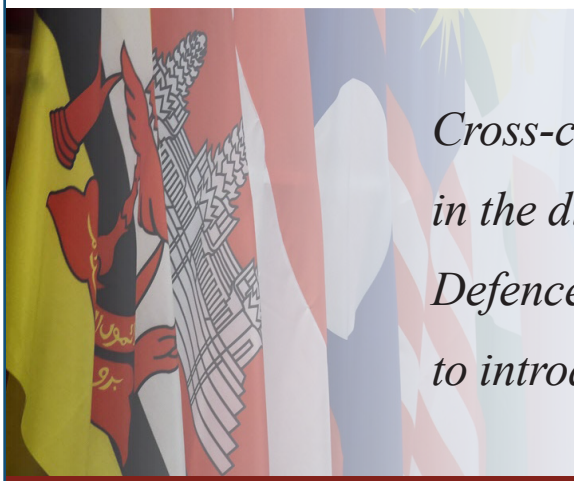
withheld. To reduce this barrier, the Pacific Data Hub in Southeast Asia aims to shift the conversation from a "need-to-know" to a "need-to-share" mentality. The platform strives to create a trusted environment that enables informed decisions by allowing communities to conduct their own need assessments. This also has benefits for the private sector, NGOs, and larger government bodies, allowing them to tailor their strategies for responses in different communities, thereby acknowledging on-the-ground realities and maximizing the use of resources.

Configurations of cooperation do not need to rely solely on existing international organizations. Dr. Cook noted that the Emergency Response and Assessment team in the Association of Southeast Asian Nations (ASEAN) depends on individual countries contributing their expertise to regional efforts, such as the Philippines' response to typhoons or Mekong countries' handling of collapsed infrastructure during flooding. However, organizations like ASEAN or SAARC need not be the only way forward. Cross-collaboration, such as India's participation in the disaster management portion of the ASEAN Defence Ministers' Meeting, can be an important way to introduce new perspectives and cut across silos.

Panel 2: Recovery. The second panel shifted from the immediate needs of disaster response to the process of recovery, with remarks from Manu Gupta of the Sustainable Environmental and Ecological Development Society (SEEDS) India and Mohammad Mahmodul Hasan of the Christian Commission for Development in Bangladesh. As experts from two NGOs with decades of experience in disaster relief and recovery, they focused on the local component of disaster management, the people on the ground, and the role of affected communities in the disaster management process.

Dr. Gupta stressed that the people affected by disasters are themselves an excellent resource and can be central to the process of rebuilding. In his work at SEEDS, he has seen communities become better prepared and more resilient to future disasters and help one another as a result of a much more inclusive disaster recovery process. Established frameworks allow communities to contribute their labor and ideas. Dr. Gupta also set the record straight regarding misconceptions about those affected by disasters. These communities are themselves the front line of their own recovery, with participation improving the agency of those affected and having a therapeutic effect on lives and society. Community involvement can speed up the recovery process. Although the most advanced technologies might not be available, there is an equally important repository of experience and knowledge at the local level that should be encouraged through equal exchange of ideas from the top down and the bottom up.

Mr. Hasan followed with his own experiences working in Bangladesh, where the cycle of floods and cyclones is a way of life. He shared an anecdote about the importance of recovery and rebuilding. In 2009, following a major cyclone, he met a man who had to wait four hours to get a glass of drinking water. By contrast, when Cyclone Amphan struck the same region in 2020, the same person had access to three sources of drinking water—rainwater harvesting, pond sand filtration, and a solar-powered, reverse-osmosis system. This synergy of new technologies and traditional systems increasing community resilience was held up as exemplary of rebuilding by many



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expert participants. Mr. Hasan also pointed out the role that Bangladesh's information-sharing structure, stretching from the national to the village level, has played in dealing with disasters. Harkening back to the first panel, he reiterated that every disaster will have unique features. While money and food are helpful forms of immediate relief, true recovery is centered on training people to deal with crises on their own.

Both speakers noted the importance of inclusivity during recovery, as it is frequently at this stage that vulnerable groups such as women, the elderly, or the socially marginalized start to be left out of the disaster management process. These people often live in the most vulnerable areas as well, compounding the impact of their underprivileged status. Specialized strategies to address issues in these communities are required, such as street lighting to improve security for women following disasters or needs assessments specifically targeting historically marginalized groups.

Panel 3: Mitigation. Tariq Karim from the Independent University of Bangladesh opened the third panel by discussing the broad considerations the mitigation phase must cover and reminding participants that mitigation must remain strategic in its goals. Governance stands as the core issue for this phase, and policymakers need to begin anticipating rather than reacting to disasters. Ambassador Karim asserted that policymaking must not be done independent of the people affected or solely to govern the commons.

Deepa Srinivasan of Vision Planning and Consulting then presented her observations of current practices in the United States and how they compare with those in India. She highlighted the importance of planning at all phases of disaster management and emphasized hazard mitigation plans that place the community first by identifying features of the local geography, climate, and population and using historical data to assess future hazards. By combining these two steps, planners can determine the greatest vulnerabilities of a community and estimate the risks of a disaster. By coupling such analysis with an assessment of a community's capability to deal with disasters, a mitigation strategy can be developed to improve resilience. Ms. Srinivasan stressed that it is better to have multiple plans for different scenarios rather than a master plan that is then adapted to a given situation. Spending resources in advance to appropriately prepare for different disasters ensures that when tragedy strikes responders know exactly what they need to do.

Pushp Bajaj of the National Maritime Foundation followed by presenting the effects of climate change on disaster management. He explained how climate change is affecting the frequency, predictability, and intensity of weather events. As the average global temperature becomes warmer, extreme weather events that were once rare are becoming more probable. Using data from the Intergovernmental Panel on Climate Change's latest report, Dr. Bajaj explained how hot temperature extremes increase in frequency and intensity with each rising degree in global temperature. Comparing present-day extreme weather events to the pre-industrial era (1850–1900), an event that would happen once every ten years is currently 2.8 times as likely to occur. If the average global temperature increases by 1.5°C, these weather events will become 4.1 times as likely. Projections for droughts as well as flooding follow a similar trajectory.

Dr. Bajaj concluded by outlining a holistic approach to disaster management that incorporates climate-change scenarios. Disaster planners will need to identify current vulnerabilities to scope out future risks, analyze and prioritize these risks, identify adaptation measures, and then implement, monitor, and evaluate these measures. By no means a small task, regional cooperation will be critical in preventing and preparing for climate-heightened disasters. As the region's primary responders, the Indian Navy and other navies should prepare for frequent HADR requests due to climatic changes. Collectively, the region will need to increase its scientific and technological capacity to record, map, and predict climate changes to better inform mitigation and adaptation strategies.

Closing out the panel, Ms. Srinivasan highlighted that South Asia faces budget constraints. Provided resources are spent on response rather than planning, and there are simply not enough resources being allocated to disaster mitigation. She stated that the importance of planning should not be underestimated and for contrast provided a U.S. Federal Emergency Management Agency statistic that every $1 invested in disaster planning and preparation saves $6 in response and recovery.

Panel 4: Preparation. The final panel covered a diverse array of topics, including geopolitics, community-level disaster resilience, and the historical trajectory and future of BIMSTEC and was led by Nilanthi Samaranayake of CNA. Ms. Samaranayake noted that, while it is impossible to ignore the complex geopolitics of South Asia, cooperation is vital for countries in the region as the scale of disasters grows, with impacts often spanning national boundaries.

Akriti Vasudeva of the Stimson Center raised the Quad as a promising avenue for India to step up its HADR commitment. Comprising Australia, India, Japan, and the United States, the Quad was essentially created as an ad-hoc meeting in response to the 2004 Indian Ocean tsunami, and thus its origin is in collaborative exercises. As India increasingly competes with China for standing in the region, HADR can provide it with net security provider credentials as well as soft-power projection. Though often seen as a limitation or hurdle to collaboration, geopolitics has the potential to direct more focus and resources toward mutually beneficial issues that would otherwise not garner attention.

Takako Izumi of Tohoku University emphasized the importance of community-level disaster management that is based on three principles: (1) self-help, (2) mutual help, and (3) public help. Ultimately, the level of damage that a community incurs from a disaster depends on the level of understanding and independent decision-making of the citizens themselves. Their collaboration plays a crucial role in overcoming disasters. Yet, hazard maps and emergency protocols that rely on hard science can underestimate the level of damage that a disaster will cause, and thus it is critical that individuals also rely on intuition and flexibility to influence their actions. Multi-layered sea walls and flood-proof or anti-seismic infrastructure will often go a long way but are not always 100% effective. Locals in disaster-prone areas must be well prepared for the extreme circumstances of increasing environmental phenomena induced by climate change.

Sohini Bose of the Observer Research Foundation gave a comprehensive description of BIMSTEC and its historical role in the Bay of Bengal. She noted the initiative's inconsistent engagement with the region, pointing out that it had only carried out two exercises in 24 years of existence. What started out as an organization for economic and technical cooperation later evolved into a vibrant organization for disaster resilience following the 2004 Indian Ocean tsunami. It has subsequently stagnated due to insubstantial economic commitments and a lack of maturity and funding, among other challenges.

In the Q&A portion of the dialogue, panelists discussed India's geopolitical challenges involving China, Japan's preparation for future disasters, and the BIMSTEC members' subnational roles. Ms. Vasudeva noted that despite India's geopolitical tensions with China, such as the 2017 Doklam standoff, India still has a role to play in the region as a "preferred security partner" for other nations. This role ideally will be centered on civil society and NGOs rather than military personnel in the disaster management process. Regarding Japan's 2011 triple disaster, Dr. Izumi responded that lessons from the past are crucial as Japan prepares for a more lethal, widespread

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earthquake that could hit Tokyo in the next ten years. Finally, Ms. Bose provided an overview of BIMSTEC members' subnational roles. Within the organization, India is the largest HADR provider in the region, while Bangladesh is the main advocate and stakeholder for disaster resilience in developing countries. Members like Thailand and Myanmar are still on the periphery of collaboration, with the former being more invested in ASEAN matters and the latter struggling from internal wars.

RECOMMENDATIONS AND POLICY OPTIONS FOR BUILDING COOPERATIVE FRAMEWORKS

Integrated management. To develop a successful framework to increase cooperation in the Indo-Pacific on disaster management, one of the first steps must be to understand limitations, clarify responsibilities, and strengthen cohesion between various levels of governance, from local communities to regional alliances.

First, many of the central governments in the region have different types of relationships with their respective states. In India, for example, the states have a great level of autonomy and in some instances can impede New Delhi's strategies or actions. Bangladesh uses networks of local stakeholders in close communication with central authorities to overcome similar challenges when coordinating disaster policy. When outlining regional cooperation, it is important to factor in a country's internal workings and develop plans that can be adaptive to variations in local governance.

Second, at the same time, state independence can be advantageous, as it can be easier to foster city-to-city relationships than overcome the complex geopolitical decisions required to find commonalities at the central government level. Factoring in private-sector engagement, a multinational operation could unify the disaster management process. Additionally, a company's culture can better retain training, values, and goals than a government that changes administrations.

Third, the limiting factors in most disaster management efforts are concentrated at the state or city level, where a lack of resources prohibits the necessary investment in mitigation and preparation efforts, such as preventative infrastructure or sufficient mitigation planning. By allowing communities to input their own need assessments, NGOs and other national and international organizations can better understand the on-the-ground needs and realities of a particular community. Emphasis should be placed on flexibility of operations. Given that no two disasters will be identical, first responders must be able to adapt to the realities on the ground in case lines of communication are cut or slowed in the hours after a disaster. Mock drills or other response training at the regional, national, state, and local levels should emphasize this point.

Fourth, communities hit by disasters are not quick to forget their losses or damaged property, and impacts can last for years. The social safety net needs to be expanded and should incorporate NGOs and the private sector in recovery efforts; these organizations can also work alongside leading individuals to help manage the geopolitics of country-to-country relations.

Fifth, disaster relief from one country to another has traditionally been provided by a government's military, which raises concerns of national sovereignty among many stakeholders. Going forward, NGOs and private corporations need to become a greater part of the process as technologies and knowledge are transferred among populations as one way to diffuse tension and concerns over a range of security issues.

Sixth, given the sensitive geopolitical environment in South Asia, having a third party present in bilateral talks could be beneficial. Japan has a very good reputation in the region, so India could engage with Japan to improve disaster management cooperation with smaller neighboring countries. If countries in South Asia (and the broader Indo-Pacific) wish to build a reputation as crisis responders, their respective embassies in the region should take a more proactive role with possible partner countries. They also need to have a plan in place to coordinate on data and communication in the leadup to a crisis, as well as provide guidance on mock drills to prepare for one.

Finally, existing frameworks in South Asia such as SAARC and BIMSTEC can offer a good starting place for cooperation. The ASEAN Defence Ministers' Meeting-Plus is co-chaired by India and Indonesia. ASEAN has made great progress in cooperation and country specialization in disaster response, which could be replicated in the Bay of Bengal.

Improving education. A second focus area is enhancing preparation, mitigation, recovery, and response efforts through education. Institutional knowledge and experience can help inform and establish curriculum and training programs that streamline and increase the effectiveness of mitigation plans.

First, disaster mitigation should encompass education, planning, and policy based on the risk and vulnerability of a community. This can be accomplished through enacting disaster mitigation plans informed by local expertise, which will assess the specific needs of a community. Community needs assessments should be incorporated alongside new technologies to develop hazard mitigation plans. Starting with the geography and demographics of the area, and then assessing the hazards themselves, analysis is needed of how historical trends may be affected by a changing climate. Multiple mitigation plans must be utilized for different kinds of disasters rather than relying on one master plan that must be tailored to fit each scenario.

Second, in some South Asian contexts, mitigation can be seen as a luxury and must be incorporated into municipal and state planning well in advance of actual disasters occurring. Educating stakeholders, particularly those traditionally left out of the process like local community leaders and the private sector, on the benefits of investing in mitigation over recovery can aid in achieving this goal.

Third, Bangladesh saw success in lessening the impact of cyclones through use of a proactive, integrated management approach. With government ministries focused on disaster management, and programs like the Cyclone Preparedness Program, Bangladesh has been able to ensure a two-way information stream between decision-makers and local communities. Coordinated by a division of emergency management or the equivalent agency, actions should be delegated to agencies to return existing operation systems such as water, healthcare, and electricity to normal. There should be an assessment of damage and a review of situational reports, and collected information should be used by local and state/national bodies to improve response.

Fourth, disaster management planning is essential and should be required for all communities at the local level. These plans should be updated regularly (every five years in many cases) and include considerations for all aspects of the disaster management process:

- *Response.* Work toward continuity of operations to reduce interruption and provide clarity of responsibility during a disaster, and produce after-action reports to identify areas of success and improve future response.
- *Recovery.* Support whole-of-society recovery, from infrastructure to housing and businesses; perform a needs assessment to ensure allocation of available resources to locations and sectors that can benefit most.
- *Mitigation.* Include not only hazard mitigation plans, but also work to integrate these with other local ordinances, such as transportation, zoning, and development planning, as these are key to removing vulnerabilities ahead of a disaster.
- *Preparedness.* Emphasize threat and hazard identification, risk assessment, and training through drills and exercises to ensure readiness ahead of a disaster.

Fifth, when preparing for disasters, the effects of climate change need to be taken into account, as more parts of the region are being affected by natural disasters that are increasing in magnitude and frequency. Early-warning and recovery systems need to be revamped for these new circumstances. Ensuring that any existing disaster management plans are updated regularly (at least every five years) will be a necessary part of the planning process. Additionally, identifying other international efforts, such as Articles 7 and 8 in the Paris Agreement, that align with more disaster-specific initiatives, such as the Sendai Framework, is an important step. Meeting

climate pledges outlined at COP21 and more recently COP26 can aid in disaster mitigation and preparedness strategies. There is a need for clear communication down the chain of command during the entire disaster management process: (1) before the disaster strikes, (2) when people hit the ground, and (3) post-disaster on lessons learned. Setting short-, medium-, and long-term needs and utilizing a cost-benefit analysis to prioritize some issues over others could be an efficient way of managing resources:

- Maintain secure systems, supplies, and equipment in operational readiness conditions; train all city personnel in hazard/threat emergency procedures; if warranted, pre-position personnel and equipment.
- Develop functional checklists to assist personnel on proper response to changing conditions; maintain an updated emergency personnel call-in list.
- Prepare for an emergency operations center with city agencies fulfilling designated operation roles and establishing clear lines of communication between decision-makers and responders.

Sixth, under the Sendai Framework, involving everyone during the disaster preparation stage, such as through evacuation drills and disaster management education, can be an inexpensive way to maximize existing resources.

Technology and information sharing. Finally, sharing information is critical in the leadup to a disaster, as well as in the critical response hours. This is a key component of cooperation, particularly as advances in technology have vastly increased the amount of information available to decision-makers.

To this end, meteorological data can be shared between national weather services. This was cited as key when preparing for cyclones striking the northern Bay of Bengal. Other data, such as vehicle geolocations or cell phone data, would benefit from data sharing but can be proprietary or sensitive. Establishing a cooperative means of sharing critical data before disasters will improve response and recovery in their wake.

Technology can also play a key role in the crucial response phase when large amounts of information must be processed quickly by key decision-makers. Sharing satellite imagery between countries to improve coordination and working alongside the relevant meteorological and security partners will be key to ensuring that national security concerns are accounted for when planning for possible HADR operations.

The mitigation phase is also ripe for the use of technology. Options include improved mapping and risk assessment by using satellite technology for planning development or the use of artificial intelligence when developing hazard mitigation plans.

Governments should work with private companies to ensure access to critical, sometimes proprietary data in the wake of a disaster. In addition, partnering with NGOs that have a presence in both India and its neighboring countries could offer an embassy or consular mission a good opportunity to improve cooperation.

Establishing a cooperative means of sharing critical data before disasters will improve response and recovery in their wake.

CONCLUSION

Disaster management planning and recovery need to factor in new challenges brought on by a changing climate and prepare for more intense and frequent disasters. As a result, disaster management planning must be flexible and able to address changing circumstances. After a disaster and while a community is recovering, resources need to be allocated to rebuild and be more prepared for the next event.

Current organizations in South Asia, from regional associations to NGOs and local governments, lack the financial engagement and long-term plans needed to prepare for future disasters. As the Modi administration engages in multilateral approaches to regional disaster response, there is an opportunity for India to take the lead in bringing its neighbors together to adapt to the evolving effects of climate change. However, before this can happen, the isolated silos of disaster management and the numerous organizations and stakeholders involved must be dissolved. While every stakeholder cannot be an expert in all aspects of the process, establishing communication, clarity, and flexibility is essential for improving disaster management and cooperation.

For South Asia and the entire Indo-Pacific, population growth, migration, and climate change will combine to increase the threats from natural disasters over the coming decade. Yet, with a forward-looking disaster management policy built to include all aspects of society and leverage cooperation among regional and global partners, the region can collectively work toward a more resilient and safer future. ~

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