INFORMATION AND COMMUNICATIONS TECHNOLOGY
AND DISASTER RISK REDUCTION DIVISION

Be Prepared:
By reducing disaster and crises risk

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Abstract

Be prepared by reducing disaster and crises risk[1]

Global warming of 2°C is likely to be exceeded during the twenty-first century. A warmer world would be riskier not only in terms of more frequent extreme weather and climate, but also the experience of systemic risks. The Asia-Pacific region faces a daunting spectrum of hazards emanating from various sources, both natural and biological. Indeed, Asia Pacific is the world's most disaster-prone region is the most disaster prone in the world. Countries here are close to reaching a tipping point beyond which – fueled by climate change – they are bound to exceed their capacity to respond. Public health is a key driver or responses to the cascades of disasters and the pandemic. Hence, strengthening health sector resilience, its interlinkages with emergency response systems and infrastructure planning are the key preparedness strategies for responding to such a major crisis. **This working paper reviews the existing practices related to health emergency, infrastructure resilience and smart ways of crisis response and prevention.**

A key lesson from the COVID-19 pandemic is to better anticipate and prepare for such a large-scale crisis amidst uncertainties. The paper examines the key enablers to this approach. It focusses on better tackling the cascading and complex crises emanating from the nexus of natural hazards, climate change and public health challenges. It also presents strategic foresight for short, medium- and long-term and suggests a collation of regional and subregional actions to better prepare Asia-Pacific for major risks of disasters, climate change and pandemics.

[1] Draft working paper for review: Disaster risk reduction section, IDD/ESCAP.

1. A riskier world: An evolving global riskscape

The global riskscape, which evolves through complex interplays among the environmental, economic, geopolitical, societal and technological factors, is fundamentally systemic in nature.

The World Economic Forum's *The Global Risks Report*s (figure 1) have been calling the global pandemic a risk to humanity since 2006[2]. The Global Risks Perception Survey 2021-2022 (GRPS) identifies climate action failure, extreme weather and biodiversity loss as the most severe risks on a global scale during the next decade. These are followed by erosion of social cohesion and a livelihood crisis as the fourth and fifth severe risks[3] (figure 1). As the world progresses and commercialization spreads across the globe, man-made disasters are beginning to pose a greater threat to humanity.

As the world continues to battle the deadly coronavirus pandemic, societal risks, have also posed various challenges. In the past two years, next to loss of lives, the greatest consequence of the pandemic has been the loss of jobs across the world. In Asia and the Pacific, the net job losses (actual, not full-time equivalent jobs) pointed to a jobs gap of 73 million at the regional level in 2020, relative to the pre-pandemic scenario.[4] Unemployment, underemployment, lower wages, fragile contracts and erosion of worker rights have emerged as some of the major threats. The loss of biodiversity is another major threat to humanity.

Next, while frontier technologies have achieved groundbreaking success in providing access, especially to health care and financial services, multiple risks have also emerged, like the growing digital divide and gap in access to digital services. Unequal or fractured access to digital networks is another risk to the world. Further, cyber-attacks have emerged as a growing threat. **Overall, the present riskscape is multifaceted and hence, calls for a multi-pronged preparedness strategy that involves whole-of-government and whole-of-society approaches.**

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[2] *The Global Risks Report 2021* World Economic Forum, (2021). The Global Risks Report 2021 Available at https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf

[3] World Economic Forum, (2022). The Global Risks Report 2022, Available at https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

[4] International Labour Organization, (2021), World Employment and Social Outlook: Trends 2021, Available at https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_795453.pdf

Figure 1: Global riskscape – A system of natural, technological, and man-made hazards

Source: Adapted from World Economic Forum, The Global Risks Report 2022, Available at: https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

1.1 Climate crisis - the biggest threat

If emission levels remain unchanged, global warming is bound to exceed 2°C in the 21st century. Consequently, heatwaves, floods, droughts, tropical cyclones and other extremes will become more frequent and intense. These are projected to also occur in regions that historically never experienced weather extremes.

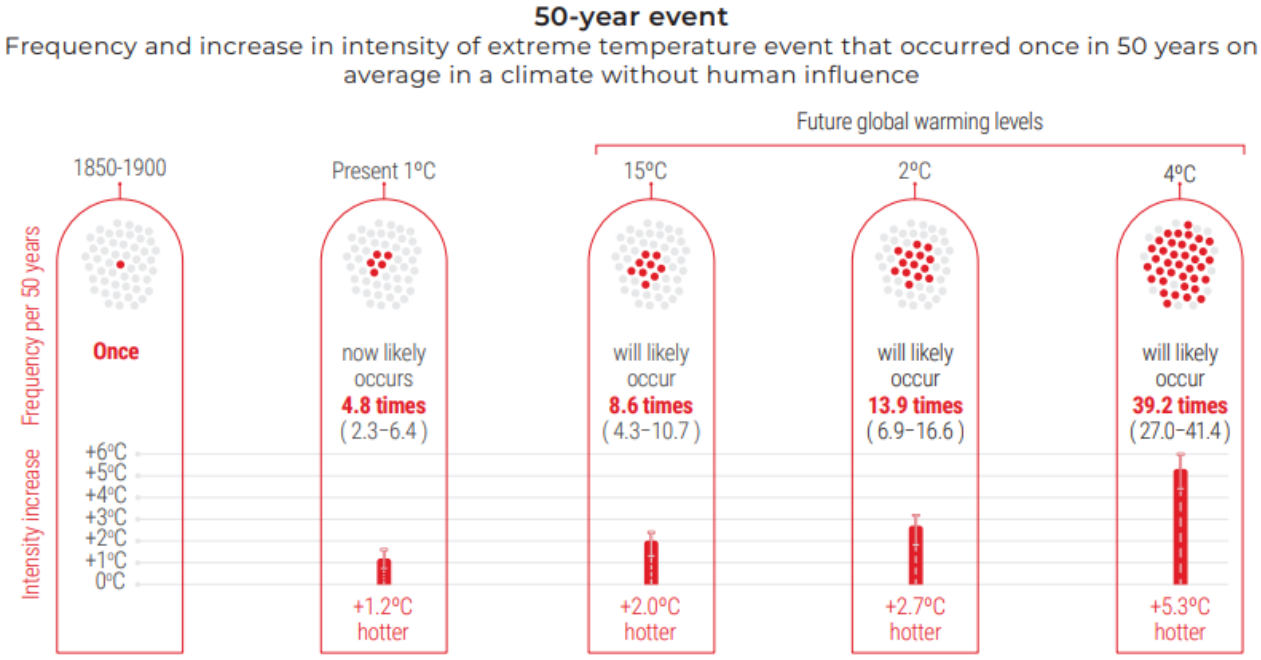
The Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis,* presents new scenarios with greater certainty to understand the changes taking place in climate extremes and their attribution to human influence. This is a step forward from the fifth assessment report. Using the latest Sixth Coupled Model Intercomparison Projects (CMIP 6), it offers improved knowledge of climate processes, paleoclimate evidence and response of the climate system to increasing radiative forcing as well as a best estimate of equilibrium climate sensitivity of 3°C. To bridge the science and policy gaps, the report uses Shared Socio-economic Pathways (SSP) to describe "five broad narratives of future socio-economic development" from potentially below a 1.5°C best-estimate warming scenario to more than 4°C warming by 2100.

According to the AR6, every fraction of a degree translates into increased risks. One of the key highlights of the report is that the difference between 1.5 and 2 degrees of global warming is substantial. For example, every additional 0.5°C of global warming causes clearly discernible increases in the intensity and frequency of hot extremes, including heatwaves (figure 2).

In the Pacific Small Island Developing States (SIDS), between 1.5C and 2°C, every increment of a degree translates into increased risks of tropical cyclones. Currently, there are only a few countries at risk of cyclones in categories 3 to 5 with wind speed ranging between 180 to 250 kilometres per hour. Based on CIMP6, under a climate scenario with very high GHG emissions (SSP 5-8.5) and warming of 1.5°C, a large number of Pacific SIDS are likely to face increasing annual wind speed in

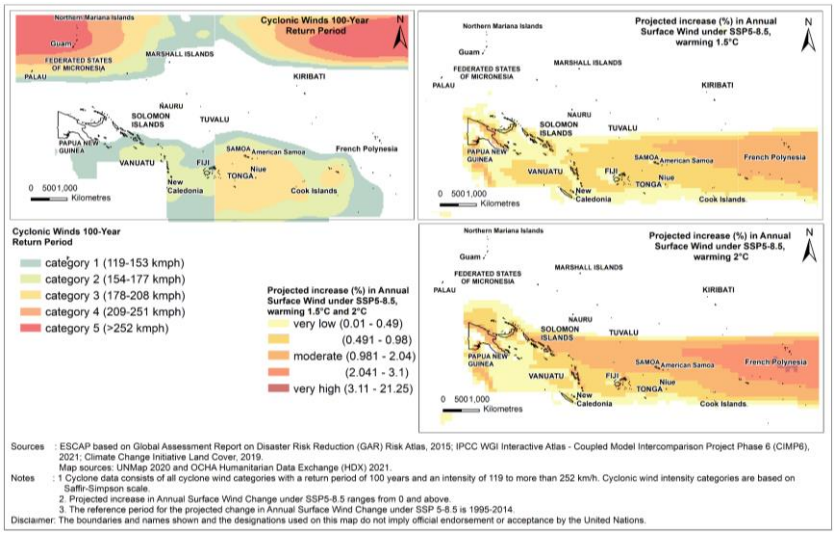
3 to 5 categories of cyclones. Further, most of the Pacific SIDS countries will be exposed to tropical cyclones in the categories 3 to 5 with warming of 2°C (figure 3). The SIDS regions have also suffered from king tides, disastrous storms, saltwater intrusion making growing food very challenging, droughts and gradual loss of low-lying areas to sea-level rise. The Pacific SIDS and low-income countries are already grappling with climate change effects. This shows that the world's most vulnerable nations are already on the frontline of the climate crisis.

Figure 2: Projected changes in the intensity and frequency of hot temperature extremes over land in drying regions



Source: Intergovernmental Panel on Climate Change, "Climate Change 2021: The Physical Science Basis", Summary for Policymakers (2021). Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

Figure 3. Exposure to tropical cyclones by Pacific SIDS at 1.5°C and 20°C warning scenarios



Source: Economic and Social Commission for Asia and the Pacific (forthcoming publication)

Asia and the Pacific confronted the pandemic during these natural hazards. This thoroughly taxed existing resources and capacities of both health and disaster management systems. The vulnerable population groups were the worst affected. The pandemic quickly exposed the systemic gaps in funding of health services as well as integrated crisis management and mitigation. Countries recognized that the demarcations between natural, biological and other hazards are, at best, arbitrary. With climate change, IPCC notes that human health will be directly impacted by changes in temperature, precipitation and increasing occurrences of heatwaves, floods, and drought, with potentially shifting patterns of disease vectors. Overall, there is extensive scientific evidence that climate change is affecting weather extremes which, in turn, will impact vectors of diseases[5]

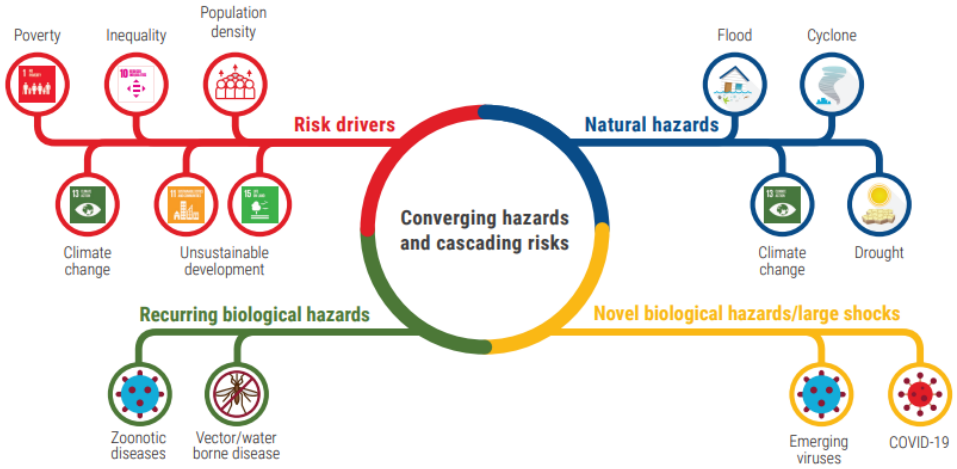
The *Asia Pacific Disaster Report 2021*[6] indicates that the disaster riskscape will continue to be reshaped by cascading hazards emerging from climate change. In addition, natural disasters linked to climate change disproportionately affect poor people and poor countries. This is of major concern as global warming is not only a hazard in itself, but it also exacerbates interactions between biological and natural hazards and

[5] Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn, 2014: Human health: impacts, adaptation, and co-benefits. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11_FINAL.pdf

[6] United Nations Economic and Social Commission for Asia and the Pacific, (2021). Asia Pacific Disaster Report. Available at: https://www.unescap.org/kp/2021/asia-pacific-disaster-report-2021

other risk drivers, such as poverty. To address these cascading hazards, **there is a need to build integrated disaster-climate-health risk scenarios.** These must not only consider each individual hazard risk, but also note where the hazards intersect and locate the highest likelihood of cascading risk zones given the existing risk drivers. This is critical in identifying the most vulnerable populations during cascading crises. Figure 4 shows that individual hazards, when overlapping, produce a cascading set of impacts on economies and populations. These hazards include the baseline risk drivers, natural hazards, recurring biological hazards and novel hazards (such as another pandemic or black swan events). These scenarios can occur on different time scales, and the intersections and overlaps of these scenarios produce cascading risks. Therefore, to become resilient to hazards, all scenarios must be modelled with their corresponding impacts on populations and sectors as well as the corresponding probabilities

Figure 4: Converging hazards and cascading risks emanating from the disaster, climate and health nexus



Across Asia and the Pacific, Governments have raced to control the COVID-19 pandemic and protect their people. The biological threat has compounded the impacts of flooding, drought, cyclones and locust swarms, making it more difficult to respond effectively.

While it is imperative to recognize that there is need for integration of disaster risk reduction and management sector and the health sectors, there are multiple challenges to overcome in order to advance this call from rhetoric to reality. Primarily, there is a need to understand systemic risks that are emerging from the convergence of multiple disasters, the existing socio-economic vulnerabilities, and quantifying multi-sectoral impacts.[7] This can support evidence based decision making, prioritization and protecting people.

[7] United Nations Economic and Social Commission for Asia and the Pacific, (2020). Pathways to manage cascading risks and protect people in South Asia: Key takeaways for stakeholders. Available at https://www.unescap.org/resources/pathways-manage-cascading-risks-and-protect-people-south-asia-key-takeaways-stakeholders

2. Be prepared: Risk-based approaches

Compounding risks can exacerbate a challenging health crisis by multiplying the initial impact.

As highlighted before, one of the biggest lessons from the covid-19 pandemic has been that our health-care system cannot cope with multiple crises simultaneously. In this context, **a lateral public health system** stipulates a three-tiered approach towards climate change, directed towards addressing hazard, exposure and vulnerability.[8] It relies on approaches for mainstreaming health aspects into other sectors and allows scaling-up effective strategies to tackle hazard, exposure and societal vulnerabilities in order to offset synergistic amplification of compounding risks. Developing community-level capacity for climate risk reduction by utilizing the available social capital is central to the lateral public health system. As opposed to the traditional approach, wherein public health is operated solely by the Government, this system is a transdisciplinary, grassroots approach to public health and facilitates community-based participation in decision-making, preparedness and response.[9]

In effect, the lateral public health system enables averting cascading impacts from a sequence of secondary events that are causally connected, with one event triggering the next (table 1). It aims to break these causal chains through transparency and multi-sectorial interventions as well as investments in health systems, poverty and inequality reduction. Further, lateral public health strives for community engagement in decision-making, preparedness and response. The COVID-19 pandemic offered an opportunity to learn and overcome the predicaments of traditional public health by leapfrogging to lateral public health.

2.1. Public health systems in multi-hazard risk areas

Lateral public health systems are more effective in multi-hazard risk hotspots where cascading risks are often high. However, access to health care – which is a fundamental requirement – is not adequate in these areas to meet the demands during emergencies. For example, there are just a small number of hospitals within the most at-risk areas in Nepal to support the most vulnerable populations during disaster shock.[10] Similarly, the highest concentrations of socioeconomic hazard risks are present along the floodplains of Bangladesh while the population living there is subjected to recurrent annual flooding. Therefore, robust health-care infrastructure combined with an agile lateral public health system would enable protecting and supporting the most vulnerable populations during emergencies.

[8] Semenza J.C., Shlomit P., (2021). Climate change and infectious disease in Europe: Impact, projection and adaptation. Available at https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00216-7/fulltext

[9] Ibid.

[10] United Nations Economic and Social Commission for Asia and the Pacific, (2017). Asia-Pacific Disaster Report. Available at https://www.unescap.org/publications/asia-pacific-disaster-report-2017-leave-no-one-behind

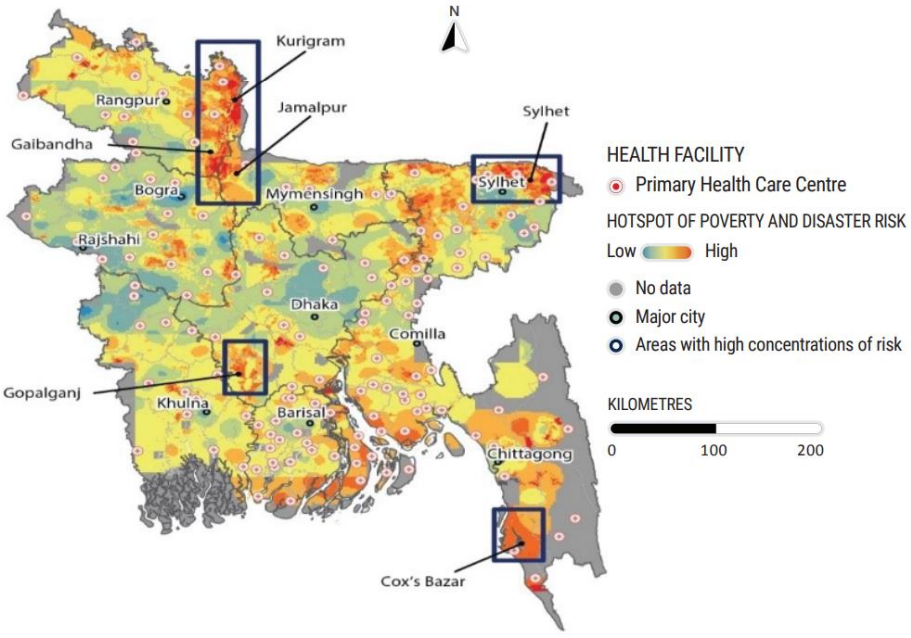
Table 1: Advancing systemic resilience to climate change through lateral public health approaches: Selected examples

Hazard	Health outcomes	Lateral public health approach
Changes in ecology and weather pattern	Climate-sensitive infectious disease outbreaks	Community-based surveillance for the early detection of an outbreak at community level, rapid detection and response can contain an epidemic. It entails engagement and training of community members in case of definitions for climate-sensitive infections such as malaria, acute diarrhoea or cholera, and a standardized format for reporting (e.g., mobile phones). Community health education regarding disease transmission and treatment modalities can facilitate community participation in outbreak control efforts.
Heat wave	Heat-related mortality and morbidity	Collaboration between communities and institutions to prepare for, and respond to heat waves; identification of a lead body to coordinate preparedness and responses; timely forecast of meteorological conditions; community outreach to vulnerable groups to avoid heat exposure.
Drought and drinking water contamination Droughts and food crises	Water-borne outbreak Food insecurity	Community-based water harvesting and water purification through low-cost household water chlorination intervention. Engaging the community with the Government, international organizations, non-governmental organizations and climate scientists, in designing, developing and implementing an early warning system for climatic events (e.g., monsoon, flood and drought). Through monitoring and improved interaction with the community, it can strengthen community resilience to future drought and food crises from near real-time to long-term.
Pathogens, vectors	Infectious diseases	Through vulnerability, impact and adaptation assessment, information regarding climate-sensitive infectious diseases, both from health and non-health sectors, is collected on topics such as: policies and measures; options to manage the health risks; evaluating and prioritizing options; human and financial resource needs; and monitoring and evaluation programmes. It can then lead, for example, to upgrading water treatment and distribution systems to avoid waterborne outbreaks or improving urban drainage for vector abatement.

Source: Semenza J.C, 2021[11]

[11] Semenza J.C. , (2021) Lateral public health: Advancing systemic resilience to climate change. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8495299/

Figure 5: Public health-care centres in multi-hazard risk hotspots in Bangladesh



The *Economic and Social Survey of Asia and the Pacific 2021* notes that natural disasters have a more devastating impact on countries with low-quality infrastructure; without good roads and telecommunications, disaster relief could be delayed and economic disruptions prolonged.[12] For the poor especially, climate change is likely to hamper access to services and critical infrastructure.

In particular, disasters impose multiple pressures on health systems and disrupt health services, thereby exposing people to greater risks in facilities with poor health conditions.[13] Impacts of COVID-19 highlight the urgent need to merge disaster risk reduction strategies into health preparedness systems, especially to support the most vulnerable populations. These must include not only an adequate health-care infrastructure, but also the availability and capacity of health-care workers to ensure proper service delivery. Further, climate induced natural hazards striking alongside health crisis escalate this challenge. For example, during the COVID-19 pandemic, super-cyclone Amphan and cyclone Nisarga followed by heavy monsoon hit India in May and June 2020, amidst the pandemic. The imminent intensification of floods in the region will also increase incidences and prevalence of diseases, vector-borne diseases as well as raise serious food security concerns. Consequently, vulnerable population groups can be pushed into

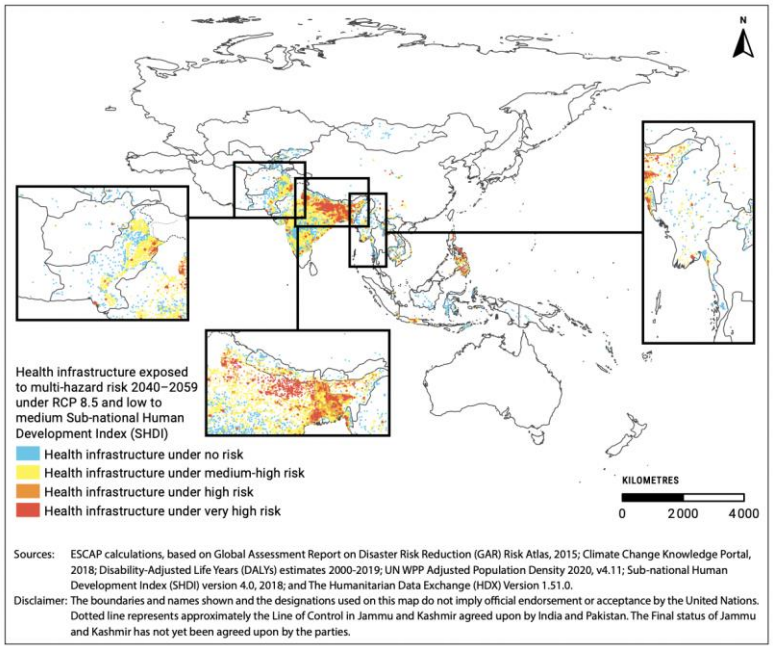
[12] United Nations, (2021). Economic and Social Survey of Asia and the Pacific. Available at https://www.unescap.org/kp/2021/economic-and-social-survey-asia-and-pacific-2021-towards-post-covid-19-resilient-economies

[13] Sanaz S., Yousefian S., Bahramzadeh A., Vaziri M.H., (2021). Systemic review of health sector responses to the coincidence of disasters and COVID-19. BMC Public Health. Available at https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-10806-9

moderate and severely acute malnutrition and weakening their immune responses.[14]

Therefore, there is an increasing need to identify health-care facilities that are located in areas at risk of cascades of natural and biological hazards, not only in the current scenario but also under climate change scenarios. Figure 6 shows the health-care facilities for people living in the marginal areas with a low or medium Human Development Index (HDI) and who are at risk from multiple hazards under the worst-case climate change scenario. For example, in Myanmar, 43 per cent of health-care facilities are located in districts with extreme multi-hazard risks and high prevalence of poverty. The proportion is also high in Nepal, Afghanistan, Pakistan and India.[15] To cope with cascading risks from natural and health hazards, health-care infrastructure must be risk-informed, and health systems sufficiently resilient to adapt to the changing climate, particularly when they serve poor and low-income populations.

Figure 6. Hospitals serving vulnerable people who are at risk from natural, biological and other health hazards under the worst-case climate scenario (RCP 8.5)



Source: Economic and Social Commisssion for Asia and the Pacific, Asia Pacific Disaster Report 2021 (Bangkok, 2021). Available at: https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

[14] World Health Organization, Regional Office for South-East Asia, (2017). Framework for action in building health systems resilience to climate change in the South-East Asia Region, 2017-2022. Available at https://apps.who.int/iris/handle/10665/258953; Karna S. (2020). Managing monsoon floods amid COVID-19. Available at https://www.preventionweb.net/news/view/72288

[15] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2021). Asia-Pacific Disaster Report. Available at https://www.unescap.org/kp/2021/asia-pacific-disaster-report-2021

2.2 Preparing health-care systems for future crises

Access to quality and affordable health-care services is the foundational need for a country to protect the population and ensure healthy living. Health-care systems in developing countries of Asia and the Pacific where resources and capacity are often constrained, are overwhelmed with the pressure to cope with disaster risks, climate change, pandemics as well as the growing burden of non-communicable diseases. Lack of equipment, adequate skilled staff, and resources are aggravating the capacity constraint. The needs that have emerged during the COVID-19 pandemic are highlighting and exacerbating existing capacity challenges. For example, India's second COVID-19 wave in May 2021 was devastating, with record numbers of cases and deaths, which exhausted the capacity of the health-care system.

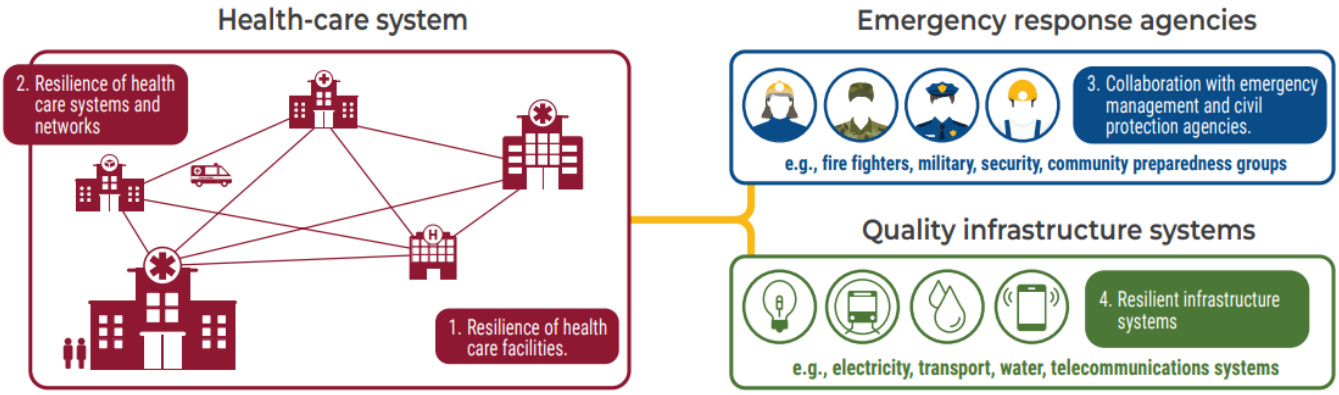
Oxygen proved to be vital for COVID-19 patients – a respiratory disease that attacks the lungs and leads to dangerously low levels of oxygen in the body. Statistics show that before the second wave, 700-800 tons of medical oxygen was required each day. However, by the second week of April 2021, the requirement had increased to 3,500-4,000 tons per day, putting immense pressure on the country's oxygen manufacturing units. A large proportion of the 238,000 deaths in the second wave (by the first week of May), have been attributed to overstretched basic health-care facilities and supplies – particularly the supply of medicinal oxygen. In essence, inefficient and unreliable infrastructure systems – including oxygen, water, energy, and transport systems – hampered effective health services delivery. From flood-induced cholera outbreaks to earthquake casualties and zoonotic diseases, health-care systems play a crucial role in mitigating the illnesses and deaths caused by emergencies. When these health services are disrupted, immediate impacts include increases in the incidences of disease, hunger and displacement; longer-term effects include disrupted livelihoods and education, and reduced labour market opportunities.[16]

In this context, the lateral public health approach can be realized at the intersection points between health-care systems, emergency management and quality infrastructure. A recent study by the World Bank, presents a systematic overview of the intersection points between health systems and emergency management, suggests embedding health systems in a wider network of emergency response systems[17] (summarized in figure 7). While the resilience of health-care systems is underpinned by the quality of infrastructure assets on which they depend, it follows the perspective of disaster risk management and resilient infrastructure systems as important components of disaster-responsive health-care provision (box 1).

[16] United Nations Office for Disaster Risk Reduction, (2019). Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland. Available at: https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2019

[17] Rentschler J., Klaiber C., Tariverdi M., C. Desjonqueres C., Mercadante, J., (2021). Frontline: Preparing Healthcare Systems for Shocks, from Disasters to Pandemics. Washington, DC: The World Bank. Available at: https://openknowledge.worldbank.org/handle/10986/35429

Figure 7: Resilient healthcare interacts with disaster management and lifeline infrastructure



Source: Jun Rentscheler, and others (2021), Frontline: Preparing Healthcare Systems for Shocks, from Disasters to Pandemics, Washington DC, The World Bank [18]

Infrastructure systems work to provide services such as energy, telecommunications, water and sanitation. Their complex and interdependent nature as well as fragmented governance has made infrastructure systems vulnerable to long-term climate change and natural hazards. Significant investment is planned in infrastructure globally in the next two decades. There are also many forward-looking infrastructure development plans that work towards decarbonizing infrastructure systems. Poor governance is a key factor that has led to infrastructure projects failing to meet their resilience and societal objectives. They must ensure that infrastructure is of high quality and is sustainable over the long term, at each stage of the infrastructure cycle. At each stage there are opportunities to enhance the resilience value of an infrastructure project and to ensure the resilience value that was built in the earlier stages.[19] **Strengthening governance systems can contribute towards enhancing the productivity, utility and resilience of infrastructure.**

2.3. Health in the Sendai Framework for Disaster Risk Reduction, 2015-2030

Health is a key element of the Sendai Framework for Disaster Risk Reduction 2015-2030. Four of the seven Sendai Framework global targets have direct links to health, focusing on reducing mortality, population wellbeing, early warning, and promoting the safety of health facilities and hospitals. Biological hazards such as epidemics and pandemics are included together with natural hazards as key focus areas for disaster risk management. The Sendai Framework for Disaster Risk Reduction 2015-2030 also places strong emphasis on creating resilient health systems by: (a) integrating disaster risk management into health care at all levels; (b) developing the capacity of health workers to understand disaster risk: and implementing disaster risk approaches in health care.

The implementation of the Sendai Framework is reinforced by the 'Bangkok Principles', which resulted from the International Conference on the

[18] Ibid.
[19] Coalition of Disaster Resilient Infrastructure (CDRI), (2021). Governance of Infrastructure for Resilience. Available at https://www.cdri.world/node/566

Implementation of the Health Aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030.[20] The Principles underline the fact that health emergencies have many commonalities with natural hazards, and that they must be addressed through risk assessments, surveillance, early warning systems, resilient infrastructure and coordinated incident management that extend beyond national borders (box 2). In short, the Principles provide a blueprint for integrating health into disaster risk management planning and integrating disaster risk management into health planning.

The ESCAP Commission Resolution (77/1) requests ESCAP to promote discussions on the implementation of the health aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030, including by taking note of the Bangkok Principles for the implementation of the health aspects of the Sendai Framework and other relevant regional and subregional frameworks and initiatives. Subsequently, in August 2021, a thematic meeting was convened in conjunction with the seventh session of the Committee on Disaster Risk Reduction with a view to strengthening post-COVID-19 resilience and disaster preparedness in the region. The Committee further recommended the development of technical advice and capacity-building support, a scale-up of regional and subregional cooperation strategies that integrate disasters, including climate-related disasters, and associated health perspectives to complement national efforts to implement the 2030 Agenda for Sustainable Development.

[20] The International Conference on the Implementation of the Health Aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030 was organized jointly by UNISDR, WHO and the Government of Thailand in March 2016.

Box 1. Five principles that are crucial to enable health systems to offer more reliable and shock-resistant services

1. Foundations: Health systems that effectively manage routine demand are more resilient to shocks. Building the capacity of health-care systems to effectively meet routine demands is a prerequisite for increasing resilience to shocks. A wide range of enabling factors need to be strengthened, such as adequate equipment, financing, skilled staff, efficient management and operational protocols. Ensuring that health systems are inclusive is key to boosting community resilience.

2. Individual health-care facilities: Managing demand, capacity and readiness for shocks. Health-care facilities need to be prepared to meet the surge in demand for health services due to shocks. Ex-ante contingency planning prepares the capacity, staff, equipment and protocols needed for emergency contexts, thus ensuring resilience to shocks at the frontline of health-care delivery. Health-care facilities themselves must also be resilient to shocks, such as flooding or earthquakes.

3. Health-care systems: Strategies to increase surge capacity and system-level coordination. In complex health-system delivery environments – especially when resources are limited – it is impossible to immediately equip every facility to the highest standard in order to provide its designated service. Organized systems' planning and flexible solutions can meet surge demand through coordinated regional and system-level responses. This includes evaluating and predicting resource and capacity constraints, and understanding the feasibility, role and effectiveness of alternative service modalities and contingency plans for critical supply needs.

4. Integrated emergency response: Coordination with disaster response and civil protection agencies. Closely coordinating the emergency preparedness of health systems with a country's overall emergency management and disaster response systems – the military, civil protection, community groups, disaster risk financing etc. – is vital. The need is most pronounced in post-disaster situations, when multisectoral issues have to be addressed simultaneously, in order to meet basic needs such as food and shelter as well as provide essential public services such as security, social safety nets, rescue, and health care.

5. Lifeline infrastructure for resilient health care services: Quality infrastructure is essential for effective health-care services – even more so during disasters and pandemics. Resilient water, electricity, transport, and communication and digital systems are crucial to ensuring adequate treatment capacity, equitable access to health care and functioning supply chains. The resilience of health-care services depends on the interdependence of these lifelines.

Source: Adapted from Rentschler J., Klaiber C., Tariverdi M., C. Desjonqueres C., Mercadante, J., (2021). Frontline: Preparing Healthcare Systems for Shocks, from Disasters to Pandemics. Washington, DC: The World Bank. Available at: https://openknowledge.worldbank.org/handle/10986/35429

Box 2. Health Aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030

The International Conference on the Implementation of the Health Aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030 adopted the 'Bangkok Principles', the seven recommendations of which cover:

1. **Integration** – promote systematic integration of health into national and subnational disaster risk reduction policies and plans, and include emergency and disaster risk management programmes in national and subnational health strategies;
2. **Cooperation** – enhance cooperation between health authorities and other relevant stakeholders to (a) strengthen the country capacity for disaster risk management for health, (b) implement the International Health Regulations (2005) and (c) build resilient health systems;
3. **Investment** – stimulate people-centred public and private investment in emergency and disaster risk reduction, including in health facilities and infrastructure;
4. **Training** – integrate disaster risk reduction into health education and training, and strengthen capacity-building of health workers in disaster risk reduction;
5. **Data** – incorporate disaster-related mortality, morbidity and disability data into multi-hazard early warning systems, health indicators and national risk assessments;
6. **Collaboration** – advocate for, and support cross-sectoral, transboundary collaboration including information sharing, and science and technology for all hazards, including biological hazards;
7. **Policies** – promote coherence and further development of local and national policies and strategies, legal frameworks, regulations and institutional arrangements.

Source: United Nations Office for Disaster Risk Reduction (UNDRR), (2016). Bangkok Principles for the implementation of the health aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030. Available at: https://www.preventionweb.net/files/47606_bangkokprinciplesfortheimplementati.pdf

3. Be prepared for the climate crisis: Unpacking the Glasgow Climate Pact

Both the pandemic and climate change are risk multipliers.

COVID-19 is a dramatic example of systemic risk, a hazard wherein the impacts have reverberated around the world bringing other systems close to collapse – most of them far removed from the biohazard origin.[21] Climate change, too, represents a huge risk to many systems, since it can cause extreme weather events and variations in climate that can trigger food and water shortages, forced migration, epidemics and loss of biodiversity, all of which can also cascade into an armed conflict.

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Glasgow Climate Pact at UNFCCC COP 26 in November 2021. This is an important step forward towards addressing the climate crisis. According to United Nations Secretary-General Antonio Guterres, the final outcome texts[22] "take important steps, but unfortunately the collective political will was not enough to overcome some deep contradictions." However, he identified some building blocks for progress that emerged from the Glasgow meeting, including: (a) commitments to end deforestation; (b) drastically reduce methane emissions and mobilize private finance around net-zero; (c) reaffirmed resolve towards the 1.5-degree goal; (d) boosting climate finance for adaptation; (e) recognizing the need to strengthen support for vulnerable countries suffering from irreparable climate damage; and (f) for the first time encouraging international financial institutions to consider climate vulnerabilities in concessional, financial and other forms of support, including Special Drawing Rights. (box 3)

[21] The *Global Assessment Report 2019* defines a 'systemic risk' as a risk that is endogenous to, or embedded in, a system that is not itself considered to be a risk and is therefore not generally tracked or managed, but which is understood through system analysis to have a latent or cumulative risk potential to negatively impact overall system performance when some characteristics of the system change.

[22] United Nations, (2021) Secretary-General's statement of the conclusion of the UN Climate Change Conference COP26. Available at https://www.un.org/sg/en/node/260645

Box 3. Glasgow Climate Pact to boost adaptation and resilience pathways

The Glasgow Climate Pact takes significant steps to boost adaptation actions and is widely viewed as one of COP26's successes. Some of the key highlights include:

New funding, new pledges to boost adaptation

COP 26 includes an unprecedented goal for developed countries to double the funding provided to developing countries for adaptation by 2025, taking the annual figure to around US$40 billion. COP26 also saw donors pledge US$413 million to the Least Developed Countries Fund, which, hosted by the Global Environment Facility, is the "only climate resilience fund that exclusively targets least developed countries." Some of these decisions made at COP26 support pathways to meaningful action on both mitigation and adaptation. They need to translate into effective action and be scaled to reach global targets of limiting warming to 1.5°C as well as building resilience to reduce vulnerability to climate change.

The Global Goal on Adaptation

The Paris Agreement in 2015 called for the establishment of a Global Goal on Adaptation, the adaptation equivalent of the global mitigation goal to limit temperature rise to 1.5°C above the pre-industrial levels. This goal is important for providing a system for tracking adaptation progress of countries. However, unlike mitigation, adaptation progress cannot be measured by a single metric. Although a Global Goal on Adaptation was not made operational during COP26, there was modest progress in this area with the launch of the two-year Glasgow-Sharm el-Sheik Work Programme on the Global Goal or Adaptation.

Nature-based solutions

Nature-based solutions were also frequently discussed at COP26. The Glasgow Climate Pact recognized the critical role of "restoring nature and ecosystems in delivering benefits for climate adaptation", a strategy known as "ecosystem-based adaptation". Another milestone at the event was the pledge to end deforestation by 2030 from more than 120 countries, representing around 90 per cent of the world's forests. The pledge will have key benefits for climate adaptation as forest ecosystems protect communities from extreme weather conditions.

Adaptation plans

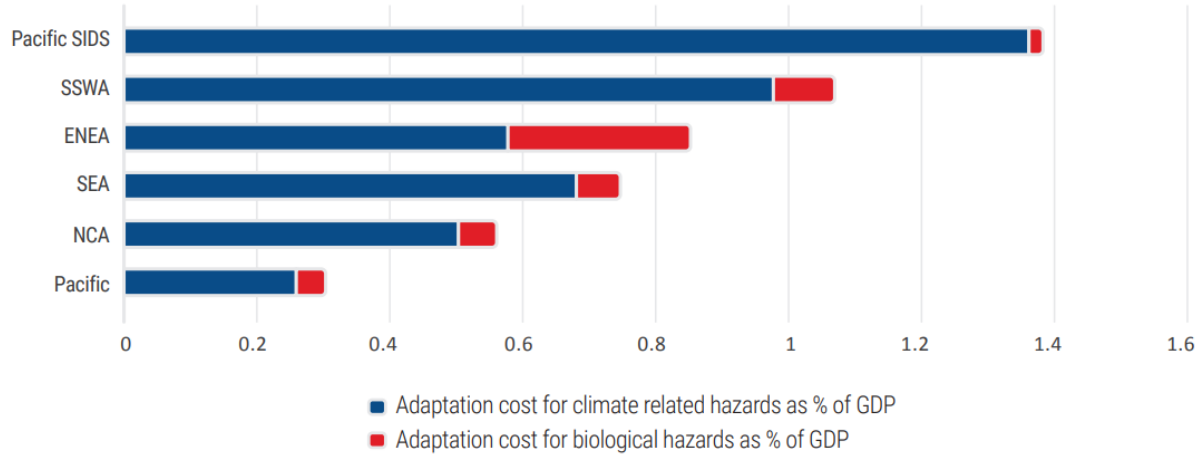
Under the Paris Agreement, every five years countries are requested to submit their Nationally Determined Contributions – plans to reduce greenhouse gas emissions and adapt to climate change. The Glasgow Climate Pact improves on this ambition with a so-called "ratchet" by requesting countries to increase their pledges again in 2022 rather than five years down the line. The Government of the United Kingdom announced that "88 countries are now covered by Adaptation Communications or National Adaptation Plans to increase preparedness to climate risks, with 38 published in the last year." National Adaptation Plans are seen by experts as fundamental to adapting to climate change.

Source: United Nations Environment Programme (UNEP), (2021). What does COP 26 mean for adaptation? Available at: https://www.unep.org/news-and-stories/story/what-does-cop26-mean-adaptation

3.1. Adaptation and resilience pathways for addressing the climate crisis

United Nations Secretary-General António Guterres has called for 50 per cent of the total share of climate finance to be spent on building resilience and adapting to the effects of a warming world.[23] ESCAP estimates the total climate adaptation costs for cascading hazards (natural and biological) under extreme climate change scenario (RCP 8.5, 2040-2059) at US$ 270 billion for the Asia-Pacific region[24] of which US$ 68 billion should be dedicated for adapting to biological hazards[25]. Around 70 per cent of these costs are in East and North-East Asia at US$190 billion. These costs also need to be studied alongside the subregion's financial capacities, which vary from 1.4 per cent of GDP for the Pacific small island developing States (SIDS), to less than 1 per cent for South-East Asia, and North and Central Asia. The adaptation costs vary substantially across the subregion (figure 8).

Figure 8: Subregional adaptation costs for climate-related hazards and biological hazards, percentage of gross domestic product



The risk profiles also vary across subregions. Hence, each subregion will have its own adaptation priorities. This is illustrated in figure 9, based on categories established by the Global Commission on Adaptation namely: early-warning systems;

[23] United Nations Climate Change, (2022). Anotnio-Gueterres: 50% of All Climate Finance Needed for Adaptation. United Nations News. Available at https://unfccc.int/news/antonio-guterres-50-of-all-climate-finance-needed-for-adaptation

[24] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Risk and Resilience Portal. Available at https://rrp.unescap.org/

[25] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2021). Asia-Pacific Disaster Report. Available at https://www.unescap.org/kp/2021/asia-pacific-disaster-report-2021

climate-resilient infrastructure; improved dryland agriculture crop production; mangrove protection; and water security.[26] In **East and North-East Asia**, the top adaptation priorities are making new infrastructure more resilient and strengthening early warning systems. In **South and South-West Asia,** the highest priorities are strengthening early warning systems and making new infrastructure resilient, followed by resilient water resource management improving drylands and protecting mangroves. For instance, heatwave early warning systems in India are saving thousands of lives every year (box 4). In **South-East Asia**, however, the key priorities are protecting mangroves and making water resource management more resilient – reflecting the increasing impact of drought, floods and cyclones in the region.[27] In **North and Central Asia**, the key priorities are making water resource management resilient and improving dryland agriculture.

It is important to highlight that for individual Pacific SIDS and the LDCs, where economic assets are highly exposed to natural hazards, adaptation costs are disproportionately high. At the country level, the highest cost as a percentage of GDP is recorded in the Pacific SIDS at 8.4 per cent in Vanuatu and 6.8 per cent in Tonga. In the **Pacific SIDS,** adaptation priorities include making water resource management resilient and improving dryland agriculture crop production, followed by protecting mangroves, strengthening early warning systems and making new infrastructure resilient. Overall, these adaptation priority matrices allow countries to choose adaptation action and investment in areas most applicable to their climate risk profiles. For example, adaptation priorities for Vanuatu include improving dryland agriculture crop production and resilient water resource management, followed by protecting mangroves, strengthening early warning systems and making new infrastructure resilient. This can be attributed to high exposure to drought and the major share of the employed population that works in the agriculture sector. Further, investing in these priorities will ensure progress in achieving multiple sustainable development goals and the 2030 Agenda for Sustainable Development (figure 10).

[26] Global Center on Adaptation, (2019). Adapt now: A global call for leadership on climate resilience (undated). T Global Center on Adaptation. Retrieved 26bMarch 26 from https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/

[27] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2021). Ready for the Dry Years: Building resilience to drought in South-East Asia (2nd Edition). Available at https://www.unescap.org/publications/ready-dry-years-building-resilience-drought-south-east-asia-2nd-edition

Figure 9: Adaptation priorities for the Economic and Social Commission for Asia and the Pacific subregions, 2040-2059

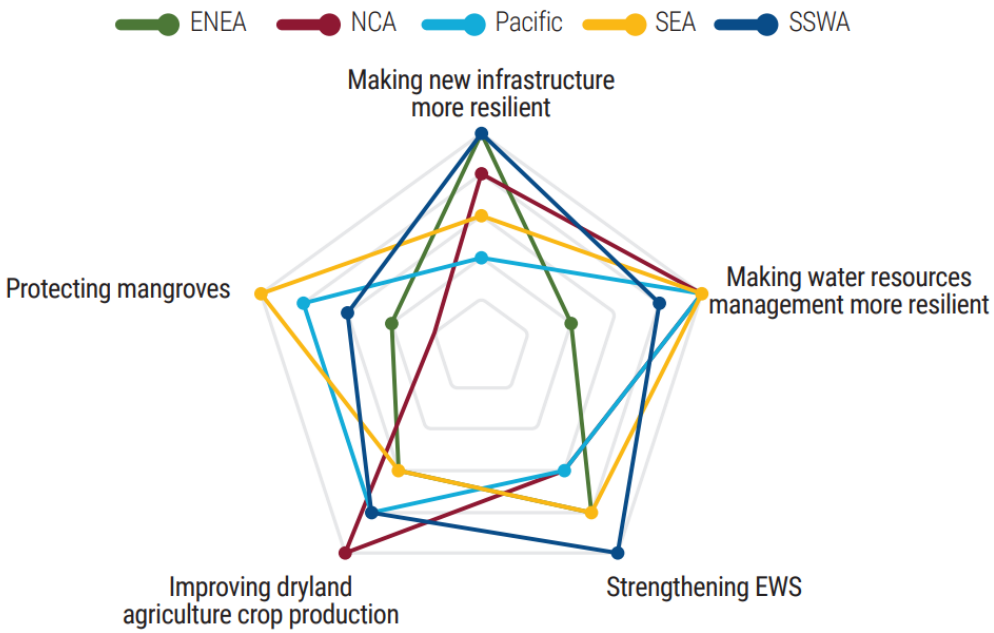
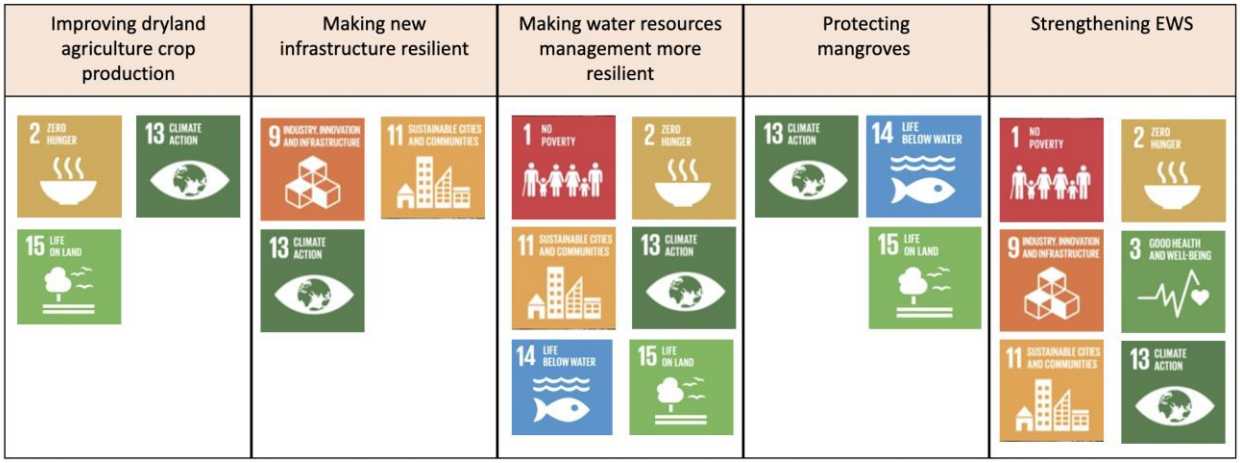


Figure 10. Adaptation priorities support progress on multiple SDGs



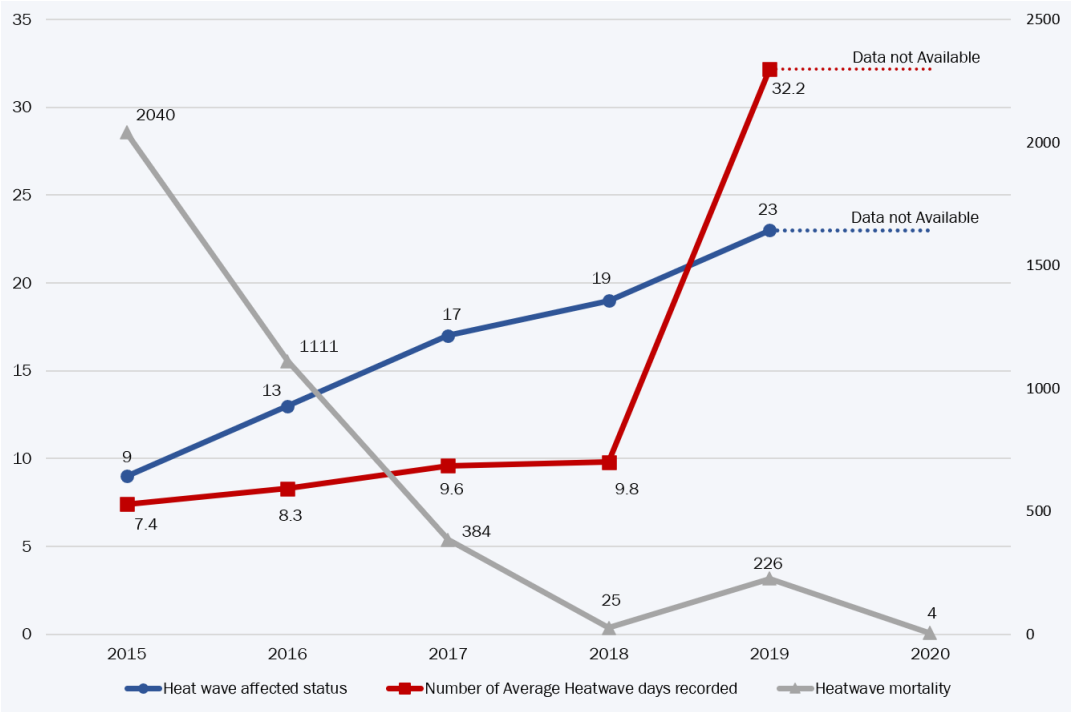
Box 4. Heatwave early warning systems are saving thousands lives per year in India

India has traditionally been severely affected by heatwaves which between 1992 and 2016, caused 25,716 deaths. Recent analysis on warming patterns, air temperature and labor losses informed by the latest climate model (CMIP6) shows that when per capita labor loss due to heat exposure is overlayed on the working age population for heavy outdoor labor (2001-2020 mean), countries in South and East Asia experience the most work hours lost, both in the coolest hours and in the full workday. India records the highest heat exposure impacts on heavy labor. Projections with climate change impacts show that India followed by China and Bangladesh will continue to face the highest heavy labor losses in 12-hours workday, in +1°C, +2°C and +4°C global warming scenarios.

Cognizant of such implications, state authorities and India's National Disaster Management Agency made preparations that substantially brought down the fatalities – as reflected in Guidelines for Preparation of Action Plan – Prevention and Management of Heatwave, (Box figure 4.1). Precise early warnings have played a vital role in achieving this success. The Indian Meteorological Department provides not only a seasonal outlook over the country on a subdivisional scale, but also guidance on temperatures over a two-week scale.

Across Asia-Pacific, six countries have put in place heat action plans that cover heat vulnerability and impact science, impact forecasting, partnerships, risk communication and policy actions. For instance, Australia, consistently ranks heatwaves as the greatest cause of death from natural hazards. Therefore, in response, Australia has developed and implemented heatwave prediction and modelling as well as improved communication and outreach.

Box figure 4.1. More heatwaves but fewer deaths



Data source: National Disaster Management Authority, Government of India, How India successfully reduced mortality due to heat waves. Available at: https://ndma.gov.in/sites/default/files/IEC/Booklets/HeatWave%20A5%20BOOK%20Final.pdf

Sources:
National Disaster Management Authority, Government of India, How India successfully reduced mortality due to heat waves. Available at: https://ndma.gov.in/sites/default/files/IEC/Booklets/HeatWave%20A5%20BOOK%20Final.pdf

Indian Meteorological Department, (2019). Forecast Demonstration Project (FDP) for Improving Heatwave Warning over India. Available at: https://internal.imd.gov.in/section/nhac/dynamic/fdpheatreport2019.pdf;

Luke A.P., Shindell. D., Tigchelaar. M., Zhang, Y., Spector T. J., (2021). Increased labor losses and decreased adaptation potential in a warmer world. Nature Communications, Available at: https://www.nature.com/articles/s41467-021-27328-y.pdf

3.2. Managing systemic risks in an interconnected world

A key lesson from the COVID-19 pandemic is to ensure better anticipation and preparation for response to large-scale global crises. It is not known which extreme risk event will strike next; it could be another pandemic, a rapidly evolving environmental disaster, or those risks driven by technological or scientific developments gone awry, unconstrained by adequate ethical and regulatory frameworks. Hence, there is a need for stronger legal frameworks, better tools for managing risks, better data, the identification and anticipation of future risks, and proper financing of prevention and preparedness.[28] Hau L. Lee describes the need to develop a system that is resilient and agile in the face of external challenges such as climate change or the pandemic. The three pillars of such a system include 'Agility", "Alignment" and "Adaptability" (Triple A Framework explained in Annex 1).[29] A set of strategic foresights, aligned with this system, can catalyze better anticipation and responses to risks (figure 11).[30]

Figure 11. Five pillars of strategic foresights to manage systemic risk

3.2.1. Agility

Systems or institutions must develop the capacity to respond to changes – for example, in demand and faster supply in order to face the challenge posed by multiple uncertainties. As explained below, this can be achieved by implementing methods to anticipate risks, downscale and develop action scenarios to tackle multi-hazard cascading risks.

(a) Anticipate crisis: It is important to recognize the systemic risk in interdependent infrastructure systems at all levels. For example, critical infrastructure systems underpin essential societal services and provide vital services like energy, water, transport and communications access. A single glitch in these services can result in debilitating impacts on an economy. Infrastructure systems are under increasing pressure from the rising frequency and intensity of disasters. This is further

[28] United Nations, (2021). Our common agenda – Report of the Secretary-General, Available at: https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf

[29] Hau L. L, (2004) The Triple-A Supply Chain, Harvard Business Review. Available at http://www.scap.pk/article/SupplyChain.pdf

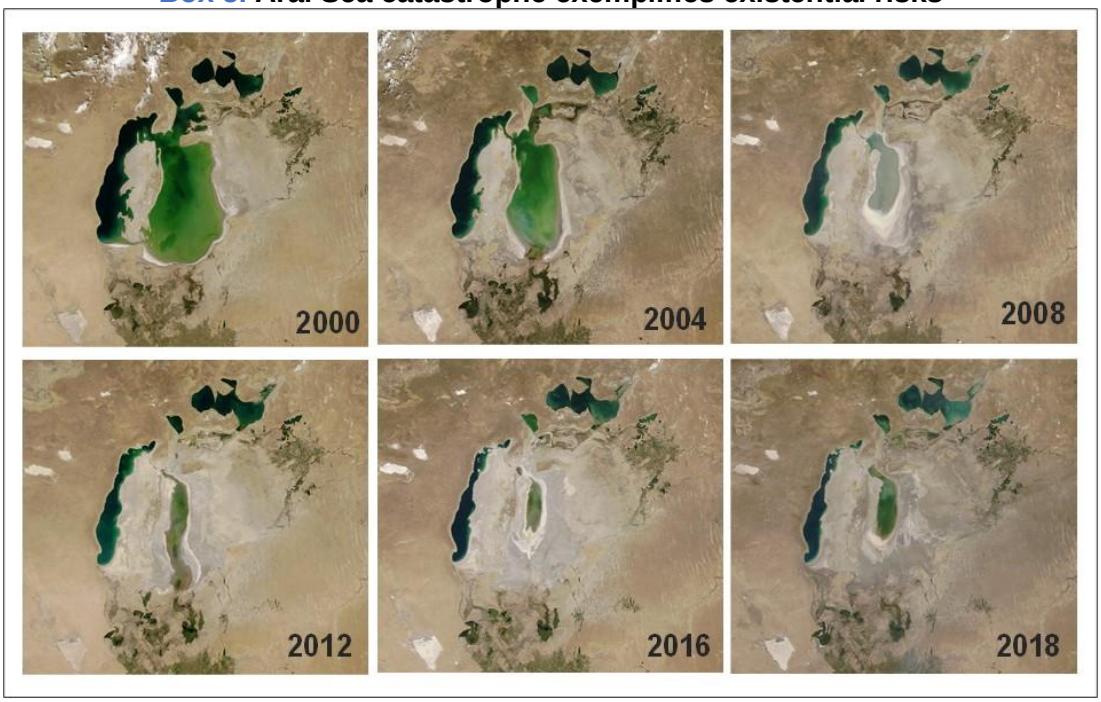
[30] A. Maskrey, G. Jain and A. Lavell, (2021). The Social Construction of Systemic Risk Towards an Actionable Framework for Risk Governance, UNDP Discussion Paper. Available at: https://www.undp.org/publications/undp-social-construction-systemic-risk-towards-actionable-framework-risk-governance

aggravated by the increasingly interdependent nature of infrastructure systems. The interlinkages influence the operational capability and resilience of the overall infrastructure. Resilient infrastructure is key to tackling impending climate change impacts.

(b) Downscale risk: Systemic risk in global supply chains need to be downscaled for better understanding of the complexity. The series of fires in the Bangladesh ready-made garment industries in 2012-2013 triggered sequential impacts in geographically discontinuous regions of different parts of the world, transmitted through global supply chains. Only downscaling risk with a better understanding of its complexities can facilitate developing the readiness for the long-term consequences of damage to a system — including the potential domino effect of harm to other systems. Further, simultaneous crises from compounded hazards manifest themselves in terms of systemic risks. Indeed, cascades of glacier burst, cloudburst, heavy rainfall and subsequent landslides are becoming more frequent and complex.

(c) Addressing existential risks with action scenarios: Critical and interdependent earth systems have been identified with thresholds or boundaries, which when breached represent existential risk. The drying of the Aral Sea in Central Asia (box 5) exemplifies this. Growing social and economic inequality, coupled with large-scale environmental degradation at all scales can lead to several crisis, which require action scenarios to be prepared in short-, medium- and long-term perspectives. The latest Sixth Coupled Model Intercomparison Project (CMIP6), utilized in IPCC's sixth assessment report provides a strong basis for identifying gaps and developing long terms scenarios with climate change impact projections.

Box 5. Aral Sea catastrophe exemplifies existential risks



Source: Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite
Disclaimer : The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The Aral Sea is located between Uzbekistan (to the south) and Kazakhstan (to the north). In the 1960s, the former Soviet Union undertook a major water diversion project on the arid plains of Kazakhstan, Uzbekistan and Turkmenistan. By 1995, the volume of the sea had decreased by 75 per cent. By 2000, 42,000 km^2 of land had been exposed. The major reasons for the shrinkage of the Aral Sea is that, first, it is surrounded by the Central Asian deserts. Consequently, about 60 km^2 of water evaporates from its surface every year. Further, agricultural development in the surrounding areas over the past 40 years decreased the amount of water flowing from the Syr Darya and Amu Darya rivers.

Sources: NASA Earth Observatory, Shrinking Aral Sea, Available at https://earthobservatory.nasa.gov/world-of-change/AralSea and NASA Visible Earth, (2003). Aral Sea, Available at: https://visibleearth.nasa.gov/images/68762/aral-sea

3.2.2. Alignment

A system must incentivize performance improvement by all stakeholders. This can be achieved, for example, when all the stakeholders have equal access to forecasts and information platforms, and there is clear designation of responsibilities. In this regard, crisis response platforms can prove to be key enablers.

Crisis response platform: Many countries in the Asia-Pacific region have responded to the COVID-19 pandemic in an *ad hoc* manner, especially due to lack of experience in pandemic preparedness and recovery of scale. Indeed, these subjects are not sufficiently integrated into global and regional frameworks, especially the Sendai Framework of Disaster Risk Reduction 2015-2030. Further, each country has responded to the COVID-19 pandemic differently due to variations in governance mechanisms and health response capacities. Hence, a crisis response platform involving all government key stakeholders would prove to be a key enabler for managing systemic risk.

3.2.3. Adaptability

A system must be capable of facing and responding to challenges posed by external changes such as a pandemic. It reflects the importance of systems to be shock-prepared.

Be shock-prepared: This requires mechanisms for: (a) surge capacity; (b) focal points and protocols to promote interoperability with existing crisis-specific response arrangements; (c) regular exercises to test efficacy, identify and fill gaps; and (d) the identification of a set of tools to make the international system crisis-ready. An Emergency Platform to respond to complex global crises enables shock preparedness.

3.3. Governance of systemic risk

Identifying the political and economic imperative of systemic risk governance is the key, particularly under post-COVID-19 conditions and the need for sustainable, green recovery. The governance of systemic risk should not be considered as a new and specialized sub-area of risk governance, but rather as a characteristic of strengthened and enhanced governance designed to reduce risk as well as enhance resilience and sustainability at the national and local levels. Risk governance and systemic risk governance should be considered as attributes of strengthened national and local governance, rather than as specialized sectors.[31] Existing Global Practices are largely organized around specific hazards, for example disaster risk management, climate change adaptation and conflict prevention, none of which can address risk in a more holistic way, even though each may think and understand risk differently.

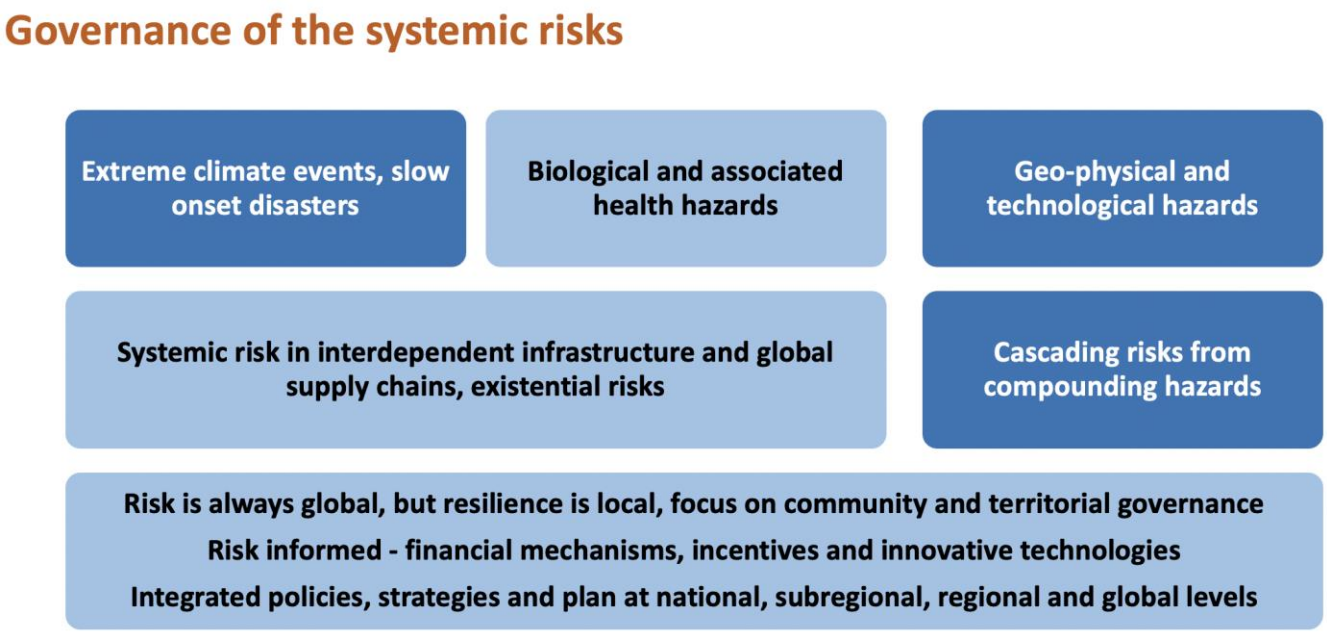
Following the 2015 Sendai framework for Disaster Risk Reduction, countries in Asia and that Pacific had already come to a greater understanding of the need for a more integrated approach to disaster risk management, for treating these risks as indivisible and for addressing them all rather than one at a time. It is well-recognized that systemic risks, biological and hydrometeorological, will continue to be affected by the changing climate. The systemic risk governance is therefore to build on multi-hazard approach with better understanding of these risks in interdependent infrastructure, global supply chains, existential risks as well as cascading risks from compounding hazards. **The framework also recognizes that while risk is global, resilience is local.** Hence, the focus must be on strengthening community and territorial governance. It factors risk at the centre of development, investment and governance (figure 12). The Global Assessment Report 2022 also highlights that governance and financial systems must work across silos and must be redesigned in consultation with the affected people[32].

Fortunately, while new threats continue to emerge, so do more agile and powerful technological tools. Sophisticated frontier technologies can apply extraordinary levels of computing power and artificial intelligence to what once seemed intractable and unmanageable quantities of data for weather and climate forecasting. This can drive operationalizing an effective systemic governance framework.

[31] A. Maskrey, G. Jain and A. Lavell, (2021). The Social Construction of Systemic Risk Towards an Actionable Framework for Risk Governance, UNDP Discussion Paper. Available at: https://www.undp.org/publications/undp-social-construction-systemic-risk-towards-actionable-framework-risk-governance

[32] United Nations Officer for Disaster Risk Reduction (UNDRR) (2022). Global Assessment Report 2022, Our World at Risk: Transforming Governance for a Resilient Future. Available at: https://www.undrr.org/gar2022-our-world-risk

Figure 12. Integrated approach to the governance of systemic risk to strengthened community resilience and territorial governance



4.The way forward: 4 regional action points

4.1 Build on the momentum of Glasgow Climate Pact to scale up adaptation and resilience pathways

Adaptation and resilience pathways are the key to climate action that supports the Asia-Pacific region in being prepared for crisis. They must be integrated in the development planning architecture, both at the regional and national levels, and including Disaster Risk Reduction (DRR) strategies and community-based approaches. The Glasgow Climate Pact gives a boost to adaptation. Increasingly, risk continues to outpace resilience, especially in the vulnerable parts of all the subregions.[33] Five subregional actions are required to narrow down the adaptation gaps in specific context of increasing exposure to: (a) tropical cyclones in Pacific SIDS; (b) flooding in the Ganga-Brahmaputra-Meghna and lower Mekong river basins; (c) drought and slow onset disasters in South-East Asia; (d) the Aral Sea catastrophe; and (e) risk corridors of drought, desertification, land degradation, and sand and dust storms in South-West Asia as well as North and East Asia. ESCAP's ongoing initiative with the ASEAN Secretariat on a subregional action plan[34] for adaptation to drought is a good example to replicate in multi-hazard risk hotspots of other subregions. This can reinforce regional actions on shared vulnerabilities and risk component of the Regional Economic Co-operation and Integration (RECI) as well as strengthen subregional actions to support Asia-Pacific Forum Sustainable Development (APFSD).

4.2 Promote risk-based approaches and lateral public health systems in multi-hazard risk areas

There are risk hotspots with a distinct disaster, climate and health nexus[35] at play in some vulnerable subregions. The lateral public health systems are more effective in these multi-hazard risk hotspots wherein cascading risks are often high. In addition, access to health care, which itself is a fundamental requirement, is not adequate enough in these areas to meet the demands of public health services during emergencies.

Concerted efforts are required for the scaling-up of regional and subregional cooperation strategies that integrate disasters, including climate-related disasters and associated health perspectives, to complement national efforts in the implementation of the 2030

[33] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2019). Asia-Pacific Disaster Report. Available at: https://www.unescap.org/publications/asia-pacific-disaster-report-2019

[34] Association for South-East Asian Nations (ASEAN), (2021). ASEAN Regional Plan of Action for Adaptation to Drought 2021-2025. Available at: https://asean.org/book/asean-regional-plan-of-action-for-adaptation-to-drought-2021-2025/

[35] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2021). Asia-Pacific Disaster Report, Available at https://www.unescap.org/kp/2021/asia-pacific-disaster-report-2021.

Agenda for Sustainable Development. These efforts must be boosted with improved implementation and enhanced capacity development. In this regard, technical advice and capacity-building support on the implementation of the health aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030 – including taking note of the Bangkok Principles for the implementation of the health aspects of the Sendai Framework – and other relevant regional and subregional frameworks and initiatives must be prioritized and implemented in partnership with key stakeholders.

4.3 Put in place a systemic risk governance framework

The governance of systemic risk is a key to being prepared in riskier times. This governance must not be hazard-specific, but must be an integrated approach to strengthen national and local governance. It must also ensure that the system is resilient and works across traditional silos to address the risks. Hence, a cross-cutting approach is required that could and should be central to the new strategic plan for managing the crisis being developed by member States. The challenge is that its existing Global Practices are largely organized around specific hazards – for example, disaster risk management, climate change adaptation and conflict prevention, none of which can address risk in a more holistic way, even though each may think and understand risk in holistic ways. The United Nations Sustainable Development Co-operation Framework and Issue-based Coalition in Asia and Pacific can play an enabling role in promoting systemic risk governance frameworks through its work programmes and partnership network at the country level.

4.4 Towards better anticipation and preparation of response to large-scale global crises

In learning lessons from the COVID-19 pandemic, it is important to better anticipate and prepare in order to adequately respond to large-scale global crises. This requires stronger legal frameworks, better tools for managing risks, better data together with improved protocols for data-sharing and capacity on data-processing, the identification and anticipation of future risks, and proper financing of prevention and preparedness. Our Common Agenda report in 2001 by the United Nations Secretary-General suggests that the United Nations should draw on a network of the best thinkers and data, externally and within the United Nations system, to present a Strategic Foresight and Global Risk Report to member States every five years. On moving forward at the regional level, the *Asia-Pacific Disaster Report 2021*, which brings out the region's dynamic riskscape biannually, and its subregional reports that zoom in on the multi-hazard risk hotspots can be aligned with such reports. In recent years, there have been considerable advances in integrated multi-hazard risk assessment, early warning systems and, impact-based and risk-informed forecasting. Efforts are required to scale up in a way that these advances address the unmet needs of anticipatory actions for better preparedness ahead of future crises.

Annex

Winning strategy of Triple-A Framework

Triple-A Framework	Challenges	Implications	Methods
Agility Objective: Respond to short-term changes in demand or supply quickly.	Increasing sources of uncertainty.	Uncertainty drives need for flexibility.	(a) Continuously provide stakeholders with data on changes in critical data so they can respond promptly. (b) Collaborate with different interest groups to redesign processes, components, and products in ways that give you a head start. (c) Keep a small buffer stock of inexpensive, non-bulky product to prevent delays. (d) Draw up contingency plans and develop crisis management teams.
Adaptability Objective: Adjust system design to accommodate external changes.	Changing needs for product/market/ time.	Supply chains to fit changing needs.	(a) Track economic changes, especially in developing countries. (b) Use intermediaries to find reliable vendors in unfamiliar parts of the world. (c) Create flexibility by ensuring that different products or services use the same components and processes. (d) Create different value chain for different services, to optimize capabilities for each.
Alignment Objective: Establish incentives for different partners to improve performance of the entire system.	Trend to distributed channels operation for same goal.	Differential interests of multiple players.	(a) Provide all partners with equal access to forecasts, and plans. (b) Clarify partners' roles and responsibilities to avoid conflict. (c) Redefine partnership terms to share risks, costs and rewards for improving performance. (d) Align incentives so that players maximize overall system performance, while also maximizing their returns from the partnership.

Source: Hau L.L, (2004). The Triple-A Supply Chain", Harvard Business Review, Available at http://www.scap.pk/article/SupplyChain.pdf

References

Association for South-East Asian Nations (ASEAN), (2021). ASEAN Regional Plan of Action for Adaptation to Drought 2021-2025. Available at: https://asean.org/book/asean-regional-plan-of-action-for-adaptation-to-drought-2021-2025/

Coalition of Disaster Resilient Infrastructure (CDRI), (2021). Governance of Infrastructure for Resilience. Available at https://www.cdri.world/node/566

Global Center on Adaptation, (2019). Adapt now: A global call for leadership on climate resilience (undated). T Global Center on Adaptation. Retrieved 26bMarch 26 from https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/

Hau L.L, (2004). The Triple-A Supply Chain", Harvard Business Review, Available at http://www.scap.pk/article/SupplyChain.pdf

Indian Meteorological Department, (2019). Forecast Demonstration Project (FDP) for Improving Heatwave Warning over India. Available at: https://internal.imd.gov.in/section/nhac/dynamic/fdpheatreport2019.pdf

Intergovernmental Panel on Climate Change, "Climate Change 2021: The Physical Science Basis", Summary for Policymakers (2021). Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

International Labour Organization, (2021), World Employment and Social Outlook: Trends 2021, Available at https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_795453.pdf

Luke A.P., Shindell. D., Tigchelaar. M., Zhang, Y., Spector T. J., (2021). Increased labor losses and decreased adaptation potential in a warmer world. Nature Communications, Available at: https://www.nature.com/articles/s41467-021-27328-y.pdf

Maskrey, G. Jain and A. Lavell, (2021). The Social Construction of Systemic Risk Towards an Actionable Framework for Risk Governance, UNDP Discussion Paper. Available at: https://www.undp.org/publications/undp-social-construction-systemic-risk-towards-actionable-framework-risk-governance

NASA Earth Observatory, Shrinking Aral Sea, (2003). Available at https://earthobservatory.nasa.gov/world-of-change/AralSea

NASA Visible Earth, Aral Sea, Available at: https://visibleearth.nasa.gov/images/68762/aral-sea

National Disaster Management Authority, Government of India, How India successfully reduced mortality due to heat waves. Available at: https://ndma.gov.in/sites/default/files/IEC/Booklets/HeatWave%20A5%20BOOK%20Final.pdf

Rentschler J., Klaiber C., Tariverdi M., C. Desjonqueres C., Mercadante, J., (2021). Frontline: Preparing Healthcare Systems for Shocks, from Disasters to Pandemics. Washington, DC: The World Bank. Available at: https://openknowledge.worldbank.org/handle/10986/35429

Sanaz S., Yousefian S., Bahramzadeh A., Vaziri M.H., (2021). Systemic review of health sector responses to the coincidence of disasters and COVID-19. BMC Public Health. Available at https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-10806-9

Semenza J.C., Shlomit P., (2021). Climate change and infectious disease in Europe: Impact, projection and adaptation. Available at https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00216-7/fulltext

Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn, (2014). Human health: impacts, adaptation, and co-benefits. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11_FINAL.pdf

United Nations Climate Change, (2022). Anotnio-Gueterres: 50% of All Climate Finance Needed for Adaptation. United Nations News. Available at https://unfccc.int/news/antonio-guterres-50-of-all-climate-finance-needed-for-adaptation

United Nations Economic and Social Commission for Asia and the Pacific, (2021). Asia Pacific Disaster Report. Available at: https://www.unescap.org/kp/2021/asia-pacific-disaster-report-2021

United Nations Economic and Social Commission for Asia and the Pacific, (2020). Pathways to manage cascading risks and protect people in South Asia: Key takeaways for stakeholders. Available at https://www.unescap.org/resources/pathways-manage-cascading-risks-and-protect-people-south-asia-key-takeaways-stakeholders

United Nations Economic and Social Commission for Asia and the Pacific, (2017). Asia-Pacific Disaster Report. Available at https://www.unescap.org/publications/asia-pacific-disaster-report-2017-leave-no-one-behind

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Risk and Resilience Portal. Available at https://rrp.unescap.org/

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2021). Ready for the Dry Years: Building resilience to drought in South-East Asia (2nd Edition). Available at https://www.unescap.org/publications/ready-dry-years-building-resilience-drought-south-east-asia-2nd-edition

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (2019). Asia-Pacific Disaster Report. Available at: https://www.unescap.org/publications/asia-pacific-disaster-report-2019

United Nations Environment Programme (UNEP), (2021). What does COP 26 mean for adaptation? Available at: https://www.unep.org/news-and-stories/story/what-does-cop26-mean-adaptation

United Nations Office for Disaster Risk Reduction (UNDRR), (2016). Bangkok Principles for the implementation of the health aspects of the Sendai Framework for Disaster Risk Reduction 2015-2030. Available at: https://www.preventionweb.net/files/47606_bangkokprinciplesfortheimplementati.pdf

United Nations Office for Disaster Risk Reduction, (2019). Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland. Available at: https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2019

United Nations Officer for Disaster Risk Reduction (UNDRR) (2022). Global Assessment Report 2022, Our World at Risk: Transforming Governance for a Resilient Future. Available at: https://www.undrr.org/gar2022-our-world-risk

United Nations, (2021) Secretary-General's statement of the conclusion of the UN Climate Change Conference COP26. Available at https://www.un.org/sg/en/node/260645

United Nations, (2021). Economic and Social Survey of Asia and the Pacific. Available at https://www.unescap.org/kp/2021/economic-and-social-survey-asia-and-pacific-2021-towards-post-covid-19-resilient-economies

United Nations, (2021). Our common agenda – Report of the Secretary-General, Available at: https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf

World Economic Forum, (2022). The Global Risks Report 2022, Available at https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

World Health Organization, Regional Office for South-East Asia, (2017). Framework for action in building health systems resilience to climate change in the South-East Asia Region, 2017-2022. Available at https://apps.who.int/iris/handle/10665/258953; Karna S.