

Executive Summary

Over the past two decades, many countries in Asia and the Pacific have strengthened their resilience against numerous natural calamities. Fewer people are dying as a result of natural hazards as countries have been devising more robust systems of early warning and responsive protection. But there is still a lot to be done. Most countries are still ill-prepared for multiple overlapping crises. Since the incursion of COVID-19 pandemic, the region has been hit by multiple natural and biological disasters, while climate change has continued to warm the world, exacerbating the impacts. The pandemic, combined with the persistent reality of climate change, has reshaped and expanded the Asia-Pacific riskscape. If the region is to achieve the goals of the 2030 Agenda for Sustainable Development, particularly Goal 1, Goal 9, Goal 11 and Goal 13, a hazard-by-hazard approach to disaster risk management is no longer viable.

The *Asia-Pacific Disaster Report 2021* addresses the complexity of these converging and cascading risks by analysing hazards (natural and biological) simultaneously, presenting the impacts of cascading risks on populations and infrastructure under current, moderate and worst-case climate change scenarios. It focuses on five risk hotspots of particular concern. The report further estimates that annual economic losses arising from such cascading risks could almost double to US\$ 1.344 billion equivalent to 4.2 per cent of regional GDP under the worst case climate change scenario. Finally, the report makes the case for more purposeful and systemic national action with fiscal expenditure on resilience amounting to only a fifth of annualized losses or 0.85 per cent of the GDP of the Asia-Pacific region, along with stronger subregional and regional cooperation as important adjuvants.

A. The state of disaster risk reduction

A mixed picture...

Over the past 50 years, natural hazards in Asia and the Pacific have affected 6.9 billion people and killed more than 2 million, almost all of whom were victims of water-related disasters, such as floods, droughts, and storms. Nevertheless, fewer people have been dying; there has been a substantial fall in the average loss of life per year, which in 2019 and 2020, fell to around 6,200 people. This is heartening progress, and a testament to the dedicated efforts of governments and communities to protecting human life. Nevertheless, the average number of people affected per year has fallen only slightly, to 122 million people. Disasters have also caused huge economic damage.

Disaster impacts are likely to intensify because climate variability and the increase in extreme temperature fluctuations can affect the frequency and intensity of disasters and make certain places and population groups more vulnerable. Climate change is thus not only a hazard in itself, but also exacerbates interactions between biological and other natural hazards, which in turn affects the underlying risk drivers of poverty and inequality, in a vicious circle.

...of cascading risks triggered by the biological shock of the century: COVID-19

For the first time, this report has estimated the economic costs stemming from the combined impacts of the disaster-climate-health nexus. For this purpose, it considers two climate change scenarios using 'representative concentration pathways' (RCPs). The first is a moderate scenario where RCP is 4.5 and the second is the worst-case scenario where RCP is 8.5. The current annual losses from both hydro-meteorological and geophysical natural hazards are estimated to be around \$780 billion. Under RCP 4.5, these losses will increase to \$1.1 trillion, and under RCP 8.5, to around \$1.4 trillion.

Concurrently, countries all over the world are still coping with the COVID-19 pandemic, a disaster of unimaginable proportions and the worst biological shock of the century. As of 6 June 2021, countries in the Asia-Pacific region had reported 49 million confirmed COVID-19 cases, and more than 748,000 deaths. The pandemic has had the greatest impact in South and South-West Asia, with 37.2 million confirmed cases, and in North and Central Asia with 6.6 million cases.

While responding to the pandemic, Asia-Pacific countries have also had to contend with their regular sequence of other natural hazards, including cyclones, typhoons, storm surges, floods, droughts, heatwaves, glacial lake outbursts, locust swarms, earthquakes and volcanic eruptions, most of which have been hydro-meteorological. Tropical cyclones, such as Amphan, Nisarga, and Tauktae, have hit countries in South and South-West Asia. Major flood events were reported in China, Japan, Papua New Guinea, Pakistan, the Islamic Republic of Iran, Kazakhstan and Uzbekistan. In all these disasters, many of the established measures for prevention, response, and recovery were interrupted by lockdowns, travel restrictions and other containment measures imposed as a response to COVID-19. At the same time, these natural hazards have hampered the response to the pandemic and facilitated the spread of the virus, as people often had to crowd together in emergency shelters. The convergence of biological and other natural hazards added to the underlying drivers of vulnerability, which include poverty, inequality, and unplanned and rapid urbanization, all of which has damaged the life prospects of millions of people.

Undoubtedly, all countries have been learning how best to react to these multiple hazards. However, some have been in a better position than others. Those countries who had experienced the outbreak of the SARS virus were able to anticipate the needs in terms of surveillance, testing, contact-tracing, treatment and quarantine implementation. To better understand the transmission mechanisms, countries used 'frontier technologies', such as artificial intelligence (AI) and the manipulation of big data. They also used advanced modelling techniques for early detection and rapid diagnosis. Those Asia-Pacific countries that are at the forefront of these technologies have been able to exploit them on a wider scale, while others, though being less technologically advanced, have still been able to use them to some advantage. Least developed countries, lacking the necessary skills and capacities, have continued to struggle.

Effective action has also depended on social mobilization, that is, promoting social distancing and hygiene and installing efficient test-isolate-treat regimes. These techniques worked well in the more developed countries, but they still need to be adapted for the densely populated, urban slums of developing countries. In some countries, official action was complemented well by local community surveillance.

For all these activities, health experts, governments and at-risk communities have also had to ensure effective communication and dispel misinformation. Governments in Asia and the Pacific have, to varying degrees of success, partnered with national academic institutions and companies to track the rapidly changing situation. Based on this information, many countries have been able to make critical, risk-informed interventions by imposing lockdowns, for example, and insulating other provinces and cities from the spread of the virus.

Nevertheless, in practice, the response and interventions have had their shortcomings. Often, they have not been sufficiently 'granular' or have not been updated quickly enough to keep pace with the spread of the virus, which typically has been transmitted in waves. As demonstrated by the ongoing fourth wave, opening up too quickly, without universal access to WHO-approved vaccinations, has necessitated a constant and alert stance which is ready to seal off fresh outbreaks of infection.

In sum, the pandemic has shown that the new normal in Asia and the Pacific will be a disaster riskscape with increasingly complex, overlapping and cascading hazards. It has also demonstrated that while some countries have achieved success in dealing with individual disasters many countries are still ill-prepared for complex overlapping crises, and the intersections of biological and natural hazards remain poorly understood.

B. The intersection of COVID-19 with natural hazards and climate change

Emerging and intensifying risks...

The COVID-19 pandemic has brought to the forefront, yet again, how risks interconnect and how these systemic risks, biological and hydro-meteorological, will be affected by the changing climate. The analysis in this *Report* shows that in the worst-case climate change scenario, the number of people at high risk, in the Asia-Pacific region, will increase by around one-third. These vulnerable people are mainly located in the Ganges-Brahmaputra-Meghna basin, the Indus basin, parts of South-East Asia, and in some Pacific island countries.

Climate change will slow the progress made in poverty reduction and may even reverse hard-won gains in development. This is already evident in the region's rapidly growing cities. People living in the region's cities face heightened vulnerability, because concrete buildings that retain heat, along with the loss of green spaces, contribute to the 'urban heat island' effect. Slums and informal settlements with improvised housing can also form micro-heat islands. Many regions are experiencing higher temperatures and different patterns of rainfall, and those along the coasts are threatened by rising sea levels and by extreme weather events. In other parts of the region, people are increasingly vulnerable to heatwaves, which is an intensifying hazard that has only recently begun to attract the policy attention it deserves. Overall, the people hit hardest are usually those who live in poor-quality housing on marginal land.

In both urban and rural areas, some groups are particularly vulnerable, notably women, children and the elderly, and those living with disabilities. The combination of natural disasters and climate change could widen gender disparities, particularly with respect to access to nutrition, and clean water and education, as well as to menstrual hygiene management and to sexual and reproductive health services. The impacts will be particularly severe for the large number of women in low-paid or unpaid work.

During disasters, children too are at higher risk of encountering violence, abuse, neglect and exploitation. The convergence of climate change and biological and other natural hazards will also increase child malnutrition. At the other end of the age spectrum, people aged 65 and over, many of whom are women and disabled, could be at greater risk during slow-onset or sudden disasters.

...give rise to five risk hotspots

The *Asia-Pacific Disaster Report 2019* presented a riskscape that included slow-onset disasters for the first time along with floods, tropical cyclones, earthquakes, and tsunamis. However, the risks have now expanded with the addition of biological hazards and the impacts of climate change, all of which are occurring simultaneously. Under these new risk parameters, a set of hotspots emerge where the impact of systemic and cascading risks are severe.

- *East and North-East Asia*: Heatwaves and related biological hazards are increasing along with the existing riskscape of earthquakes and tropical cyclones.
- *North and Central Asia*: High rates of COVID-19 cases are being superimposed on newly emerging areas of drought, land degradation and biological hazards due to climate change.
- *South and South-West Asia, and South-east Asia*: Some parts of these subregions are the global epicentres of COVID19. The pandemic is being superimposed on intensifying floods, droughts, and cyclones, leading to systemic failures that threaten to reverse poverty reduction gains and the achievement of the SDGs. The poor living along river basins in these subregions are the worst affected,
- *Pacific small island developing States*: Emerging high rates of COVID19 are being superimposed on cyclones and multiple other hazards that have been exacerbated by climate change and have led to an emerging and complex riskscape not seen before.

Focusing on these hotspots can enable countries to capture the impact of systemic and cascading risks and highlight priority areas for action, as discussed in the next section.

C. The scaled-up contours of a regional resilience response

The COVID-19 pandemic has served as a wake-up call, a stark reminder, that humanity will always remain vulnerable to powerful natural forces. Thus, it is important to assess how countries, in the Asia-Pacific region, should respond to multiple, converging hazards. This report suggests four national priority areas for action. It also highlights areas where subregional cooperation can be strengthened and serve as building blocks for a regional strategy for disaster, climate and health resilience.

Scaling up national policy actions

1. ENVISAGE RISK SCENARIOS

Traditionally, risk is envisaged as an interaction between hazards with vulnerability, exposure, and adaptive capacity. But this does not take into account how, on our increasingly complex and fragile planet, all these hazards and impacts interconnect and overlap. Thus, most aspects of human societies can now better be considered in terms of these intersecting systems. In these circumstances, the best approach is to envisage a series of scenarios, each with different interlinkages and relationships. Planners will need to invest more in the development of composite risk matrices to identify and stratify vulnerable populations, and their varying needs and capacities, in order to make comprehensive risk assessments and take targeted actions.

In 2020, the ESCAP secretariat developed a prototype of composite matrices that placed districts or areas into appropriate risk zones, incorporating risks from endemic, natural, and biological hazards. The methodology was piloted for Bangladesh and India, and highlighted the states most exposed to cascading disasters, including monsoon floods that occurred amid the COVID-19 pandemic, along with the endemic risk drivers of poverty, inequality, and population density.

2. CAPITALIZE ON FRONTIER TECHNOLOGIES

In their race to control the COVID-19 pandemic and protect their people, countries have increasingly invested in 'frontier technologies', and adapting innovation to local exigencies. Artificial intelligence and the manipulation of big data have enabled a better understanding of the transmission mechanisms. Advanced modelling techniques have been used for early detection, rapid diagnostics, prevention of the spread of the virus, as well as for managing critical supplies and delivering equipment.

New technologies will need to be combined with enhanced social organization and mobilization, adapted, in particular, to the region's densely populated urban slums where such techniques are difficult to apply. There is scope for experience sharing and learning from countries that effectively used frontier technologies to support official actions and local community surveillance by offering 'ears to the ground'. For example, by checking for unintended consequences of official action and taking corrective steps, while also using social media to dispel misinformation, and improve communication between health experts, governments, and at-risk communities.

3. INVEST IN HEALTH AND SOCIAL PROTECTION

Disasters impose multiple pressures on the health systems and disrupt health services, exposing people to greater risks in facilities with poor health conditions. The impacts from COVID-19 highlight the urgent need to merge disaster risk reduction strategies into health preparedness systems, especially to support the most vulnerable populations. The pandemic has clearly demonstrated the value of digital health systems, though their legal and privacy issues need to be carefully addressed.

The pandemic shock has also highlighted the importance of strong social protection that encompasses disaster preparedness. Over the years, governments have tried to ensure that social protection is more shock-responsive. But the scale of the pandemic has brought to the fore the need for social protection that is not just shock-responsive but also shock-prepared. Building on existing achievements, the aim should be universal social protection throughout people's life cycles. Equally important are risk-informed investments in health and education infrastructure and service delivery.

4. TARGET ADDITIONAL FISCAL SPENDING

Governments will need to boost resilience through targeted, more forward-looking fiscal spending. But the important question is how much fiscal investments will be required? Prior to the pandemic, estimates included the costs of building greater resilience to climate change. However, the costs of protection from biological hazards must also be added to these numbers.

The annual cost of adaptation to natural and other biological hazards under the worst-case climate change scenario is \$270 billion, of which \$68 billion is required for adapting to biological hazards. This is equivalent to 0.85 per cent of regional GDP for the total adaptation cost, and 0.22 per cent of regional GDP for the adaptation cost for biological hazards. These costs need to be considered alongside the capacity to pay. The costs of adapting to climate change, as a percentage of GDP, vary from almost 1.4 per cent for the Pacific SIDS, to less than 1.0 per cent for South-East Asia, North and Central Asia, and the entire Pacific subregion.

Nevertheless, even when biological hazards are added, the cost of adaptation under the most severe climate change scenario is only one-fifth of the annualized losses from natural hazards for the region.

To increase adaptation spending, governments will need to diversify their sources of finance. In addition to those used for normal public spending, other financial instruments can include climate resilience bonds, debt-for-resilience swaps, and debt relief initiatives. Governments can also share the costs through public-private partnerships using such instruments as parametric insurance.

Scaling up subregional and regional cooperation

Initiatives at the subregional and regional levels can serve as adjuvants to these four national policy actions.

South-East Asia: As part of the effort to mobilize region-wide action on drought adaptation and disaster resilience, ASEAN and ESCAP have jointly produced the *Ready for the Dry Years* publication series. The findings from this report supported the adoption of the ASEAN Declaration on the Strengthening of Adaptation to Drought, that was held at the 37th ASEAN Summit on 13 November 2020. As a follow-up, the ESCAP and ASEAN secretariats are working on an ASEAN Regional Plan of Action on *Adaptation to Drought 2021–2025*, for ASEAN member countries to consider and adopt.

East and North-East Asia: The North-East Asian Subregional Programme for Environmental Cooperation has served as a comprehensive intergovernmental framework. There is thus scope to scale up the Program's work on desertification and land degradation and its interlinkages with climate change.

South and South-West Asia: Ministers dealing with environment and disaster risk management have called on ESCAP to shape a longer-term, holistic, coordinated and more strategic approach by developing a new regional framework for managing cascading risks from natural and biological hazards.

North and Central Asia: ESCAP is undertaking a study on the risk drivers of water-related disasters in inland water-basins, including the impacts of climate change, through advances in Earth observation, digital elevation modelling, geospatial techniques and high-resolution climate modelling. This will help promote understanding on ways to address crises, such as the Aral Sea basin catastrophe, from a multi-sectoral risk management perspective. To date, analysis on these long-standing environmental challenges, using disaster risk reduction perspectives, is a relatively under-studied approach, but one which lends itself to strengthened collaboration among countries of North and Central Asia.

Pacific island States: ESCAP, jointly with the Government of Samoa and the United Nations system, is implementing a project on strengthening resilience of Pacific islands States through universal social protection. ESCAP is also partnering with the Pacific Regional Environmental Programme and the Pacific Community and there is scope to scale up subregional activities related to disaster, climate and health resilience for the protection of people.

Asia-Pacific region: Disaster risks know no borders, so countries across Asia and the Pacific need to work together through overarching regional initiatives. Subregional initiatives can serve as the building blocks for regional approaches. The risks in the steppes of Central Asia may be very different from those of the Pacific small island developing States, but what countries across the region should have in common, however, are sound principles for managing disaster risks in a more coherent and systematic way, principles that are applied with political commitment and strengthened through regional and subregional collaboration.

In this regard, there is a need for a regional strategy on building back better with disaster, climate and health resilience. It is recommended that the strategy incorporate the analytical components and policy recommendations presented in this report. The four work streams proposed in this report are: (a) policy coherence, (b) multi-hazard and integrated early warning systems, (c) climate change adaptation, and (d) investing in resilient health infrastructure.

More complexity ahead

As climate change intensifies and more biological threats surely lie in wait, Asia and the Pacific will face an increasingly complex set of hazards. In the new disaster riskscape, these multiple threats will often overlap and intersect, triggering a cascading series of events. To combat these threats, countries will thus need to take comprehensive action to protect the poorest at national, subregional and regional levels.