

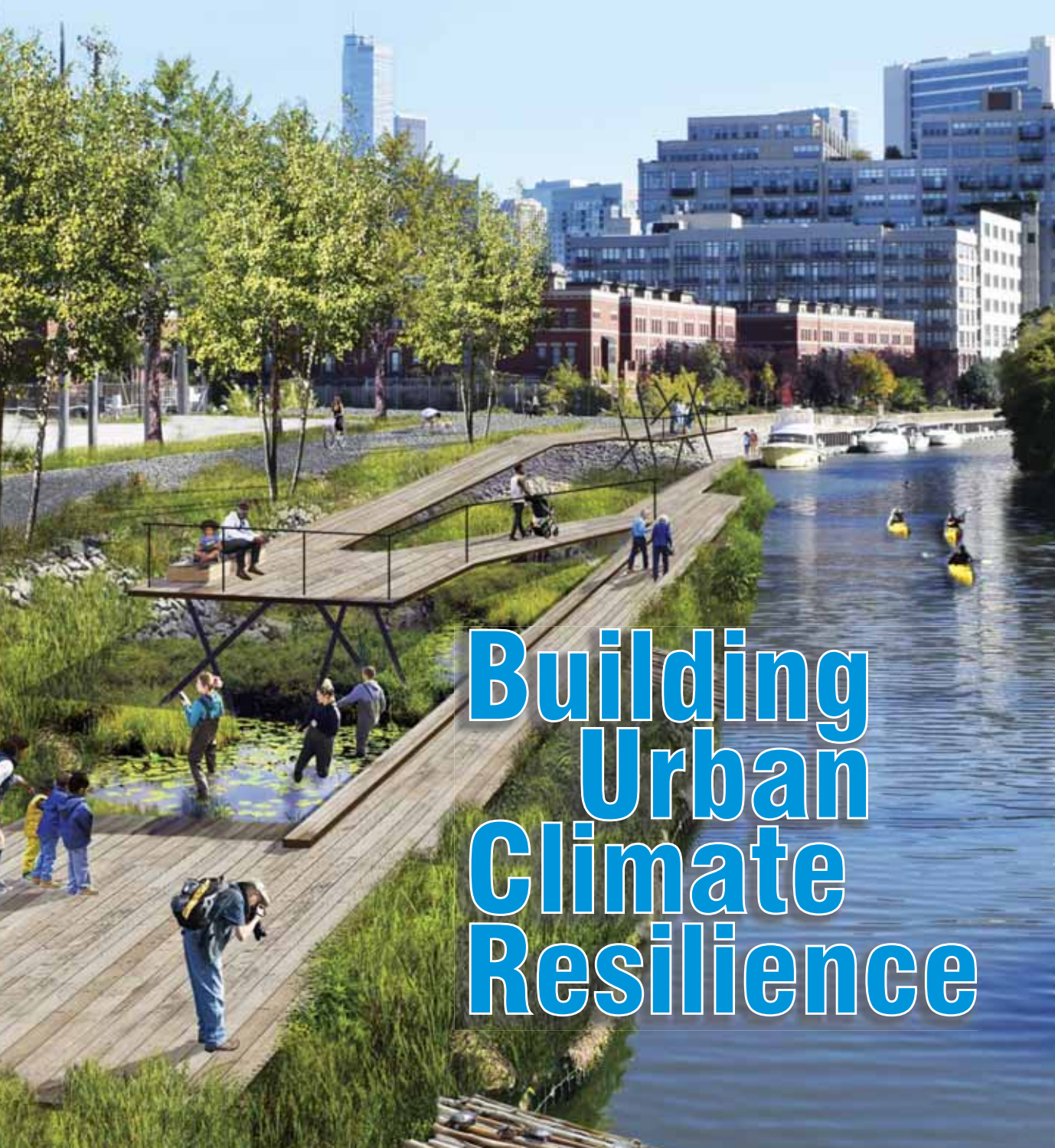
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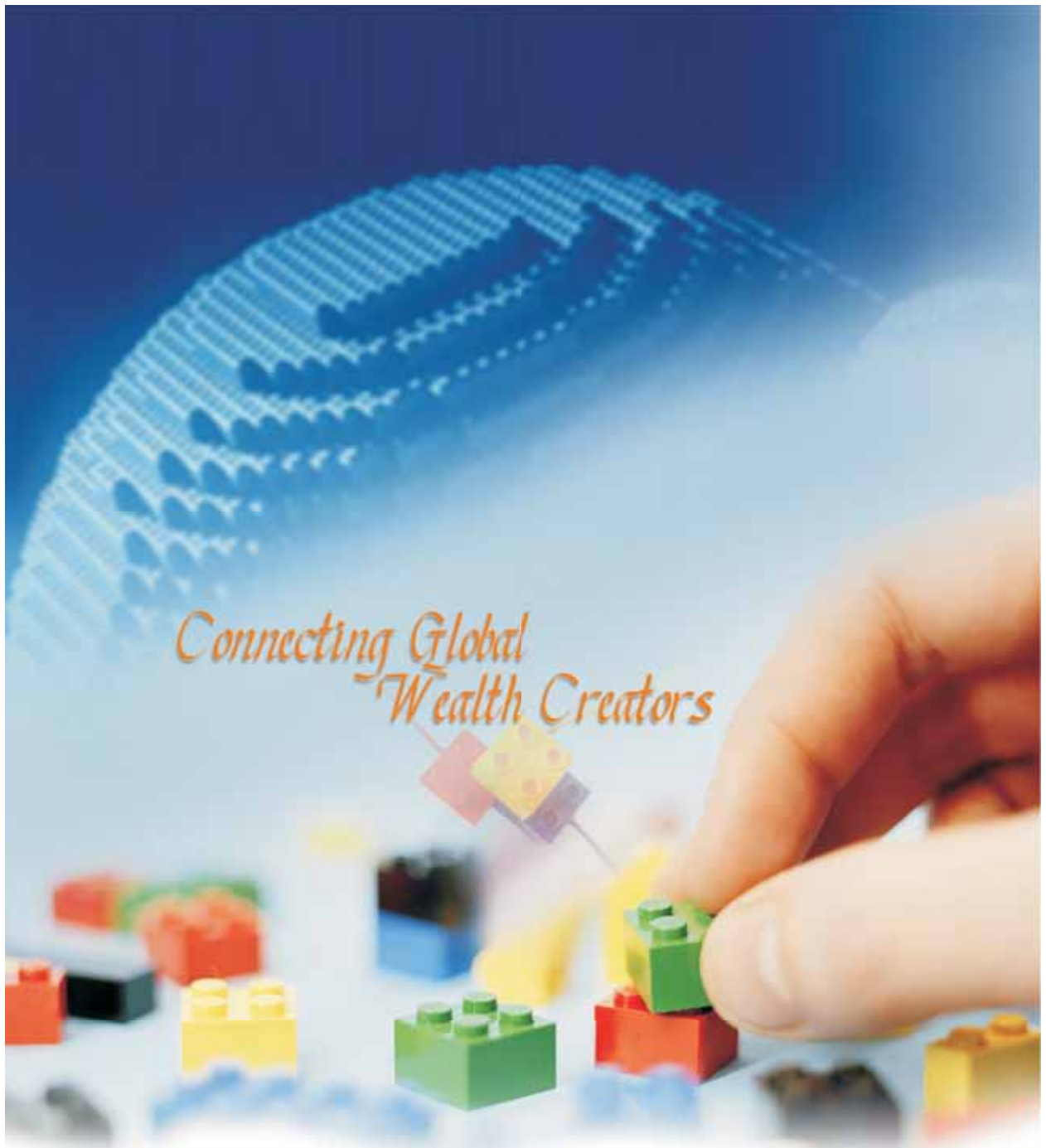
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Making Disasters Everyone's Business



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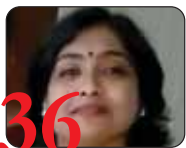
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Dear Readers,

Greetings!

As we step into the New Year, we leave behind a tumultuous year dominated by the COVID-19 pandemic. It is now time to welcome 2021 on a positive note with the launch of the vaccination. The response in India and globally is that these vaccines will usher in a more resilient society. In this backdrop, it gives me immense pleasure to place the latest edition of Know Disasters in your hands in our mission towards making disasters everyone's business.

COVID-19 was a massive stress for everyone, whether directly or indirectly, shaking up our psyche, leading to tremendous anxieties and uncertainties. Notwithstanding the fallout, there are many lessons to be learnt in terms of building on the good practices from the COVID-19 responses for future pandemic responses, deriving inputs from the innovations, opportunities, benefits reaped from the ecology and environmental perspective. It is, therefore, important to highlight not just the negative impact of COVID-19 but the positive aspects too. In this sequence, our unwavering obligation to bring COVID-19 articles would continue to remain as one of the key features in all the editions of the magazine. In this context, check out the article "Hazard of Cramped Spaces: COVID-19 Makes a Strong Case for Affordable Housing" by Moin Qazi.

Like the first edition, the second edition was also able to attract the attention of a large number of readers on account of the brilliant articles contributed by eminent authors and individual organizations. I reaffirm that the overall philosophy, objectives and approach of Know Disasters magazine is grounded on the need to demystify and simplify, and making disasters everyone's business. Attuning to this rationale, Renae Hanvin who is a multi-stakeholder disaster resilience expert based in Melbourne, Australia, has contributed an article on "Making Disaster Resilience Everyone's Business".

As we move forward, we dedicate this third edition to the widely-discussed theme: Climate Resiliency. Increasingly dangerous climate impacts are beginning to unravel decades of hard-won sustainable development gains. Floods, droughts, cyclones, fires and rising seas are hitting the poorest and most vulnerable hardest, while efforts to prepare for and manage these risks – although oftentimes innovative and effective – are failing to match the scale and speed of adaptation required.

This third edition carries articles on "Adapting to Climate Change on Scale: Addressing the Challenge and Understanding the Impacts of Asia Megacities" by Tom Burkitt; "Climate Change Displacement: How Can Cities Cope With Newcomers?" by Ambika Chawla; "V3ISESH Framework Planning Concept: Sustainability and Adaptation for Inclusive Disaster Risk Management" by Prof (Dr) Anil K. Gupta; "Nature-Based Solutions - Urban

Development and Strategy Options" by Rajeev Jha; "Post-Disaster Housing Reconstruction in the Global South: An Example from Bangladesh" by Dr Iftekhar Ahmed, and "Children Can't Wait' During Humanitarian Crises" by Soumi Halder and Devendra Tak, Save the Children. As this edition covers the Dec-Jan period, we also bring an interview with Mr Surya Narayan Shrestha, Executive Director, NSET, Nepal, on the 87th anniversary of the January 1934 mega earthquake in Nepal and India, which had caused wide-scale losses and destruction in Nepal and the Indian State of Bihar.

Know Disasters magazine is widening its scope to buttress connectedness with the three CCCs as discussed above. In this regard, we have new team members with core DRR background joining our Editorial team. They are based in selected locations of India to capture stories. In this edition, you would also read ground reporting from them that builds a strong case of making disasters everyone's business.

We truly value the continuous feedback from our readers - the three CCCs - Community, Common Man and Citizens - who have suggested that we carry a few articles in Hindi, a language spoken by the largest number of people in India. In line with our commitment to making the magazine everyone's business, we have added a few articles in Hindi.

Considering that this edition highlights climate resilience, we are sure that you would gain wider interest in reading the Global and India Disaster News and Trends that mentions the world's fastest supercomputer to study climate change, climate change as a global emergency in the biggest-ever poll, India's 10th place ranking in the Climate Change Performance Index 2021, and many more.

We trust this edition of the magazine drives home the message of the importance of disaster risk management.

Wishing you happy reading!



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Adapting to Climate Change on Scale

Addressing the Challenges and Understanding the Impacts of Asian Megacities

Tom Burkitt

Disaster Risk Reduction | Climate Adaptation | Spatial Planning for Resilience | Technologies for Insurance & Decision Support | Community Resilience & Capacity Building Christchurch, Canterbury, New Zealand

The world is urbanising at an astonishing rate [1]. As our climate and ecological emergency deepen [2] and as cities ascend to a position of economic and political influence that exceeds that of the State [3], we must accelerate the uptake of solutions that reduce emissions and resource consumption in cities (especially megacities) if we are to meet our global obligations under the Paris Agreement [4] and restrict global heating to 2 degrees [5].

It is a difficult journey. The concentrated use of resources and release of emissions by cities can wreak havoc on the atmosphere, resources and the environment, but they can also be a source of environmental good and critical innovation. So, while alarming and overwhelming, it is in our cities that we must place our hope.

This short paper highlights the impacts and vulnerabilities of megacities with a focus on Asia and presents six emerging ideas for action that could help accelerate the sustainable development of future megacities.

Asian Megacities: Scale and Impacts

Megacities are urban agglomerations with populations exceeding 10 million. It was once thought that this threshold was almost unattainable, yet as of 2018, the worldwide 'club' of megacities has grown to 33, of which, 20 are in Asia [6].

Tokyo, Beijing, Delhi, Bangkok, Manila and Jakarta are notable examples of megacities in Asia with populations ranging from 11 to 24 million, and they are all growing.

According to the World Economic Forum, just under half of all Asians live in cities, compared to 82% of



Tom Burkitt

Americans and 74% of Europeans. Asia is now undergoing a very rapid and large-scale rural-to-urban migration. Asia is projected to have two-thirds of the world's megacities by 2025. While greenhouse gas



Country	SRTM	CoastalDEM	Change
1. China (mainland)	29 million people	93 million people	+67 million people
2. Bangladesh	5 million people	42 million people	+37 million people
3. India	5 million people	36 million people	+31 million people
4. Vietnam	9 million people	31 million people	+22 million people
5. Indonesia	5 million people	23 million people	+18 million people
6. Thailand	1 million people	12 million people	+11 million people
Total, global	79 million people	300 million people	+221 million people

Table 1: Current population below the elevation of an average annual flood in 2050 (Top six countries)

emissions on a per capita basis can be lower in dense urban areas, cities are still responsible for over two-thirds of emissions worldwide.

What happens in Asia needs to concern us all. Not only is the region a key trading partner for us, but it is a region whose emissions and impact extend beyond its geography and indirectly impact our communities.

Megacities impact the environment and contribute to greenhouse gas emissions in many ways within their municipal boundaries and throughout their supply chain. They consume energy and resources for the construction and operation of buildings and infrastructure, create pollution in the air, rivers, and seas, generating enormous amounts of organic and inorganic waste. A troubling statistic on pollution for Asia, for instance, is that China, Indonesia, the Philippines, Thailand, and Vietnam are dumping more plastic into oceans than the rest of the world combined.

The megacities of Asia are highly exposed and vulnerable to the effects of climate change. Recent studies suggest that the exposure may have been underestimated for Asian cities. For instance, Jakarta and Bangkok are sinking under the weight of their populations, and approximately 70% of people worldwide living on land vulnerable to sea-level rise and coastal inundation are in eight Asian countries: China, Bangladesh, India, Vietnam, Indonesia, Thailand, the Philippines, and Japan.

“The threat is concentrated in coastal Asia and could have profound economic and political consequences within the lifetimes of people alive today.”

The direct impacts of increased temperatures, higher storm intensities, and coastal inundation are amongst the critical threats; but

indirect impacts of climate hazards on critical resources, food, and energy supply and management are other insidious issues for which many cities are woefully underprepared.

Taking Action

So, what can we do about it? The answer is many things and too many to address here. Instead, here are six ideas gaining traction and are being considered by planners, engineers, and municipal authorities responsible for urban development in Asian megacities.

#1: Applying Focus on Climate Resilience as Part of Strategic and Other Impact Assessments

Climate resilience requires us to consider both mitigation and adaptation. We need to ensure that we do not take maladaptive steps or make decisions that lock us into approaches that we will regret later.

By adopting a holistic climate resilience framework and organising action and investment, leading cities are making progress and getting organised. They are identifying synergies, the win-win situations when actions reduce both carbon emissions and climate risks. These cities understand the trade-offs and can mitigate any threat of malinvestment where actions can be undone or rendered less effective by the effects of climate change if they are not sufficiently resilient. They are also capable of piggybacking opportunities and identifying actions that are coupled in their design or implementation and where additional mitigation or adaptation actions can be added at a small marginal cost. Certainly, taking such an integrated approach to mitigation and adaptation is efficient and is proving effective.

#2: Understanding and Measuring the Risk to Inform Strategies

“What if we set the world on fire, not by burning fossil fuels, but by our burning desire to understand our environment?”

Laura Tenenbaum, Former Senior Science Editor for NASA's Global Climate Change website at NASA's Jet Propulsion Laboratory

Climate Resilience

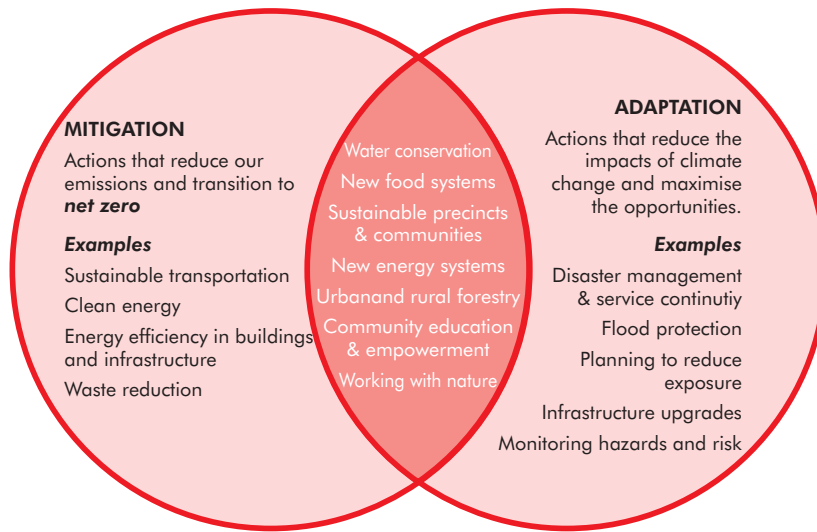


Figure 1: Climate Resilience as an outcome of coordinated and synergistic activities addressing mitigation and adaptation on scale.

Risk is a measure and not a nebulous or arbitrary concept. It is expressed as a function of a) hazard intensity and probability, b) the exposure of things we care about to the hazards, and, c) the vulnerability of the exposed elements.

Each of these components of risk is highly variable in space and

time, and this makes it tricky to understand and model. However, there are many sophisticated modelling frameworks for risk, and cities can also move forward effectively by adopting qualitative assessments of risk in order that they identify the high priority areas to focus on.

A common way to visualise risk is as a Venn diagram where risk is the

intersection of hazard, vulnerability, and exposure.

Cities that take a risk-based approach to their impact assessment processes and decision-making for spatial planning and infrastructure development are in a better position to identify risk hotspots and to prioritise investment in adaptation. By applying a multi-hazard risk assessment, some cities are more likely to develop effective policies to adapt to exposed communities, limit further exposure, and reduce overall vulnerability.

#3: Joining a Coalition of the Willing

Everyone is learning. Collaboration amongst cities is critical, and the new megacities need to harvest knowledge from other cities that are moving forward with climate action.

It is very encouraging to observe the emergence over the past ten years of strong city networks building capacity and driving the implementation of ambitious climate action plans. For instance, the C40 network [10] is a global network of 96 cities, including 26 megacities firmly committed to transition to a net-zero economy. These cities represent 25% of global GDP and over 700 million citizens. There is good news with 53 of the 96 cities having peaked in their emissions before the end of 2020. Most will be net-zero by 2045, and this network of cities is growing. Other active and determined networks include the Global Covenant of Mayors [11] and the Asian Cities Climate Change Resilience Network [12].

#4: Unlocking Innovation to Decarbonise the Supply Chain

Consider the ecological footprint and emissions, not only within the city limits but also the emissions and impacts at the source of all materials, products and goods it imports.

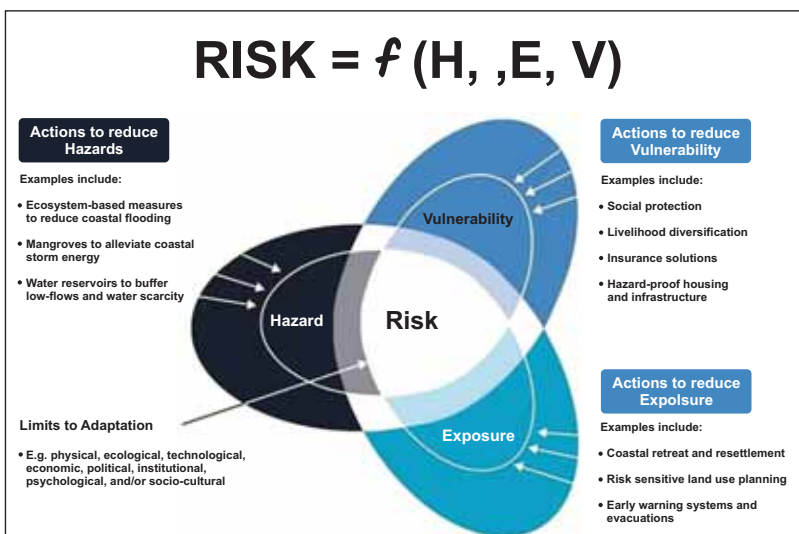


Figure 2: The risk function and its common visual representation with examples of actions to mitigate climate risk

The role of municipal authorities is to lead, enable, and inspire sustainable development and transition to a low carbon economy, and it is encouraging that cities are now beginning to adopt aggressive sustainable procurement policies that reduce environmental impact and emissions throughout the supply chain; but there are huge and untapped opportunities to do far better in this regard.

#5: Identifying Shift Projects with Transition Engineering

Transition Engineering [13] is a powerful and straightforward evidence-based approach that engineers can easily learn and use to help shape future cities. It takes a systems perspective to plan changes to today's engineered systems that 'downshift' the fossil fuel-based energy they require. The effective transition must involve the entire society, economy, law, ecology, infrastructure, energy and material supply chains.

Application of the approach by engineers responsible for city master planning and infrastructure development would be a very powerful lever. The Interdisciplinary Transition, Innovation, Management and Engineering (InTIME) Methodology central to transition engineering generates new opportunities for shift projects with the mission of achieving the 80% fossil fuel production decline required to meet global warming mitigation targets.

#6: Embracing the Adaptive Circular City Framework [14]

What if we could:

The emerging framework for Adaptive and Circular Cities [15] is powerful. Coupling adaptation and circularity can unlock innovation on the scale and create sustainable and resilient urban environments. In their mission to reduce GHG



Design out waste and pollution from cities?



Keep products and materials in use in cities and maintain their value?



Regenerate natural systems in and around cities?

emissions and minimise waste, several cities are beginning to design their systems around a circular economy to maximise value extracted from products and infrastructure whilst in use and to ensure materials and parts are recovered and regenerated for further use. This approach stimulates the economy and slows the over-extraction of resources and overproduction.

What does this mean for Impact Assessment practitioners?

There is a lot of work to do, and impact assessment practitioners have a vital role to play as advocates of these and other approaches that drive sustainable urban development on a large scale.

Whilst many of us are already involved in understanding and mitigating the impacts of rapid urbanisation, we must also consider the impacts (both positive and negative) of large-scale plans and investments made at a pace to reduce emissions and adapt our cities to climate change.

For instance, large coastal reclamation projects, now planned or underway, in many coastal Asian cities are designed to create more land and mitigate against coastal inundation in the long term, but the environmental impact of material extraction at source, deposition,

and transport is enormous and often underestimated.

Another example of a dramatic response to climate change is Indonesia's decision to establish a new city on Borneo to replace Jakarta as its State capital. Whilst envisioned as a smart, green, and sustainable alternative, the direct and indirect impacts on the environment and society will be extraordinarily hard to mitigate at the pace the government is intending to move.

Such transformation should be informed by rigorous analysis of the impacts of these well-intended investments, but most cities are paying too little attention to the environmental, social and cultural impacts of taking rapid action to reduce emissions and build their resilience to natural hazards. This presents an opportunity for both scholars and practitioners of impact assessment to explore the pros and cons of mitigation and adaptation to support better decision-making in our future cities

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Making Disaster Resilience Everyone's Business

Renae Hanvin and James Ritchie are Co-founders of corporate2community (C2C) and the Resilient Australia Alliance (RAA). Known for 'doing disasters differently', Ms Hanvin is a multi-stakeholder disaster resilience expert based in Melbourne, Australia. Mr Ritchie is an international disaster risk and resilience expert currently based in Germany.

It is time to shift the conversation and empower everyone to play a role. All stakeholders need to work closely together. Fragmented approaches waste resources by duplicating activities or leaving aspects of disaster resilience and recovery out. It is time we empower all stakeholders to understand and play their role in building preparedness and resilience. This includes individuals, business, government and communities owning and embracing new accountabilities to build local, national and international resilience. Disasters don't plan ahead, but we can!

In recent years, successive natural and unnatural disasters have become part of our 'new normal'. Recognising the need to start 'doing disasters differently', we established corporate2community (C2C) to put more focus on planning and resilience before disasters occur.

In the past, we expected disasters would affect a specific region or group of people. In 2020, we saw the impacts of a global pandemic. We also saw compounding and complex disasters, including cyclones, floods, locust plagues and industrial disasters hit countries like India. In Australia, a bushfire would



Renae Hanvin



James Ritchie

only affect those communities directly in its path. But the COVID-19 pandemic has confirmed that disasters do not discriminate. The causes of their outbreak can be varied and we should accept them as part of our every day lives.

There has never been a more important time for all stakeholders to build capabilities and understanding about disasters. This includes individuals, households, businesses, government and the non-profit or non-government organisation sectors.

We now see that disasters can have direct and indirect effects and that these consequences can either be short, medium or long term.

Extreme disasters are occurring

more often. We, therefore, need to establish a culture where disasters are better understood and embedded into everything we do. Preparing for disasters and building resilience should be a part of our daily planning. It should not be a one-off event that happens after a disaster has taken its toll.

Disasters have an enormous impact on our environment, our lives, and our livelihoods. We cannot stop disasters but we can prepare, plan for, and build a resilience-led culture. This will prepare us for future impacts, while reducing or eliminating impacts on vulnerable communities.

We must accept that compounding and complex disasters are here to stay and we should make it our

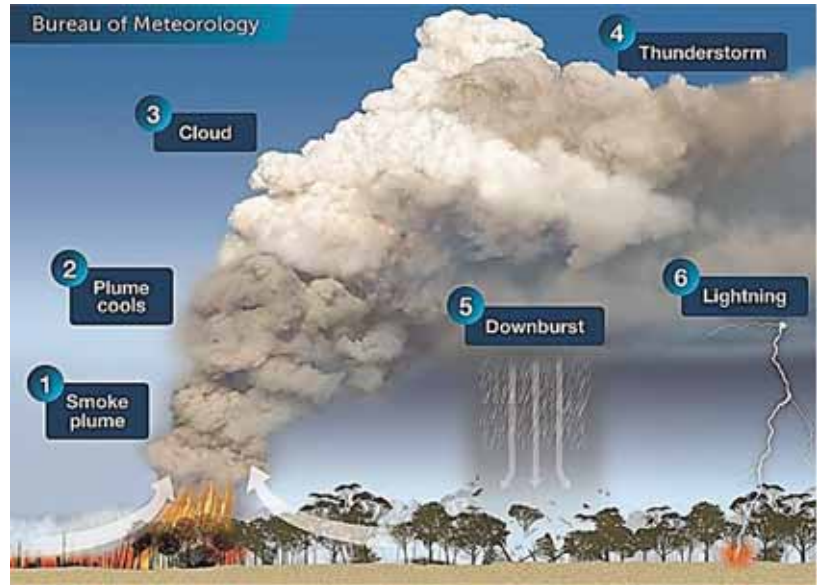
goal to make disasters everyone’s business.

In making disasters everyone’s business, C2C has identified five key themes to accomplish this.

Know who “Everyone” is

C2C is a stakeholder-related social enterprise. We base everything we do on who’s leading, who’s contributing, and who benefits. And we start with people before infrastructure.

Historically, emergency management and disaster sectors have operated separately or in silos. Operational responders, not-for-profits and governments have used their own perspectives and understanding while responding to these calamities. In the past, operational responders have been the drivers in this space. They have a set role (like putting out fires), but it is important that we move on from this mindset. While there has been some positive movement in ‘working together’, it has often been slow and uncoordinated. The new era of disasters requires greater leadership. Different leadership based on outcomes and not just outputs. We also need to change the way we work together and the roles we each play. This will better support the direct and indirect



community impacts from complex and compounding disasters.

It is time for a mindset changes from “I” to “we” or “them” to “us”. This can start by looking at who is around the table when taking decisions or developing policies and programs to build resilience. More importantly, it is about looking at who isn’t there? Why not?

All disaster-related initiatives should include Consequence-led Stakeholder Mapping - so you start with ‘who’. Start to think differently and include all actors such as businesses (from large corporates to sole operators) and industry

associations. Ensure you have considered all layers and aspects of government. In most countries, the local government plays a key role. And finally, how can you involve the community from individuals to entire households and the larger local groups?

In Australia, we have been using a model of shared responsibility for 10 years. In 2011, the government established the National Strategy for Disaster Resilience (NSDR) . It describes disaster resilience as the collective responsibility of all levels of government, business, non-government sector and individuals. A united focus where working together to improve disaster resilience is more effective than one sector’s individual efforts.

The more people/stakeholders we bring into the discussion, the more we can make it everyone’s business.

In 2018, Australia released its National Disaster Risk Reduction Framework. This Framework is the next iteration of Australia’s Disaster Risk Reduction journey. While it is a good step forward, it still requires work to bring it ‘alive’ and connect its purpose to multi-



Point of View



their strategic outputs suggest they will create a combined focus on resilience, response and recovery for all-hazards disasters. From C2C's viewpoint, this is a positive step forward.

In addition to the progression of some Government departments, there have been positives from the recommendations of the 2019-2020 Black Summer Bushfires Royal Commission . The Australian Government announced the formation of a new Federal Government agency focused on disaster resilience . This fresh approach, which will be established by June 30, 2021, will position all-hazards resilience as a national priority.

At C2C, we use the 80/20 disaster rule. 80 per cent of disaster preparedness is typically the same regardless of the disaster itself. So, when we deliver strategic programs to governments, business or communities, we always take an "all-hazards" approach. One example is to encourage business leaders to prepare their significant and business critical information for potential disaster impacts. Implementing an all-hazards

stakeholders and bring relevance to every stakeholder group, every day. It has the potential to make a real difference in enhancing disaster risk reduction and strengthening disaster resilience. Many recognise that C2C and its key strategic approach - the 'Resilient Alliance Australia (RAA)' is a positive initiative to build capabilities and connections across stakeholder groups. Together they are making tangible cultural changes for businesses, governments and communities to start considering disaster risk while delivering disaster resilience.

Bushfire Recovery Agencies . This reactive approach carries a risk of replicating research, ideas and support. Focusing only on flood or bushfire alongside only recovery and not the lifecycle of disasters (preparedness, response, recovery and resilience) is inefficient and costly.

The NSW State Office of Emergency Management has taken a different approach. In 2020, it changed its name and strategic focus to Resilience NSW . Early indicators in

Prepare for all disasters at once

In Australia, we have often focused on individual disasters. In 2019, there were severe floods in Far North Queensland. Following this, the Federal Government established the National Drought and North Queensland Flood Response and Recovery Agency . Its sole mandate is to manage recovery to this one specific disaster across one restricted region.

After the devastating 2019-20 Black Summer Bushfires, the Victorian and Federal Governments established



approach allows them to continue operating after a flood, bushfire, or during a pandemic, where people are allowed to work from home. As a result, one preparedness mitigation action can benefit them across multiple disaster scenarios.

Invest in building connections

A research conducted by Professor Daniel Aldrich from US-based Northeastern University shows resilience and social ties are more important after a disaster than money. Connected communities are more resilient than affluent communities. The importance of social capital was clear in Professor Aldrich’s research after the 2011 Fukushima disaster in Japan. He found communities with more ties, interaction, and shared norms worked better to provide help across the community.

Professor Aldrich is also a member of C2C’s (RAA) Advisory Committee. RAA is a certified social enterprise we established at the national level to empower every Australian business leader, owner and operator to build resilience capabilities; capabilities that can transfer from business



leaders onto their employees, customers, suppliers and the community in general. The result is to organically-build resilience across the community.

RAA is leading a holistic approach to national resilience by building an ecosystem of solutions to all types of disasters. The RAA’s Disaster Resilience for Business Hub is co-designing programs, tools and solutions that apply to every business regardless of their industry,

type and size. These solutions focus on increasing disaster risk understanding and reduction, improving preparedness and planning, and building resilience including social capital.

Increased understanding of resilience led by connections between business leaders, owners and operations will empower them to build better and stronger connections with their employees, customers, suppliers and communities. This delivers an organic outcome of building multi-stakeholder resilience.

Communicate in a common language

There are a lot of buzzwords and jargon in the disaster space. This makes it hard for all stakeholders to find relevance. It doesn’t help when different stakeholder groups use different words to talk about the same things. To bring everyone on a collective journey, you must find a common language which everyone understands.

To achieve this traditional stakeholder groups will need to



Point of View

be open to change to enable new stakeholders to join the discussions, find relevance and contribute to the outcomes.

The COVID-19 pandemic has seen a range of new terms added to our every day vocabulary. Perhaps one of the most common is “social distancing” or staying 1.5 metres away from other people. In Australia, we have widely accepted this term, but Daniel Aldrich suggests “physical distancing” would have been a better term.

We know social ties are important during a disaster. It would have been preferable to explain that physical distancing does not mean lessening or restricting social interactions. But is the latter how people understood the term? Has using the “social distance” messaging confused its intent? Potential consequences include people becoming long-term recluse, losing the ability to re-enter society or increased levels of mental health and anxiety. This example shows the power that language can have before, during, and after disasters.

Educate and remove the fear

Most people do not want to talk about disasters every day. Before 2020, it was unlikely we would discuss what would happen “if a global pandemic meant our communities and businesses went into lockdown for three months” during our lunchroom and dinner-table conversations.

However, the more we talk about and plan disaster preparedness, relief, recovery and resilience, the better off we will be.

In addition, a major area that all stakeholders can and must work together on is the pandemic of ‘misinformation’. Business, government and communities must



establish better ways to mitigate misinformation. The need must be to deliver purposeful evidence-based facts and information with clarity and structure. We need all leaders and people across communities to make best value decisions during disasters. Misinformation is not just unhelpful, it actually creates higher risks for vulnerable people and communities.

We know that for many people, disaster resilience is a new topic. And while awareness is important, this is more than just having an informal chat. That is one reason C2C established group coaching for small business owners. It is great for knowledge-sharing and building networks that are so valuable when disaster occurs.

Many people from corporates to micro business owners do not look at disasters being a lifecycle - before, during and after. We spend most focus on the during and after, with the before forgotten or ignored. Yet research tells us: for every \$1 spent before can save up to US\$15 in post-disaster recovery .

In 2020 in Australia, the cost of bushfires, long-term drought, storms and COVID-19 is likely to be billions of dollars. Imagine if we spend just 10 per cent of this cost on

disaster awareness and resilience in Australian households, businesses, and local governments.

Knowledge is power. The more we inform stakeholders about disaster planning, resilience and recovery, the better off they will be when disaster strikes. The better informed and prepared stakeholders are, the more lives and livelihoods we will save.

In conclusion

It is time to shift the conversation and empower everyone to play a role. All stakeholders need to work closely together. Fragmented approaches waste resources by duplicating activities or leaving aspects of disaster resilience and recovery out. It is time we empower all stakeholders to understand and play their role in building preparedness and resilience. This includes individuals, business, government and communities owning and embracing new accountabilities to build local, national and international resilience.

Disasters don't plan ahead, but we can! ■

Climate Change Displacement: How Can Cities Cope With Newcomers?

Ambika Chawla is the Director of Urban Climate Innovations, a woman-owned think and do tank which informs policymakers and the public about the role of city-level governance to tackle climate, migration, and urbanization challenges while designing solutions to address these challenges. As a climate change policy writer, she has contributed to policy reports which have been published by UN-Habitat, the Global Green Growth Institute (GGGI), the Panos Institute, the World Wildlife Federation, and the One Earth Future Foundation.

With the coming years, climate-induced migration to urban hot spots is likely to intensify. As it does, collaborations across sectors can help fragile city governments deliver a more effective humanitarian response in times of crisis while empowering internally displaced persons to play a central role in efforts to fully integrate into the society.

When the rains never arrived in the East African nation of Somalia in 2016 and 2017, hundreds of thousands of rural residents were compelled to abandon their lands and livelihoods due to one of the most severe droughts in decades. In 2019, from September to December, heavy rains led to severe flooding displacing thousands of people from their homes in rural areas and towns in the districts of Belet Weyne, Baardheere and Berdale.

These climate migrants traversed barren and dusty landscapes or travelled through torrential rains seeking food and shelter. Many ended up in refugee camps in urban areas such as Badbaado, a sea of makeshift tents on the outskirts of Mogadishu that is now home to tens of thousands of internally-displaced persons.

The challenges they face are profound, says Ben Mbaura, National Emergency Response and Disaster Risk Reduction Coordinator at the International Organization for Migration (IOM), including inter-clan conflict, poor sanitation, limited education and insufficient access to food. On top of that, many “do not have the necessary skills to match the labour market needs, which also results in high levels of unemployment and exclusion,” Mbaura notes.

The response to internal displacement such as this has long been to provide emergency or short-term assistance. In recent years, however, with so many internally-displaced persons living in protracted displacement, humanitarian organizations have recognized the need to empower them to move toward greater self-reliance. As a result, in 2016, the United Nations and the Government of Somalia created the Durable Solutions Initiative (DSI) to introduce long-term solutions for internally-displaced persons in Somalia. The DSI gives these people a voice in decision-making processes that shape their future and offers a model for other cities that are or soon will be, in similar circumstances.



Ambika Chawla

Fragile Cities

Every year, millions of people around the world are forced to abandon their lands, livelihoods and communities due to the effects of climate change. And the rate of climate-induced migration is increasing — with most taking place in the form of rural-urban migration within countries.

According to a recent World Bank report, “internal climate migrants” could number more than 143 million by 2050, mainly in sub-Saharan Africa, Latin America and South Asia. If the past is any indication, most will be forced from their homes by extreme weather events. Others will move from rural areas to cities due to a slow-onset of climate-related events such as desertification.

Analysis

According to a recent World Bank report, 'internal climate migrants' could number more than 143 million by 2050, mainly in sub-Saharan Africa, Latin America and South Asia.

Pablo Escribano, a specialist on migration and climate change in Latin America for the IOM says this migration will create "urban hot spots" where displaced persons converge in search of shelter, food and jobs.

Climate migrants who arrive in cities are likely to move to informal settlements, and many of these hot spots will occur in rapidly expanding cities in low and middle-income countries with weak governance and limited capacities to provide social services and infrastructure.

"In Asia, recent estimates of the increase in sea level rise have strong implications for cities like Jakarta, Bangkok and Dhaka," Escribano says. In Latin America, he says, Rio de Janeiro, Lima, La Paz and Mexico City will experience migration pressure from sea level rise, melting glaciers and other climate-change effects. "Fast-growing cities in Africa, such as Lagos, Luanda and Kinshasa, are also considered to be city hot spots," he adds.

Urban development expert Robert Muggah has dubbed these urban settings as "fragile cities." As Co-Founder and Research and Innovation Director of the think-tank Igarapé Institute in Brazil, Muggah developed 11 indicators that determine urban fragility, including crime, inequality, lack of access to services and climate-change threats.

Ani Dasgupta, Global Director for the Ross Center for Sustainable Cities at the World Resources Institute (WRI), says fast-growing cities face multiple threats that increase the vulnerability of new arrivals.

"As cities expand, many municipal



A group of people carry items to a boat by hand in Bangladesh. The port has disappeared because of rising sea levels, an impact of climate change.

governments are overburdened. They are not able to keep up with increasing demand for basic services like housing, jobs, electricity and transport," he says. "The climate crisis is an additional challenge on top of this. Flooding, heatwaves, water shortages and more powerful storms tend to affect new migrants and already vulnerable populations most severely."

Move toward Self-Reliance

The goal of the DSI is to strengthen the ability of government at all levels — local, state and federal — to help internally-displaced persons integrate into society. It has mobilized funding from donors such as the World Bank, U.N. agencies and the Peacebuilding Fund (the U.N.'s financial resource for supporting peace in areas experiencing or at risk of conflict) to support initiatives that allow internally displaced persons to present their ideas for community infrastructure projects along with strategies to become self-reliant.

Teresa Del Ministro, the DSI Coordinator for Somalia, says the DSI is a response to a growing

global awareness of the limitations of traditional humanitarian approaches to deal effectively with internally displaced persons. "With that trend increasing worldwide, it appeared that multi-stakeholder partnerships are needed at all levels," she says.

Many municipal governments are not able to keep up with increasing demand for basic services, such as housing, jobs, electricity and transport.

The DSI is considered particularly innovative because it lets internally-displaced persons articulate the kinds of solutions they need to move toward self-reliance. "A participatory, locally-owned approach is one of the programming principles for the DSI," says Isabelle Peter, the DSI's Coordination Officer.

One example is the Midnimo I project supported by the Peacebuilding Fund with the IOM and UN-Habitat as partners. With support from Midnimo I ("midnomo" means "unity" in Somali), climate migrants and other displaced persons in southern and central Somalia met with representatives of their host communities, along with city and national government officials, to



surprised many in the international community, and there was the recognition that collectively we needed to support Ethiopia,” says H el ene Harroff Atrafi, DSI Coordinator in the U.N. Resident Coordinator’s Office. “In doing so, we looked at international good practices, including in neighbouring Somalia.”

At this point, the governance structure for the DSI is being established with the Government of Ethiopia in the lead. “We have agreed on the vision forward, we have brought together all of the partners who want to work together. Now the operational rollout must begin,” says Atrafi.

The number of climate migrants in Ethiopia could close to triple by 2050, with Addis Ababa set to become an urban hot spot for climate-induced migration.

In the Somali region, one of the ten regions of Ethiopia, the DSI is at the stage of detailing the options that internally-displaced families have: urban and rural relocation; return to the location of origin; and potential integration in the settlements where the displaced individuals currently reside.

According to the World Bank report “Groundswell: Preparing for Internal Climate Migration”, the number of climate migrants in Ethiopia could close to triple by 2050, with Addis Ababa set to become an urban hot

develop creative solutions to the many challenges they face. Among other things, the initiative sought to help communities define and drive their recovery — most prominently through community action plans (CAPs) and documents that lay out local priorities for community-driven recovery.

As part of Midnimo I, the IOM-trained Somali government representatives to engage displaced persons in visioning exercises to help them articulate their short-term needs and present ideas on strategies to move toward greater self-reliance. Midnimo I was implemented in the cities of Kismayo and Baidoa, home to more than 450,000 internally displaced persons. “Together they would come up with priorities for infrastructure investments or other types of investments. If a project did not have funding for these priorities, the government would convene other actors and ask for their support,” says Del Ministro.

According to an evaluation report by the IOM, the Midnimo I project created short-term employment opportunities, led to the construction of community infrastructure projects and contributed to the establishment of a land commission and improved relations between authorities and displaced communities. Nearly

350,000 people directly benefited from the Midnimo I project as a result of constructing or upgrading community-prioritized schools, hospitals, water sources, police stations, prisons, airports and more, according to the IOM’s Mbaura.

The DSI in Ethiopia

The DSI has also been implemented in Ethiopia, where a drought that began in 2015 left millions dependent upon emergency food aid. The Government of Ethiopia, with support from U.N. agencies, governments, donor agencies and non-governmental organizations, launched its DSI in December 2019. As in Somalia, the focus is on long-term self-reliance.

“The scale of the displacement



Analysis

spot for climate-induced migration. Smaller cities, such as Jijiga and Deri Dawa, are also expected to receive increasing waves of climate migrants.

In February 2020, Ethiopia ratified the African Union Convention for the Protection and Assistance of Internally Displaced Persons (IDPs) in Africa, a legally binding instrument for protecting internally-displaced persons in Africa. There is hope this will bring greater awareness about the need to support innovative, participatory initiatives for internally-displaced persons there.

The Way Forward

Around the world, fragile city governments can partner with international humanitarian organizations, NGOs, research institutions, the private sector, U.N. agencies and other city governments to strengthen their capacities to tackle challenges at the intersection of urbanization, climate and migration.

For the Internal Displacement Monitoring Center (IDMC), a think-tank based in Geneva, multi-stakeholder partnership plays a crucial role in gathering information about internally displaced persons.

“We start with the people affected — internally-displaced persons and host communities — and from there, we build up the agenda, collaborating with national governments, U.N. agencies, NGOs, academia and research centres,” says Pablo Ferrández, a Research Associate with the IDMC.

Andrew Fuys, Senior Director for Global Migration at the nonprofit Church World Service, says that one priority for research is to identify how the risks climate migrants face are similar to or differ from those of other internally-displaced persons in cities so that organizations can provide the appropriate services for



climate migrants.

Despite the well-designed programmatic approach to implement durable solutions, unless a climate change adaptation strategy is delivered at the regional and local levels, we may expect further climate change-induced displacement

Del Ministro and Peter say the long-term success of the DSI in Somalia will depend on overcoming several challenges. Organizers will need to ensure sufficient resources for community-led initiatives, overcome obstacles to coordination and strengthen the capacities of city governments.

“Stronger capacities are needed in human resources in city planning,” Peter says. “There is a need to have financial resources available. Developing the skills and knowledge of people who are equipped to deal with challenges in cities is required.”

Oana Baloi, Program Management Consultant for UN-Habitat in Ethiopia, emphasizes the need for city governments to gain greater access to climate-related finance opportunities.

“Despite the well-designed programmatic approach to implement durable solutions, unless a climate change adaptation strategy is delivered at the regional and local levels, we may expect

further climate change-induced displacement,” says Baloi. “Accessing climate financing for large scale interventions to ensure adaptation and displacement prevention remains a challenge.”

Ferrández says there is also a need for decentralization so that towns and smaller cities receive adequate resources to support internally-displaced persons.

“Bringing efforts to achieve durable solutions from the national to municipal level also means intervening beyond areas such as Baidoa, Kismayo and Mogadishu, where the international presence is strong, to secondary cities and rural areas,” he says.

With the coming years, climate-induced migration to urban hot spots is likely to intensify. As that continues to be so, collaborations across sectors can help fragile city governments deliver a more effective humanitarian response in times of crisis while empowering internally displaced persons to play a central role in efforts to fully integrate into the society. The hope is that when climate migrants are given a voice in decision-making processes in fragile cities, they can devise solutions that will lead to a more secure future not only for themselves and the cities in which they live but also for future generations. ■

National Society for Earthquake Technology (NSET)

Playing a Pivotal Role in Earthquake Risk Reduction in Nepal

An interview with Surya Narayan Shrestha, Executive Director, National Society for Earthquake Technology (NSET), Nepal

The Himalayan region is always prone to frequent seismic activities owing to its geological and geographical vulnerability. The 1934 Nepal-India earthquake or the 1934 Bihar-Nepal earthquake was one of the worst earthquakes for both countries. The quake that occurred on January 15, 1934, was recorded 8.1 on the Richter scale. Over 30,000 people were said to have perished in the disaster. The epicentre was in eastern Nepal. There was extensive damage to life and property. The intensity was so strong that its effect was felt in Kolkata - 650 km from the epicentre. Purnea, Munger, Muzaffarpur and Champaran were among the worst affected areas. In an interview with Surya Narayan Shrestha, Executive Director, National Society for Earthquake Technology - (NSET), Nepal, he shares the lessons learned from the 1934 mega quake in dealing with future earthquakes.

From the 1934 earthquake to the 2015 Gorkha earthquake, how has the paradigm of earthquake risk mitigation evolved?

Unconditionally, this is very important as the 1934 earthquake in Nepal holds a historical perspective. It exposed the underlying seismic vulnerability of Nepal in several respects. Comparatively, in those days, there was barely any scientific earthquake preparedness existing in Nepal. It only remained confined to rehabilitation and reconstruction, which often took more than five years. In the aftermath of the earthquake, the Nepal Government received support from other nations as well. The lessons drawn from relief and recovery were not archived by the Government due to the non-existence of such a conceptual framework and an organised system. It was documented in a substandard manner.

The 1934 earthquake was a major turning point for Nepal. In 1988, Nepal was shaken yet again by a 6.9 magnitude earthquake. An earthquake of such magnitude was a wake-up call, and consequently, the Nepal Government formulated a National Building Code in



Surya Narayan Shrestha

1994. The Building Code governs the construction of all types of buildings and lays provision for making earthquake-resistant buildings. It was a historical and important milestone for Nepal. It also led to the creation of several organisations, including NSET in 1993. Since its inception, NSET has played a pivotal role in earthquake risk reduction with a holistic approach. Thanks to the several risk reduction measures undertaken by NSET, there has been a paradigm shift towards reducing seismic vulnerability through mitigation and awareness generation.



NSET has a long history of working in Nepal. Can you briefly describe your current as well as the past earthquake risk mitigation projects?

Primarily, as per our mandate, our role was limited to an organisation outside the government, supporting the implementation of the Nepal National Building Code. Since our establishment, we have been focussing on safer building construction. Within this purview, we concentrate on all kinds of activities related to risk reduction at the community level. Retrofitting school safety is one of the key areas of intervention. The schools that survived the 2015 earthquake in Nepal with less damage and destruction are now taken care of by the government under the School Retrofitting Programme. In the same proportion, hospital safety is being retrofitted. NSET also works with 16 municipalities for the implementation of the Building Code. As part of its holistic approach, strengthening the disaster preparedness system for effective response is another area

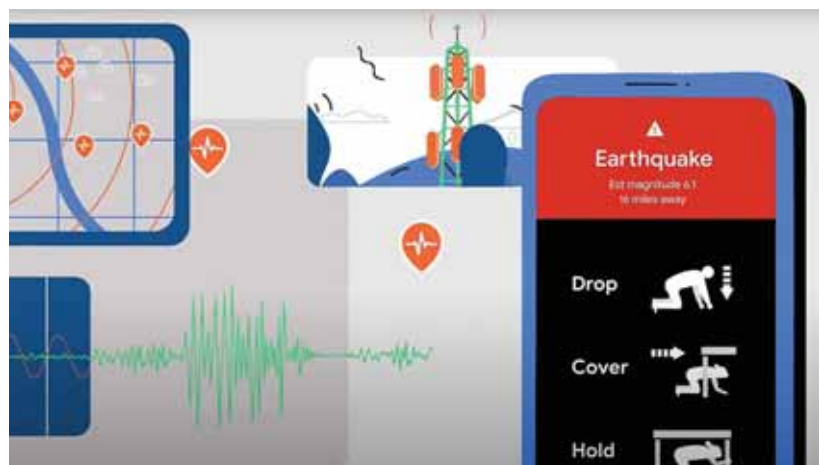
“The key to the success of any DRR measure can be largely achieved if local resources are fully exploited as well as the local ownership is also ensured.”

- Surya Narayan Shrestha, Executive Director, NSET, Nepal

that we are intervening. Besides, the key area also involves capacity building and training and providing technical support to institutions in such activities. Enhancing emergency response capacity through extensive capacity-building of institutions such as the Army, Police, and Red Cross is an integral part of our risk reduction approach.

Every year on January 15, we observe the Annual Earthquake Safety Day.

According to new research by Lancaster University, a new fault system in South Eastern





and increasing preparedness. We have played a vital role in all these aspects at the local level. The critical need for building resilience at every level calls for formulating a disaster management plan for all the local authorities. We would be happy to contribute to this initiative.

What is your overall approach to earthquake risk reduction? What are the guiding principles and concrete ways to prevent a disaster when starting a new initiative?

The involvement of key stakeholders is one of the important determinants of such initiatives. Designing scientifically proven, earthquake-resistant technologies with the help of the local community and ensuring that these technologies are cost-effective is the target. Earthquake-resistant technology that brings simplified and adaptable methods for the community would be another approach. Besides, the potential for replicability also counts for us as a guiding principle.

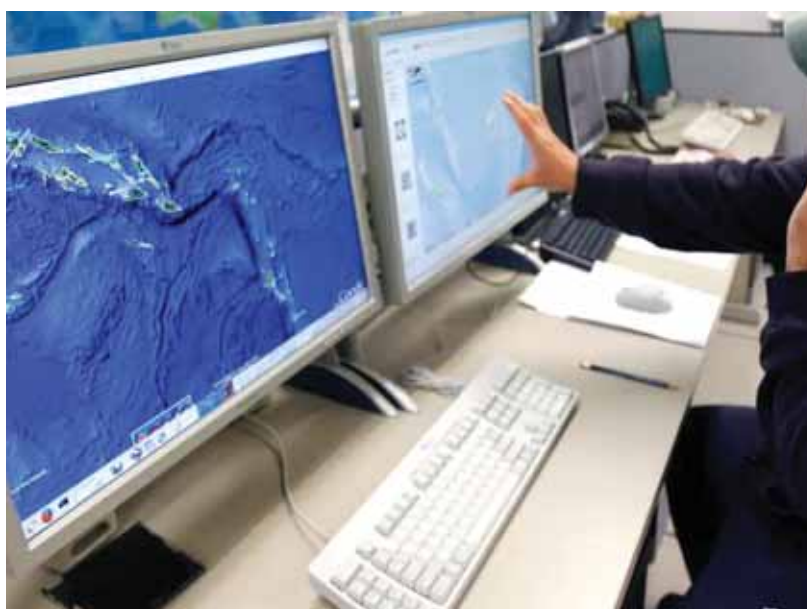
Nepal has been found, with the potential to cause big earthquakes. Can you throw some light on this and the probability and its impact on India and other neighbouring countries?

This is a bit technical in principle. I have not gone through the details. That is another major detail, but generally, this Himalayan region is prone to big earthquakes. It needs more in-depth research as the fault lines have the potential of causing a high-magnitude earthquake.

mitigation in line with the Sendai Framework?

NSET is one of the key players in supporting the Government of Nepal in implementing the Sendai Framework on DRR. Guided by the Sendai Framework on DRR, progress has been made in Nepal in risk assessment, DRR governance, investment in building resilience

The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted by the UN Member States almost five years ago. What progress, if any, has been made by NSET in earthquake risk



Analysis



How can cross-border coordination be facilitated in the event of an earthquake, with special reference to India?

Disasters are not bound by political boundaries. They have no socio-economic considerations. To

facilitate cross-border coordination, it essentially necessitates developing strategies at three levels namely, national, state and local level. We should emphasise more on the community level whenever any disaster strikes as the community suffer the most, and at the same time, they are also the first responders.

Local governments play an important role, and of course, the State and Central Government. The importance of cross-border cooperation can be well demonstrated by citing the example of the 2001 earthquake in Gujarat (India). After the Gujarat earthquake, the NSET team went to Gujarat and learned from the response and recovery experiences for one year in collaboration with SEEDS India. The learnings from that earthquake were put into practice during the Nepal 2015 earthquake underscored the significance of cross-border cooperation.



Can you please illustrate any advancement of the Early Warning System like parameters, accuracy, time-gap between the prediction and the event of an earthquake?

So far, science has not arrived at that



level in predicting an earthquake to know the exact date, magnitude or place. However, with the help of research, we can scientifically work out these long-term predictions. The travel time of primary waves is slightly faster than secondary waves, though secondary waves are more destructive. As of now, predicting an earthquake is not possible.

A major part of your efforts involves community engagement. What specific methods

have you found to work best?

The key aspect is to start engaging the community right from the inception phase i.e., the planning phase. This certainly prolifically brings the expected outcomes. Another key aspect to consider involves incorporating certain space for utilising local resource as it provides ownership. It is also equally important to identify local champions and building trust with them and simplifying the knowledge which is transferrable to the community for a better

understanding. Transferring knowledge about disasters and their prevention in a simplified process to others is more important than limiting the knowledge about disasters and their prevention to oneself. In earthquake risk-mitigation measures, we not only need the collaboration of earthquake engineers but also social scientists who can potentially play the role in disseminating knowledge in a simplified manner with the involvement of the community. The key to the success of any DRR measures can be largely achieved if local resources are fully exploited and local ownership is ensured. Identifying local champions and empowering them will eventually lead to community empowerment.



Are there any issues specific to Nepal - cultural, political, economic - that has made your efforts - either difficult or easy - to ensure earthquake preparedness?

Gaining trust is very important in any intervention related to earthquake risk reduction. We need to understand the contextual setting. Only then can solutions be suggested. ■

V3ISESH Framework Planning Concept: Sustainability and Adaptation for Inclusive Disaster Risk Management

Prof (Dr) Anil K. Gupta is a Professor and Head of Division at the National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India.

The V3ISESH - Vital, Viable and Vibrant Inclusive Safety-Environment-Sustainability-Health (V3ISESH) Framework is a wisdom-driven, innovative and effective tool to address the prevailing and future complexity of risks faced by people, governments and businesses. The PDM (Preventive Disaster Management) Framework by Gupta & Yunus (2004, Current Science) which preceded the 2005's Disaster Management Act of India argued for a holistic, proactive and risk-mitigation-centric approach. However, despite the best understanding, policy facilitation and realization of the need for greater convergence and integration, institutions and actors digressed from this in ground realities. This calls for a systemic audit to determine the root causes of why disaster risk reduction has been inadequate despite many policies and discourses at the top.

It is not the lack of knowledge or intent, but inadequacy in terms of strategic tools and/or right skillsets for integrated vulnerability assessment and planning that is responsible for this inertia. The Sendai Framework of Action, Paris

Climate Agreement and SDGs gives a set of parameters for monitoring and evaluation, but the question remains: how they can be defined under an integrated framework protocol. The Indian Prime Minister gave a 10 Point Agenda on Disaster Risk Management when he inaugurated the 7th AMCDRR (the first after SFDRR) at New Delhi in 2016 as an easy set of roadmap. However, an operational framework for these agenda items has never been devised in a form that can be monitored.

Given the above dichotomy of a pessimistic scenario, a light of optimism and promise with the proposed V3ISESH Framework Planning Concept that has been evolved with international policy protocols as well as national and regional priority regimes and also using the lessons from the past as well as diverse vulnerability and risk analysis exercises under ACCRN, 100 Cities programme, Gorakhpur Model, CDKN projects, etc, the author recommends piloting the V3ISESH Framework Planning Concept and evolving into a fully equipped toolkit to help address the gap area.

The recent Adaptation Gap Report 2020 highlighted on two major dimensions of climate resilience integrated disaster risk management, viz. (i) Nature-based solutions or ecosystem services for carbon neutrality and



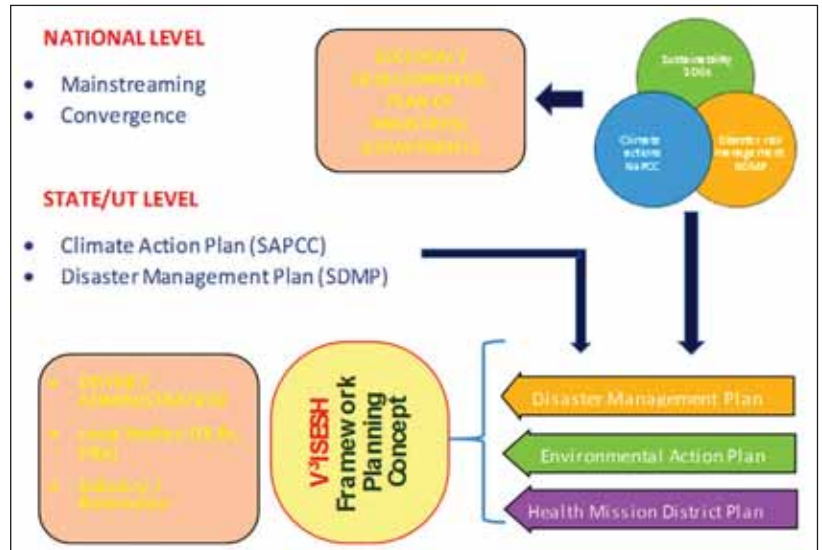
Prof (Dr) Anil K. Gupta

adaptive risk management, and (ii) Governance and coordination effectiveness including financial strategies, tools, institutions and administrative mechanisms. These recommendations seem to have been built on the findings of recent ones, i.e. 1.5°C Report, SREX Report, etc. The recent COVID-19 pandemic has been a significant lesson in keeping each of the goals, priorities and targets set under SDGs, Paris Climate Agreement and SFDRR (for 2015-30) to provide a matrix of vital parameters for M&E towards integrated implementation mechanisms for sustainability.

The Global Adaptation Summit 2021 voiced aloud the global leaders' (including the Indian Prime Minister) call for concerted actions and lifestyle changes on all fronts – housing, agriculture, food, transport, energy, industry, etc., and reiterated the need for adaptation inclusion in all the key facets of development; including a disaster-

resilient infrastructure. An illustrative model exercise to enumerate the V3ISESH Framework concept and process, the pilot study involves the following key dimensions into the key planning sectors:

1. District-level Planning
2. Local Planning (Urban Local Bodies, Village Panchayat/Rural Cluster Units)
3. Corporate/Businesses
4. Industry, Establishment, Organization, Institution
5. Sub-national Level
6. Institutions and Systemic Framework



As the national level systemic framework suffers a lot due to duplicity, overlap, ambiguousness of roles at certain points and domains, and given the need of integration and options of reaping co-benefits, there is need to revamp these institutions, including disaster management organizations like the National Disaster Management Authority (NDMA) and related institutions. Climate change has become central (besides environmental emergencies including health, air, water, waste and chemical emergencies) due to the growing occurrence with new kinds of disaster typology. Therefore, public safety and DRR cannot be achieved

in isolation from environment, health and sustainability disciplines. The integration under V3ISESH, which embraces vital significant, vibrant, viable options and flexible alternatives as an umbrella institutional authority in place of NDMA, can also be thought of.

India is seen globally, and especially in the global south (and in the regime of South-South cooperation), a leader with true ground examples in natural disaster management. The time has come that it comes up with a prudent model, i.e. V3ISESH Framework Planning Concept, with an equally equipped organizational and operational system covering environmental, health and

sustainability to foster a true sense of public safety as part of the development and socio-economic culture.

In Corporate planning and business management, the resilient inclusive BIA (Business Impact Analysis), DIA (Disaster Impact Analysis, as part of EIA – for a holistic and inclusive approach to project clearance and decision making), LCA (Life Cycle Analysis – to ensure risk is assessed and addressed at all stages) and auditing (safety, health, environment, etc.) are not recognized attributes to strengthen the business continuity and sustainability in the backdrop of increasing environmental emergencies, climatic and disasters-related shocks and uncertainties.

Lessons of the COVID-19 pandemic are crucially important in this direction as it was a global disaster of unprecedented scale and a black swan event. Complexities with a series of other disasters and complexity of administrative and scientific challenges make an interesting case study for auditing our existing systems in DRR, health, environment, safety and climate resilience. Region-specific case studies as research subjects can help with clear and distinct insights. ■



Nature-based Solutions - Urban Development and Strategy Options

Rajeev Jha is an international development professional with substantial experience working in the South Asia region. Over the years, he majorly invested in disaster risk reduction, climate change, humanitarian response work. Mr Jha's latest work includes working with UNDP India as a DRR Consultant and as National Lead for Practical Action on its DRR and flood resilience work, which is supported by ZURICH Foundation.

This article dwells upon emerging nature-based solutions, their role in urban development, climate change, disaster risk reduction to build urban resilience. It also discusses some of the development options or strategy to be in sync with nature-based solutions. The overall approach is general in nature and illustrations have been taken from several regions to promote the cause of NbS.

Children frolicking in the swimming pool; young people posting their selfies on social media platforms; family tour packages becoming the norm for middle-class societies around the world to go on long, adventure holidays to some exotic or isolated region. Now take your mind to just one and half decade ago; the humdrum of forced leave was not present. Most of us did not live and grow up in high-rise buildings, our pool was an open neighbourhood pond where we would frolic around on endless summer days, and the flora and fauna was in abundance. No one required an expensive holiday package to experience them. We were one with nature. Not anymore.

When Greta Thunberg told world leaders: "How dare you? You have stolen my dreams and my

childhood" at the UN Headquarters, she was referring to the impact of climate change that despite scientific evidences being crystal clear about the degradation of the climate and its impact on humankind, politics and the solutions taken thus far are still not enough as there is little visible change seen.

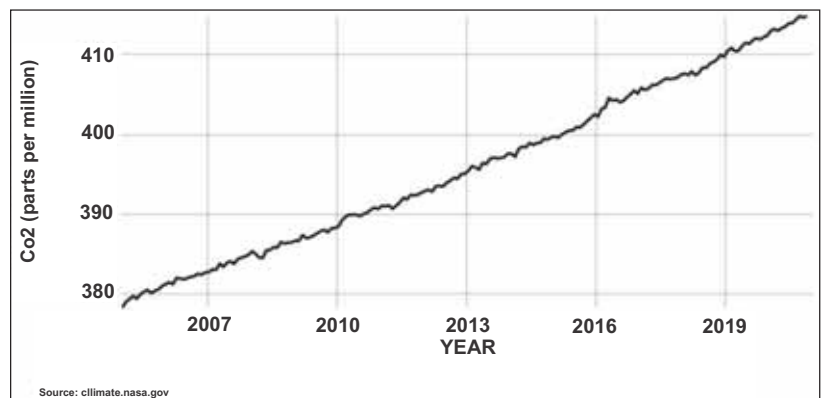
From the Hyogo Framework of Development to the Paris Climate Change Agreement to the Sendai Framework of Disaster Risk Reduction, national and state-level action plans and numerous pilot projects being implemented across the globe have emphasised the magnitude of nature-based development solutions either directly or indirectly. As per climate.nasa.gov, over the past 170 years, human activities have raised atmospheric concentrations of CO₂ by 47% above pre-industrial levels found in 1850. This is more than what had happened naturally over



Rajeev Jha

a 20,000-year period (from the Last Glacial Maximum to 1850, from 185 ppm to 280 ppm).

Nature took a catastrophic brunt of this carbon explosion. Anthropometric interventions needs a better and workable solutions for an inclusive governance. And NbS is one of the options to explore as it has the potential to mitigate some



of the fundamental issues, if not all.

Popularly known as NbS, it can be applied to several developments - from sustainable livelihoods to water security to infrastructure-led growth in cities and towns. In particular, the urban realm of development needs special focus because of its centrality of subjects. It can also act as a growth engine for the upcoming decades for mankind.

The emphasis to work around nature while executing infrastructure projects has been a subject of debate for a long time. There have been several initiatives taken before. The river-basin approach propagated in most of the flood-prone regions of India and the world can be seen in that light, implying the notion of growth and development either in livelihood or infrastructure in line with the flow of the water. Flood zoning and regulation also acts

WHAT IS NBS

Nature-based Solutions (NbS) are defined by IUCN as actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges (e.g., climate change, food and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits. NbS is best considered an umbrella concept that covers a range of different approaches. These approaches have emerged from a variety of spheres (some from the scientific research domain, others from practice or policy contexts) but share a common focus on ecosystem services and aim to address societal challenges.

as an enabler. The coastal zone regulation laws of the country also reflects a lot on the type of development that can happen within the coastal zone; and most development should happen in sync with nature. Overall, there is always an emphasis on recognising the fundamental role that an ecosystem plays in supporting human beings' wellbeing, and that should be the cornerstone of the present

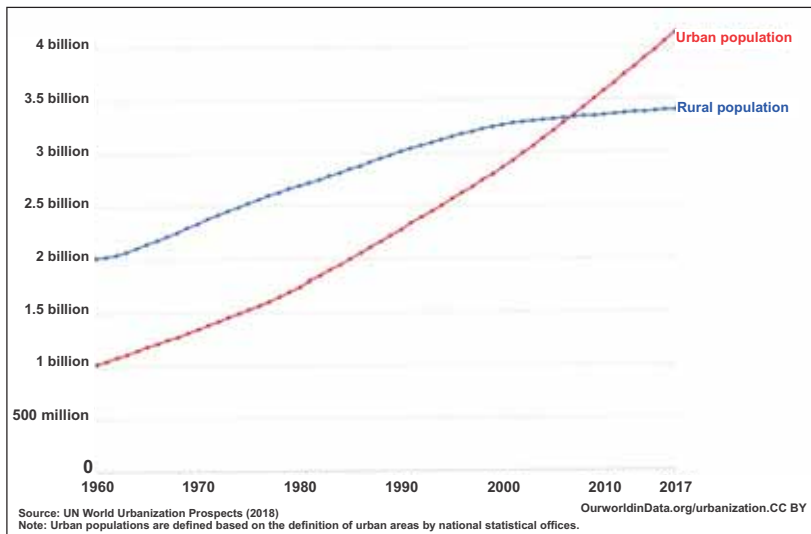
development. The same approach also advocates the idea that people should not be passive beneficiaries of nature's benefits, but they should also proactively protect, manage or restore the natural ecosystem as a purposeful and significant contribution to addressing major societal challenges. Further, the increasing water security aspect in the development process has also hurried the recognition of nature-based development solutions that takes both nature-based solutions and conventional engineering solutions should be viewed contradictory to each other.

Urban Development and Planning

One of the important paradigms of nature-based solutions lies in urban development, because in the 21st century, it is the cities faces flux of migration and pressure of development to cope up the increasing demand of balancing the eco system and infrastructure laden growth. According to estimates from the UN World Urbanization Prospects on the number of people globally who live in urban and rural areas. Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas,



Photo Source- IUCN



Current Challenge

There is growing recognition by government agencies and other stakeholders that the existing, largely engineering-led approach to dealing with urban growth and development issues such as flooding and drought is failing to deliver outcomes which build resilience overtime—and, in some cases, directly competes with them. All too often, master plans encourage growth in areas subject to serious flooding even when past extreme events are considered and are projected to become more frequent and severe. Equally, there are many cases where infrastructure investments have made the urban conditions worse even though they follow national and sometimes international development safeguards and procurement procedures. The reasons for this poor performance in urban planning and development control include the following:

- Plan zoning schemes do not have associated safeguards and fail to take into account climate change and environmental and social conditions.
- Engineering initiatives tend to be project-based and site specific (i.e., they do not

combined with the overall growth of the world’s population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa. Climate change impacts are amplifying these challenges. Nature-based solutions have emerged as a concept for integrating a range of ecosystem-based approaches to address a range of societal challenges. Nature-based solutions directly address and contribute to increased urban resilience, but understandings of the mechanisms and vehicles for their implementation in cities are still being developed. There is potential for mainstreaming nature-based solutions through integration into urban planning approaches, but these are not yet well developed in either research or practice.

There is growing concern that urban planning and nature-based solution should be developed with the help of each other for the sake of maintaining the balance between ecology and infrastructure-laden growth. As it involves a range of different issues—environmental, social, economic, and aesthetic in nature. It also determines how towns develop and who is involved in the process. Integrated urban development is centered

on improving the quality of life or “liveability” for residents by incorporating environmental, social, and climate change concerns into planning. Rapid urbanization and escalating demand for urban services have increased pressures on natural systems and resources within towns, reducing their liveability. As more people fill towns in search of a better quality of life, the need for service infrastructure will intensify. The challenge is to maintain the natural system foundation of urban areas and natural resource availability while implementing sustainable solutions to urban service provision



consider potential implications for broader environmental and social systems).

- Infrastructure projects are often conceived and delivered in isolation of wider town development considerations.
- Projects typically deteriorate over time (i.e., require expensive ongoing maintenance and renewal).
- Construction frequently is based on design standards which are not adjusted to factor in climate change and sustainability and are often decades old.
- Rehabilitating systems impacted by poorly conceived projects is difficult and expensive.
- Procurement and contracting processes inhibit rather than facilitate community involvement and management.

Development Options

Green Network Concept

Asian Development Bank (ADB) in its seminal report on "Nature Based Solutions for Building Resilience in Town and Cities" has advocated the development of green network concept. As per the concept town need to develop in ways which protect, rehabilitate, and mimic natural systems so that the urban landscape maintains a network of natural corridors and connected green spaces. It is the single most

important strategy that all towns need to adopt in response to climate change. It brings multiple benefits along with enhanced resilience including greater equity in living standards and community well-being. The concept of green urban networks involves large green spaces linked in a network through green corridors in ways which facilitate the flow of people, water, wildlife, and other resources.

Water conservation and effective management

The principle of water conservation and its management is vital for the

infrastructure, a frequent challenge in most of the towns is to reduce or minimise the burden of new development on existing stormwater infrastructure. It should be taken in the form that new development must not lead to a net increase in the quantity or decrease in the quality of stormwater discharged from the project site compared with pre-development levels.

Measures promoted to achieve such a requirement might include rainwater tanks, rain gardens, retentions ponds, and bioswales. Such water conservation and management measures could apply

Water Conservation and Green Plan, Singapore

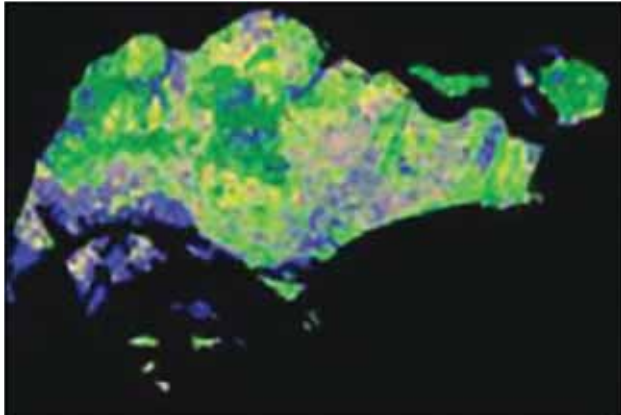
Green cover in the city to grow from 35.7% to 46.5% between 1986 and 2007, despite the population growing by 68% from 2.7 million to 4.6 million. Singapore's Master Plan 2003, which has adopted the theme "A City in a Garden." The master plan, drawn up by the Urban Redevelopment Authority to steer Singapore's urban development to 2017, incorporates a new Parks and Water Bodies Plan with the following guiding principles. As part of the implementation of the master plan, the Public Utilities Board has opened up and developed its water bodies for conservation and recreational activities. Since 2011, the water catchment area has been increased from half to two-thirds of Singapore's land surface. Rainwater is collected through a comprehensive network of drains, canals, rivers, stormwater collection ponds, and reservoirs before it is treated for the drinking water supply. That strategy is accompanied by a comprehensive rehabilitation and greening of the city's watersheds and of water infrastructure using bioengineering methods and community involvement.

urban planning as well nature-based solutions. In particular with drainage-to-drainage

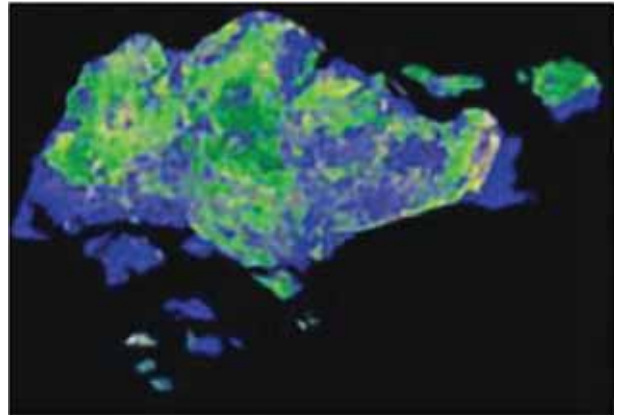
to an urban development of any scale whether an industrial site, market, government building complex, or dwelling. They are consistent with the emerging approach of water sensitive urban design, which is defined as "a land planning and engineering design approach which integrates the urban water cycle, including stormwater, groundwater and wastewater management and water supply, into urban design, to minimize environmental degradation and improve aesthetic and recreational appeal."

GREEN NETWORK HAMBURG

While Hamburg has already had an impressive green infrastructure, now it is planning a more interconnected green network that will cover the 40 % of its area and support commuting by bike, recreation and climate change resilience. The project aims to connect the two green belts, parks, recreational areas, cemeteries and animal habitats to each other with green paths and with the already existing axes leading from the agglomeration to the urban core. The green network could not only absorb CO₂ but also prevent flood by soaking up an increased amount of rain water caused by superstorms.



1986 Vegetation Cover: 35.7%



2007 Vegetation Cover: 46.5%

Note: Dark green areas: tree canopy cover; light green areas: shrub cover or grasslands.

Source: Civil Service College Singapore.

www.cscollge.gov.sg/Knowledge/Ethos/World%20Cities%20Summit/PublishingImag

Energy

Conservation and less reliance on fossil fuels

Urban planning and management need to apply the energy conservation principle in a variety of ways - from emphasizing public transport use and reducing car dependence, incorporating sustainable building design

and renewable energy in new development, through to protecting viable agricultural lands and green spaces within the urban landscape. Each of the other urban planning green infrastructure principles has a role to play in promoting energy conservation and wise management. For example, energy conservation and management are a key principle applied

through effective application of sustainable design in buildings and transport systems. Town planning can promote green infrastructure methods which reduce energy consumption such as “green” and “blue” roofs (i.e., roofs designed to store water), green walls, and various green street, urban canopy, and water management options that reduce the heat island, etc.

Green infrastructure uses vegetation, soils, and natural processes to manage water, temperature, and air quality to create healthier, resilient, and beautiful urban environments. At the town scale, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, clean air, clean water, food, and recreation. At the local level, green infrastructure includes stormwater and drainage management systems that mimic nature by soaking up and storing water and to improve its quality. For specific infrastructure systems, most importantly, it improves engineering by including natural components and bioengineering methods. At all scales, green infrastructure emphasizes nature-based solutions and uses of local resources and materials to build community self-

ENERGY CONSERATION BUILDING CODE, INDIA

The Government of India has taken steps to improve energy efficiency in buildings. The enactment of the Energy Conservation Act in 2001 has led to the establishment of the Bureau of Energy Efficiency (BEE) and the development of ECBC. ECBC, launched in 2007, is the first building energy code in India. It applies to new commercial buildings with a connected load of over 100 kW-h or a contract demand of over 120 kV-amperes. ECBC prescribes minimum energy performance standards for the building envelope, heating, ventilation, and air-conditioning (HVAC) system, interior and exterior lighting, and service hot water in each of the five climatic zones in India. It also sets energy efficiency requirements for building electric power and motors. ECBC allows buildings to comply through three methods: prescriptive, simple trade off, and whole building performance. While the simple trade-off method allows for trade-offs among envelope components, the whole building performance method is meant for flexibility within the entire building system as long as its overall energy performance is equivalent to or better than a standard ECBC compliant building. All large national public buildings are now required to comply with ECBC. ECBC has been adopted in seven States; Delhi being one. 16 States are in the process of adopting ECBC

Source: Indian Bureau of Energy Efficiency, 2016. ECBC

Water Bodies Delhi

The management preservation rejuvenation of Delhi water bodies is a matter of concern. Delhi has 629 identified water bodies that need protection and management from encroachment. All these water bodies are being managed by eight different department or authority making the task of preservation and rejuvenation cumbersome due to complex coordination network. Department of revenue/irrigation and flood control manages 476 water bodies followed by Delhi Development Authority (DDA) 118. (Delhi Parks & Gardens Society, Department of Environment, Govt. of NCT of Delhi).

to region so the challenges and solutions. Because of its vagueness, there is less clarity about the implementation mechanism to be adopted. Further, at the province or State level, application of nature-based solutions in development planning is far and few. At the inception design level, most of the large infrastructure project being planned and implemented at large does not take the cognizance of its. It is also being viewed as an impediment in taking up the large infrastructure projects and act as a ticking box to obtain the necessary permission from recognized agencies. Most of the urban municipalities in India and around do not have the policy coherence about adopting nature-based solutions. The more focused Government of India SMART City projects have very few elements of it. State Climate Change Action Plan, which is a part of the larger mandate of Nationally Determined Contribution (NDC) under the Paris Climate Change Agreement also speak little about the NbS. A policy framework about its application and guidelines is the need of the hour. The Government of India supported program - Atal Mission for Rejuvenation and Urban Transformation (AMRUT) - is aimed at rejuvenating the growing number of large cities in the country through infrastructure as well as management-reform-based interventions. There is scope to integrate Nature Based Solutions, i.e. a number of urban common features like urban forest, conservation of water bodies, stormwater management, maintenance and development of parks and other greenery features, urban agriculture, porous and paved surface to save the runoff water, can be taken up under this program. An incentive-based policy action program can also be initiated to promote regional and local actors for working on NbS. ■

reliance and resilience.

Green infrastructure planning should be the first step in the town spatial planning and development process and should be closely coordinated with planning for grey infrastructure. Integrated planning and design connect the two - gray and green - in a more effective, economical, and sustainable network. Ideally, the green infrastructure strategy for a town and specific green measures should be defined and mapped out before gray infrastructure options are considered and planned. In many situations, green infrastructure provides the best solutions to town development, leaving hard engineering to complement or make up any shortfall. If gray infrastructure is put in place first, it often rules out green options and reduces urban sustainability and resilience.

Covering core urban areas

The core of urban development should emphasize on covering core urban areas with green cover as maximum as possible. Development of trees and vegetated streets and boulevards, green plazas, green roofs, and walls makes for attractive settings for shopping and leisure in the intensive use areas of towns and also improves the vibrancy of local economies. Street trees and green spaces provide shade, a cooling effect, cleaner air and noise reduction; making core urban areas more liveable and bringing multiple economic benefits.

Recommendations

Though nature-based solutions are widely in use and practice, there is still not good clarity about what constitutes a perfect nature-based solution as the dimension of development varies from region



Hazards of Cramped Spaces: COVID-19 Makes a Strong Case for Affordable Housing

Moin Qazi is an author, researcher and development professional who has spent four decades in the development sector. He was a Visiting Fellow at the University of Manchester. He was a representative of commercial banks on the Expert Committee which collaborated with the University of Manchester, International Fund for Agricultural Development, Rome, Ministry of Rural Development, Govt. of Malaysia and Grameen Bank, Bangladesh, for designing microfinance-driven programs for poverty alleviation. He served as the Chancellor's nominee in Nagpur University.

Policy-makers, financial institutions and housing experts also need to evaluate their current policies, cultures, and operational style. With a thoughtful approach, they can be better prepared to tackle this enormous problem. The Government will have to change course and shift away from the legacy mindset before the problem gets out of hand.

Among the many challenges that have gained urgency in the aftermath of the COVID-19 pandemic, housing requires a highly creative response. The huge exodus from cities to villages was

necessitated due to lack of proper housing in cities. Expanding access to affordable housing is essential not just for equitable development but also for social stability.

When residents do not have proper places to live, the stress on families and neighbourhoods can create severe social implications. COVID-19 has highlighted the high social and economic costs of this gap in the safety net. People living in low quality, overcrowded, or unstable housing cannot follow directives on safe shelters or maintain social distancing. As a result, they are at a far greater risk of contracting the virus, along with other illnesses. There is mounting evidence that COVID-19 could be airborne, and



Moin Qazi

the lack of adequate ventilation increases the risk of transmission. The Novel Coronavirus is now also referred to as a "housing disease" because of the strong links between overcrowding, poor housing conditions and higher mortality rates. The disease spread quickly in households living in cramped spaces, without access to water and sanitation.

The central dilemma of poor housing has been wonderfully captured by Jacob Riis in his inimitable style: "The sea of a mighty population, held in galling fetters, heaves uneasily in the tenements... The gap between the classes in which it surges, unseen, unsuspected by the thoughtless, is widening day by day. No tardy enactment of the





business investment, education and cultural activities and other essential services. A decent habitat and shelter can contribute not just to their wellbeing but also catalyse the overall economic growth. It is thus critical to recognise housing investment as a basic, fundamental building block of economic activity.

There is nothing more critical to a family's quality of life than a healthy, safe living space. Sustainable and inclusive housing solutions could bolster economic growth quickly and efficiently and hence, should be given priority over education and health.

Housing is not a standalone issue; it is closely intertwined with, and often the cause of a slew of health and developmental problems. Poor ventilation and the inability to maintain basic hygiene are major causes of poor health. Fragile building structures undermine the safety and vastly increase vulnerability to disaster. Lack of lighting and space limits the ability of children to study. Inadequate privacy and lack of sanitation contribute to a host of diseases, thereby perpetuating poverty.

For many people in the developing world, the land on which they live is

law, no political expedient, can close it. Against all other dangers, our system of governance may offer defence and shelter; against this not. I know of but one bridge that will carry us over safe, a bridge founded upon justice and built of human hearts."

While we continue to record improvements in dealing with poverty, homelessness has elicited but an unimaginative response from policy doctors. The apathetic approach of successive governments is symptomatic of the disease that ails India's housing system. Slums constitute 17% of urban households in India; in Mumbai, they constitute 42% of households. They also lack necessary amenities like private toilets and the availability of clean

water. Dense living and a weak public healthcare system mean that populations already susceptible to COVID-19 carry a further risk of transmission of the virus. Essential precautions like social distancing cannot be practised in such living conditions.

Housing is only part of the equation when it comes to addressing historical inequities and ensuring healthy communities. Human health and wellbeing depend on a range of interconnected social, economic and physical factors that impact the environments in which we live. The key to good and healthy housing is to make sure that residents have access to transportation, affordable healthcare, living wage jobs, small



Point of view



providers have married the core principles of micro-credit — peer-based borrower selection and repayment enforcement, close follow-up on repayment and so on — with the technical expertise required to investigate land ownership and other classical housing finance principles. This model has been highly successful wherever governments are offering long-term tenancies and shared-ownership housing. But the sector is still in need of more sustainable business models to get legitimacy in mainstream finance.

their only asset. If that property is not publicly recognised as belonging to them, they lose out on several social benefits.

Land ownership is often the bedrock of other development interventions. Owning land boosts nutrition, educational outcomes and gender equality. The converse is equally true. When land security is absent or weak, that is, when men and women do not receive recognised legal rights to their land and can thus be easily displaced without recourse — development efforts flounder, undermining conservation efforts, seeding injustice and conflict and frustrates efforts to escape poverty.

For most of India's poor and vulnerable, secure property rights, including land tenure, make for a rare accessible luxury. Many who live in slums have little to no control over or ownership of the property they live on. The lack of official land titles is a major impediment to the acquisition of housing finance. People do not have documentary proof of being owners of the piece of land on which they live and are, therefore, legally insecure. Many low-income villagers have owned their land for generations, but they lack formal ownership documents. Hence, they do not have access to formal financial services. Once their inhabited land gets formally titled,

they could obtain access to several public benefits, including loans.

Traditional housing finance has not been able to offer products tailored to low-income people, but a range of financial institutions are applying good microfinance practices to housing finance. This allows them to successfully deliver much-needed services to economically weaker customers. The increased provision of housing microfinance has resulted in safe and healthy housing conditions for millions, thereby improving families' social and economic resilience. With its roots in traditional microfinance, the housing microfinance sector provides larger, lower interest loans that align with low-income households' incremental building practices.

Successful housing microfinance

Housing micro-finance is broadly defined as small, non-mortgage-backed loans dedicated to housing activities offered in sequences to support the incremental building practices of low-income populations. It can include a range of financial services that support improving or upgrading housing such as home repair and expansions, additional cooking space, water and sanitation services, energy efficiency upgrades, the purchase of inhabitable land or permanent structures and the construction of new housing.

Housing micro-finance intersects both housing finance and micro-finance. The emerging practise encompasses financial services that allow poor and low-income earning people to finance their habitat needs with methods adapted from the micro-finance experience:



- Loans are for relatively small amounts and are based on clients' capacity to repay;
- Repayment periods are relatively short (especially in comparison to mortgage lending) and are on par with mid-to-high-end micro-finance individual loans;
- Loan pricing is expected to cover the real, long-run costs – operational and financial – of providing the service;
- Loans are not heavily collateralised, if at all, and collateral substitutes, such as tax receipts or para-legal documents of the land lease, are often used;
- Loans tend to finance habitat needs incrementally with short repayment periods and relatively low monthly payments;
- If the provider is an MFI, credit services for housing can be linked to prior participation in savings or more traditional microenterprise loan services; and
- A housing loan is combined with a small working capital loan for economic activity. Such combined loans are known as productive housing loans.

The demand for housing microfinance is high. Clients already channelise a good portion of micro-enterprise loans to home improvement. Micro-entrepreneurs also use their homes as productive



assets for generating income. A home can be a place to store inventory, produce goods and run a business. A home is also a personal asset that usually appreciates over time. Home improvement, thus, not only enhances living conditions but is also an investment.

The Government also needs to use creative approaches in making rental housing a safe option for house owners. Its share in overall housing has been steadily declining. There is a need for replacing current rent control laws with a modern tenancy law, which would give full freedom to tenants and owners to negotiate the rent and the length of the lease. Rules concerning eviction also need to be reformed to restore the balance between the rights of tenants and the owners.

We need a differently structured and more professional market rental sector. A Model Rent Act is needed to promote rental housing. There

should be a mutual agreement between the landlord and the tenant for a stipulated lease period before which the tenant will not be allowed to be evicted, and after the expiry of the lease period, the tenant will not be permitted to continue in the housing unit.

Rent control laws give tenants so much security that landlords worry they may not regain possession of their property at the end of the lease period. People often leave their properties vacant until they get a tenant they are comfortable with.

It is time the Government puts rental housing to use. Its share in overall housing has been steadily declining. There is a need for replacing current rent control laws with a modern tenancy law, which would give full freedom to tenants and owners to negotiate the rent and the length of the lease. Rules concerning eviction also need to be reformed to restore the balance between the rights of tenants and the owners.

Policy-makers, financial institutions and housing experts also need to evaluate their current policies, cultures, and operational style. With a thoughtful approach, they can be better prepared to tackle this enormous problem. The Government will have to change course and shift away from the legacy mindset before the problem gets out of hand. ■



'Children Cannot Wait' During Humanitarian Crises

Soumi Halder is Manager - Campaigns & Communication (East)

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Save the Children

Save the Children's latest report 'A Generation at Stake: Protecting India's Children from COVID-19's Impact' revealed that children are most stressed about the uncertainties that the pandemic has brought in their lives. This shows that we need to pay attention to children's mental health, especially during a crisis, as it is very crucial, especially during their formative years. Three out of every four children, both urban and rural, reported an increase in negative feelings since the outbreak of the pandemic: many citing reasons like ambiguity over getting back to school, no contacts with teachers or friends, loss of livelihoods in the family leading to insecurities and violence in household relationships. Sudarshan, CEO, Save the Children, pointed out that, "Our findings show that the economic shocks endured during the pandemic have correlated with the increase in violence against both adults and children, as well as the increase in domestic chores and caring duties – particularly for girls – and reduced mental health and wellbeing. Children are becoming the biggest victims of their social and economic impacts. It is agonizing to see that COVID-19 is likely to exacerbate existing deprivation from both a monetary and a multidimensional poverty angle, and this hugely impacts the mental health and psychological wellbeing of children."

During any humanitarian crisis, we must take cognizance of the specific needs of the most vulnerable and marginalized girls and boys; with a special focus on



Soumi Halder

girls. This includes children without family care, especially children in street situations, children on the move, migrant and internally-displaced children and refugees, child labourers, children in childcare institutions, children with disabilities and children living with underprivileged single parents (especially with mothers).

The huge impact of disasters on children is visible with the staggering number of deaths and injuries to children. Children's vulnerability increases with the decrease in age and existing ill-health conditions. Among lives lost in disasters, at least one out of three is a child below 18 years. Children are the worst-affected during disasters due to physical, psychological and social vulnerabilities. The major impact remains physical vulnerability as children withstand the worst of shocks during any disaster.

Be it natural disasters like flood, earthquake, cyclone, heat and cold waves or so-called man-made disasters like fire, epidemic, civil strife, etc., children are the worst sufferers as they are doubly hit. Firstly, due to the inability to escape or fend for themselves,



Devendra Tak

especially very young children, they are at high risk of injury. Secondly, post-disaster, children are deeply affected due to separation or loss of family members, their homes or even loss of livelihood of the family. The invisible impact of the disaster is manifold and deep-rooted so that it tends to affect their childhood altogether. As an after-effect of any disaster, children are always prone to be engaged as child labour to supplement the loss of livelihood, or they fall prey to traffickers as child brides or end up in the dingy alleys of a brothel.

The increase in frequency and intensity of disasters affect the survival and development rights of children as it leads to fear, loss of school days and being injured. More than one out of two parents reported that extreme events like flood, cyclone, erosion, etc., have become more hazardous and frequent in the last ten years. Save the Children and PwC India's 2020 report, 'Protect a Generation: Climate Security for India's Children', pointed out that vulnerable families and children bear the maximum exposure and brunt of climate crises. Children have greater sensitivity to climate crises and poor

adaptation strategies and resilience.

The Save the Children-PwC India report, based on a year-long study across Uttarakhand, Madhya Pradesh and West Bengal, covering three different hazard-prone ecosystems – floods, droughts and cyclones, studied the impact of climate change on children, identify risk and mitigation strategies and develop a roadmap for a climate-resilient future. Jaivir Singh, Vice Chairman PwC India Foundation, said, “Through this research, we have tried to voice the challenges faced by vulnerable children and have sought to provide a series of practical and feasible strategies that are essential to building resilience in the face of increasingly frequent and complex climate-change-induced disasters. We hope that this report forms the basis for further evidence generation, informed advocacy and policymaking to create a sustainable change in the lives of children in India and beyond.”

Climate crises are a reality, the report informed, given the increase in frequency and intensity of hazards, thereby, leading to enhanced risk/impact on livelihood, health, nutrition and child rights. The report identified mitigation measures to support families who face the consequences of the changing climate. It also calls authorities in coping with the impact of the crisis and for strong implementation of child-focused adaptation strategies to support future generations.

The ongoing climate crisis is harming the most marginalised and deprived groups of children first and worst. The climate and environmental crisis affect all children. Children already disadvantaged by poverty, discrimination, gender inequality and social marginalisation and those most at risk of being left behind in global development efforts are disproportionately vulnerable to the impacts of climate change. The World Bank, for example, estimates that climate



change impacts could push an additional 100 million people into poverty by 2030. Marginalised girls in the least developed countries are often the most vulnerable to the climate crisis due to gender, social and intergenerational injustices.

Children are exposed to extreme weather events such as floods, cyclones, heatwaves and drought, slow-onset events such as sea-level rise, water scarcity, desertification and resource depletion and environmental degradations such as deforestation, soil depletion and loss of biodiversity and ecosystems. This affects their ability to survive, learn and be protected. Children are killed and disabled and they face increased exposure to diseases such as water-borne and vector-borne diseases and food and nutrition insecurity. Children who have experienced climate-related crisis are found to be more likely to have higher rates of absenteeism and lower levels of educational attainment.

To help communities build up resilience, the Save the Children-PwC India report urges authorities and other actors to strengthen childcare and welfare schemes and train frontline workers such as health professionals and teachers to identify households in distress. In addition, the government is asked to roll out apps with health

information in disaster-prone areas, which should be user-friendly for semi-literate people. During and after a crisis, child-friendly spaces where children can recover and share their experiences need to be made available together with children’s collectives where they can help each other cope. Infrastructure must be adapted to withstand climate impacts, and some areas need to be equipped with early warning systems against rain-induced landslides. Special programmes can help communities set up or strengthen alternative livelihoods so communities do not need to move elsewhere for survival. Save the Children understands that ‘Children Cannot Wait’ and, therefore, it makes every effort to be the ‘First to arrive and last to leave’ whenever any disaster strikes. This leading independent child rights organization, working across 11 States in India and 120 countries around the world aims to do ‘No Harm’ to children. It aims to provide an early response to any emergency, including the COVID-19 pandemic. A strong element of the disaster preparedness is to build the resilience of communities, and Save the Children has undertaken various work towards this end in India. Children’s Groups have played a stellar role in alerting their communities as part of the

Children as Changemakers – Mamata and Krishna

One of the strongest elements of Save the Children's work is the development of our youth advocates and child champions. Over the years, Save the Children has steadily engaged in grooming the children to let them advocate for their rights. It is in this hour of demand that these champions come up with exemplary support. Our Child Champions across the country are helping us take the message of hygiene and the importance of handwashing to their peers and communities.

Save the Children works to empower children to participate in advocating for their needs by amplifying their voices. It also engages with children and Children's Groups to train them to look after themselves and others in their communities. This initiative has shown positive results

during COVID-19, especially during the initial months when it was hard for government and humanitarian organisations to reach the communities due to lockdowns and the need for social distancing. Many children who have been part of disaster risk reduction and other humanitarian trainings were able to respond on their own in the time of crisis. They were the hands and feet of the work done to create awareness and safeguard communities.

Such is the story of Mamata Sardar, an 18-year-old girl from Sandeshkhali Block of North 24 Parganas in West Bengal. Being a girl from a very humble background, she had to support her family. She was a child labourer in Kolkata where she underwent immense physical and mental abuse from

her employer. After being rescued from that gruesome situation, she is in regular touch with Save the Children and its PNGO. She has been nurtured through various capacity building programmes. Despite coming out of such a challenging situation, Mamata had the zeal to continue her education. She is presently studying in Std. XII and is a child member of the Village Level Child Protection Committee that is functional in her village. Amidst the lockdown arising due to COVID-19, her village was severely battered by super cyclone Amphan. Despite such hurdles, she always remained in close coordination and contact with her peers in the village. She knew that children are most vulnerable in these perilous times, so she was in regular contact with the VLCPC members. Thus, she

Early Warning System to ensure that everyone evacuates to safety.

All stakeholders (government, civil society, multi-lateral organizations, corporates, media and communities) who can bring about a positive change for children during crises must work in a coordinated manner, keeping the focus on children's needs.

Urgent recommendations from our report, 'A Generation at Stake: Protecting India's Children from COVID-19's Impact':

Provide uninterrupted access to critical services to the most vulnerable children and their families: These include access to critical services such as healthcare, nutrition, food security, education, mental health and psycho-social support, protection against violence, social protection and child-sensitive cash transfers to the most vulnerable children, including children from migrant families.

Scale-up investments in children: Considering that COVID-19 and its



after-effects will continue to affect the lives of children, there is a need to increase investments in children. Hence, it is important to ensure that health, nutrition, education and protection services are well-resourced and inclusive.

Strengthen the delivery system: There is a need to strengthen the mechanisms to ensure effective implementation of programmes for children during COVID-19.

Ensuring the availability of a trained and skilled workforce is crucial to reach out to children. Strengthening the delivery of services to vulnerable children, including children from migrant families is even more important.

Build engagement of multi-stakeholders: A coordinated and synergised effort is required to have state, civil society organisations, private sector, academia, media,

could prevent 13 child marriages and stopped three children from being trafficked in the aftermath of cyclone Amphan.

As a Good Samaritan, Mamata, knowing the vulnerability of children, has also been extending psycho-social support to her peers. She has oriented the Children Group member about maintaining confidentiality. She is building up the relationship between the local Panchayati Raj Institution (PRI), Block Authorities, ChildLine and local police station to strengthen child protection mechanism. Save the Children envisages to see her in a much bigger role and to work as a catalyst to strengthen the watchdog mechanism/community-based child protection mechanism in her district. "Mamata has been a pillar of strength for the children in her community even during this difficult time," acknowledged Panchayat

Pradhan of Sarberia Panchayat.

Krishna is a 16-year-old Child Champion studying in Class X. He lives in one of the most populated slums of urban Patna, Bihar, called Ketari Mohalla, Adalatganj. He has been associated with Save the Children for the past five years. He is a member of the Children's Group. During the lockdowns, he played a key role in the repatriation of a seven-year-old missing girl who was trafficked. He received a lot of flak from within the community for being involved in her rescue, but he remained steadfast. He also ensured the continuation of his peer's education as schools remained closed for months on end. This young champion went on a relentless awareness campaign to sensitize his neighbourhood of the deadly virus through paintings. He also made his people aware of the need to maintain social distance

while availing daily requirements from the crowded neighbourhood.

Krishna bears an outstanding character of confidence and resolve. He loves to sing and act. He aspires to become a singer-actor. His father, the only earning member of the family, who used to earn his livelihood by selling sugarcane juice, had fallen sick and was bedridden for more than two months. To sustain his family during this difficult phase, Krishna took charge of his father's business and tried to continue his education virtually. Be it any challenge or any hardship, for instance, the lack of ration during the pandemic-induced lockdown, supporting his peers or even his family, this teenager soldiered on with immense courage. He says: we can face and win any test if we remain hopeful and we should work hard and not give up our resolve to win.



community, citizens and children work together to address the violation of child rights during the COVID-19 pandemic and come up with innovative solutions to address this complex problem.

Generating evidence on children: There is a need to invest in building evidence on the impact of COVID-19 on children. Efforts in generating data on children should be directed at all the

critical child rights issues including health, nutrition, education and child protection. There is a need to specifically focus efforts on collecting data on vulnerable children and families, including children from migrant families.

Listening to children: There is a need to listen to the voices of children, including girls and children from migrant families. It is important to ensure that dialogue

and interaction with children capture their experience and the impact of COVID-19. These experiences and interactions should be used to develop response plans.

Ensuring a comprehensive focus on children, especially the most marginalised and deprived groups, is critical for inclusion in policies and all disaster management plans. Attention must be given to specific needs and vulnerabilities of girls, children living with disabilities, refugee, migrant and displaced children and other vulnerable groups. COVID-19 threw up unprecedented challenges, but all stakeholders were quick to adapt their strategies and support the communities. We have now become better prepared to innovate, seize new opportunities and work collaboratively. There are many challenges ahead, but a better understanding of the needs and the ways to respond to them with whatever resources available provides hope for the future. ■

2004 की बाढ़ और दरभंगा नवोदय विद्यालय

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2004 में दरभंगा नवोदय विद्यालय बाढ़ के पानी से घिर गया था जिसकी गिरफ्त में करीब 450 छात्र-छात्राएँ और 50 के आसपास अध्यापक और कर्मचारी आ गये थे। यह कहानी जानने के लिये मैं और मेरे एक मित्र सतेन्द्र प्रसाद खोजते-खोजते एक शिक्षक दम्पति (श्रीमती सुनीता सिंह और उनके पति डॉ. अनिल कुमार ठाकुर) से मिलने वैशाली नवोदय विद्यालय, ग्राम बप्फापुर, प्रखंड लालगंज, जिला वैशाली पहुँचे जिनके बारे में पता लगा कि वह उस समय दरभंगा नवोदय विद्यालय में नियुक्त थे। इन दोनों लोगों ने 2004 की घटना के बारे में विस्तार से बताया जिसे हम यहाँ यथासम्भव उन्हीं के शब्दों में उद्धृत कर रहे हैं।

“2004 में मैं दरभंगा नवोदय विद्यालय में शिक्षिका थी और उस समय विद्यालय में 450 बच्चे थे। 12 जुलाई की सुबह से परिसर में पानी भरना शुरू हुआ और शाम तक कमर भर पानी कैम्पस में आ गया। पानी जब बढ़ना शुरू हुआ तब लड़कों को तो हम लोगों ने अकेडमिक बिल्डिंग में रखवा दिया था और लड़कियाँ अपने हॉस्टल में थीं। सभी बच्चे ऊपर की मंजिल में थे क्योंकि नीचे पानी भर गया था।

परिसर में केवल एक चापाकल पानी की सतह के ऊपर था, बाकी सब डूब गये थे। थोड़ा पानी और बढ़ा होता तो यह बचा हुआ हैण्ड पम्प भी पूरी तरह डूब जाने वाला था। इसी अकेले नल से सभी लोगों के लिये पानी की आपूर्ति होती थी। पहली जुलाई से सत्र की शुरुआत हुई थी तो हमारे पास करीब डेढ़ महीने तक के लिये खाद्य सामग्री जमा थी। इसलिये भोजन की चिन्ता तो नहीं थी मगर यह तय था कि साग-सब्जी नहीं मिल पायेगी, दूध और गैस के सिलिंडर की समस्या होगी, इसकी भी आशंका थी। लड़कियों का खाना उनके हॉस्टल में और लड़कों का प्रशासनिक भवन में बनता था। लड़कों के लिये उनकी तरफ और लड़कियों के लिये उनकी खुली छत पर। 14 जुलाई से हेलीकाप्टर से खाद्य सामग्री और पानी के पाउच, मोमबत्ती, दियासलाई और कुछ दवाएं गिराना शुरू हुआ। यह सारा सामान बच्चे इकट्ठा करते थे और मोमबत्ती और दियासलाई हम स्टाफ के लोगों को भी दे दिया करते थे।

“हमारी प्रिंसिपल किसी काम से शहर गयी हुई थीं। इसी बीच यह घटना हो गयी। वह बाढ़ के कारण वापस नहीं आ सकीं। एस. बी मिश्रा जी हमारे वरिष्ठ



श्री (डॉ.) दिनेश मिश्र,
नदी, गाद, जल, जीवन हरयाली विशेषज्ञ

अध्यापक थे उन्होंने ही मोर्चा सम्हाला। बिजली नहीं थी। मोबाइल कुछ समय तक इनवर्टर से चार्ज किया गया ताकि बाहरी दुनिया से संपर्क बना रहे। पूरे कैम्पस में सिर्फ एक बल्ब जलाते थे हम लोग कि इनवर्टर कुछ ज्यादा समय तक काम कर सके। बाद में बिजली न होने से इनवर्टर भी ठंडा पड़ गया और हम लोग एकदम अलग-थलग पड़ गये। बिजली आने में तो 15-20 दिन से ज्यादा समय लग गया था। पहले दो दिनों तक तो संशय की स्थिति बनी ही हुई थी कि पानी कब तक रहेगा और क्या-क्या दिन देखने पड़ेंगे। लड़कियों की छत का एक हिस्सा खुला हुआ था और उसी पर हेलीकाप्टर से सामान गिरता था। बाकी के ऊपर स्लोपिंग छत थी जिस पर हेलीकाप्टर से कोई सामान गिराना नामुमकिन था। लड़कों के लिये जरूरी सामान अकेडमिक बिल्डिंग के ऊपर गिराया जाता था। गैस सिलिंडर ट्रैक्टर की मदद से मधुबनी से मुश्किल से आ पाता था क्योंकि मधुबनी खुद पानी से घिरा हुआ था। दरभंगा के डी.एम. ने काफी मदद की थी और किसी तरह की कोई कमी नहीं होने दी। नीचे कमर भर पानी था और हम लोगों





को आशंका थी कि पानी अगर बढ़ गया तब क्या होगा पर उससे ज्यादा पानी बढ़ा नहीं। पानी में साँप के साथ तरह-तरह के जलीय जीव-जन्तु दिखाई पड़ते थे, मछलियाँ भी आ जाती थीं। ऐसी हालत में हम लोग लगभग 8-10 दिन तक रहे। साँप, बिच्छू, कीड़े-मकोड़ों से परिसर भर गया था।

“बच्चों ने बहुत सहयोग किया। उन्होंने हमें आश्वस्त किया कि हम लोग कम खायेंगे और आने वाले दिनों में दिक्कत न हो इसका ध्यान रखेंगे। खिचड़ी बनती श्रीमती सुनीता सिंह, डॉ. अनिल कुमार ठाकुर के साथ दिनेश मिश्र थी दोनों शाम और जब तक आलू था तब तक चोखा (भरता) बनता गया। नीचे वाले सारे टॉयलेट पानी में डूबे हुए थे उसकी भी परेशानी थी।

श्रीमती सुनीता सिंह, डॉ. अनिल कुमार ठाकुर के साथ दिनेश मिश्र

“ऊपर के टॉयलेट पर दबाव था। स्टाफ के लोग भी नीचे वाले घर खाली करके ऊपर की मंजिल में आ गये थे। अकेले हैण्ड पम्प से पानी लेने के लिये बच्चे और मेस के स्टाफ पतीला लेकर जाते थे और पतीले को टेढ़ा करके जितना पानी ला पाते थे उससे काम चलता था। पतीला उठा कर नहीं लाना पड़ता था क्योंकि पानी पर तैरा देना ही काफी था, पतीला गंतव्य तक पहुँच जाता था। यह बात अलग थी कि उसमें इस तरह से पानी बहुत कम आता था। निचली मंजिल में तो 6 से 7 सीढियाँ पानी में डूबी हुई थीं। उस पानी में साँप और मछली दोनों दिखाई पड़ते थे। कुछ

बच्चों ने तो मछलियाँ पकड़ भी ली थीं। उनके लिये तो मजे का माहौल था। पढ़ाई-लिखाई होनी नहीं थी। बस मौज-मस्ती थी। उनमें से कुछ तो यह भी कहते थे कि ऐसी बाढ़ हर साल क्यों नहीं आती। हम लोग जरूर डरे हुए थे क्योंकि जिम्मेदारी थी। हमारे क्षेत्रीय कार्यालय के अधिकारी और तत्कालीन लोक-संसाधन मंत्री फातमी साहब भी हेलीकाप्टर से चक्कर काटते थे मगर नीचे उतरने की कोई जगह ही नहीं थी कि वह लोग यहाँ आ पाते। उनसे हमारा संवाद भी नहीं हो पाता था क्योंकि हमारे पास कोई जरिया ही नहीं था।

“उसके बाद पानी घटना शुरू हुआ। तब हम लोगों ने चैन की साँस ली क्योंकि गनीमत इतनी हुई कि इस दौरान कोई बच्चा बीमार नहीं पड़ा। हमारी चिन्ता छठी कक्षा में आये नये बच्चों को लेकर ज्यादा थी क्योंकि वह पहली बार घर छोड़ कर 6 जुलाई को यहाँ आये थे और एक सप्ताह के अन्दर यह घटना हो गयी। पानी कम हुआ तब बच्चों के घर के लोग भी आने लगे पर उनका आना भी कम खतरे से खाली नहीं था। कोई रेल लाइन पर चल कर आया तो कोई पैदल आया। सवारी मिलना शुरू होने में कई दिन लगे। कुछ अभिभावक बच्चों को अपने साथ ले जाना चाहते थे मगर हमी लोगों ने मना किया कि यहाँ कम से कम खाना तो उन्हें मिल जा रहा था। घर जाने पर तो उसका भी भरोसा नहीं था फिर रास्ते के खतरे अलग थे। ज्यादातर घर वाले मान जाते थे क्योंकि वह तो खुद किसी दूसरे के घर में शरण

लिये हुए थे। सातवीं कक्षा का सिर्फ एक लड़का था जिसको उसके माता-पिता ने एयरलिफ्ट करवाया था क्योंकि वह बच्चा बहुत ही भयभीत हो गया था। बाकी बच्चे कैम्पस में ही रहे।

“एक दिन एक दुर्घटना हो गयी थी जब एक सिलिंडर में आग लग गयी। किसी की अक्ल काम न करे कि अब क्या किया जाये। खाना बन जाने के बाद एक लड़की कुछ गरम करने के लिये रसोई घर में आयी थी तभी ऐसा हुआ। खैर, अनिल जी ने सिलिंडर को बाहर पानी में फेंक दिया। अब उससे आग तो बुझ गयी मगर गैस तो निकल ही रही थी। वह सिलिंडर बाहर पानी में घंटों चक्कर काटता रहा और उससे डरावनी आवाज़ निकलती थी ठीक वैसे ही जैसे गुब्बारे से हवा निकलने के बाद होता है। बहुत देर बाद जाकर वह शान्त हुआ जब उसकी गैस खत्म हो गयी। इतना ही अच्छा हुआ कि वह किसी ऐसी जगह से नहीं टकराया जहाँ कोई दूसरी दुर्घटना होती। हम लोग दहशत में थे क्योंकि उसी दिन तमिलनाडु में सिलिंडर के साथ एक ऐसी ही दुर्घटना हुई थी जिसमें कुछ लोग मारे भी गये थे।

“स्थिति सामान्य होने में तो करीब डेढ़ महीना लग गया। अगस्त के अन्त में हालात सामान्य हुए थे। पानी उतरने के बाद कीचड़ का साम्राज्य फैला हुआ था। सामान बहुत बर्बाद हुआ था, पुस्तकालय में पानी घुसा हुआ था तो किताबों का बहुत नुकसान हुआ। खेल-कूद वाला सारा सामान नष्ट हो गया था। पानी सिर्फ ज़मीन की तश्तरी जैसी बनावट के कारण कैम्पस में ही था, बाहर सड़क सामान्य थी। जब हम लोगों को लगा कि हम लोगों की गाड़ियाँ पानी में तैरने लगेंगी तो जैसे-तैसे उन्हें कैम्पस के बाहर सड़क पर पहुँचा दिया गया।”

इस घटना से निपटने के लिये पहले से कोई तैयारी नहीं थी और न किसी ने ऐसा सोचा ही था कि ऐसी परिस्थिति पैदा हो सकती है। यह आपदा का एक सबक है और इसके लिये तैयार रहना पड़ेगा।

Post-Disaster Housing Reconstruction in the Global South: An Example from Bangladesh

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Asia is the world's most populous continent. It also experiences the greatest impacts of rapidly recurring disasters. Housing in this Global South is often most severely devastated by disasters. Therefore, building housing back to a better standard that is less vulnerable to context-specific hazards can contribute to reduced disaster risks in the long term. This concept of 'Building Back Better' is also embodied as one of the four priority areas of the Sendai Framework for Disaster Risk Reduction, a global framework supported by the United Nations. With this background, this study illustrates the issue of post-disaster housing reconstruction through a case study in Bangladesh, one of the most disaster-prone and climate change-threatened countries in the world.

Housing is often the most important asset for people. Rapid onset disasters such as earthquakes and cyclones cause significant devastation to housing; slow-onset disasters such as floods and bushfires often displace people from their homes and cause destruction. Displacement or loss of

housing makes people vulnerable to possible aftershocks or the weather - rain, snow, heat, etc., amplifying the effects of the disaster. Thus, there is a need for resilient housing to protect people from disaster risks and impacts.

Countries of the Global South tend to bear the brunt of disaster impacts, with the poor being the most severely affected. Asia, the continent with the highest population and where the majority are Global South countries, experiences the greatest disaster impacts. Recently, in 2019, almost 75% of the people affected by disasters were in Asia; 45% of the deaths caused by disasters globally occurred in Asia[i]. These disasters are accompanied by loss of housing with an estimated average of 14 million people becoming homeless annually[ii]; indicative of the precarious and life-threatening living circumstances of the great majority of the world's people.

The greatest share of loss in the total impact of a disaster on the economy is often experienced by housing. For example, in the 2004 tsunami and earthquake in Indonesia, one of the most massive disasters in recent times, the housing sector experienced maximum economic damage[iii]. The impact of disasters on the built environment is much higher in the Global South than elsewhere because of the widespread prevalence of poorly-



Dr Iftekhar Ahmed

constructed buildings.

The increasingly frequent and extensive disasters in recent times have led to reconstruction initiatives by a wide range of agencies worldwide. Housing in the Global South is often most severely devastated by disasters, and hence, receive the maximum resources for reconstruction compared to other sectors. Most country-specific guidelines and initiatives for safer construction have been developed after major disasters such as earthquakes and tsunamis.

During the post-disaster housing reconstruction (PDHR) process, there is the opportunity to understand and overcome the vulnerabilities that had previously prevented resilient

housing construction. Building housing back to a better standard that is less vulnerable to context-specific hazards can contribute to reduced disaster risks in the long term. Reconstructed housing with future risk in mind can prove more resilient. This concept of 'building back better' is embodied in a priority area of the Sendai Framework for Disaster Risk Reduction, a global framework supported by the United Nations that has implications for housing in the Global South which is so significantly affected by disasters.

The above issues relating to PDHR are illustrated here through a case study in Bangladesh, one of the most disaster-prone and climate change-threatened countries in the world. Annual floods and extreme weather events are common and recurrent there, and ferocious cyclones impact the 700-kilometre coastline where more than 40 million people live. One of the most damaging cyclones in recent times, Cyclone Aila, struck south-western Bangladesh in 2009, killing nearly 200 people and destroying or damaging almost 550,000 houses^[iv] (BDRCS, 2011).

A 'disaster-resilient housing' reconstruction project was undertaken in the affected Satkhira district for a rural beneficiary community of 300 people whose entire settlement was swept away by the cyclone and accompanying surge. The project was led by academics from BRAC University with the support of two prominent agencies – the Bangladesh Rural Advancement Committee (BRAC), one of the largest NGOs in the world, and the United Nations Development Programme (UNDP), one of the largest agencies within the United Nations (UN) system. The project highlights the vulnerability of coastal communities that live under the threat of climate change and

related disasters and underlines the necessity of addressing this vulnerability.

In addition to housing reconstruction, rehabilitation of basic infrastructure and services was essential. Embankments damaged by the cyclone were repaired by the government, and homestead land and roads were raised above the flood level by a local NGO, Shushilan, which also planted trees along roads to prevent erosion. They also provided fruit-producing trees for planting on homesteads to stabilise the land. Shushilan helped excavate fishponds in front of each house to serve as a source of food and income (fish, ducks) and for bathing and washing. Other NGOs also provided support like livelihoods, household-level rainwater tanks and sanitary latrines.

An approach situated between owner-driven and donor-driven strategies proved fruitful, with donor and community priorities mediated by BRAC University's design team. Community consultations undertaken by the design team played a significant role in the project, using scale models to elicit the community's house design preferences. The process indicated a desire for two-storey houses, reflecting the trauma experienced from the high storm surge. Forty-three new houses and a primary school were built by local construction workers and people from the community; giving the community a sense of ownership. Technical supervision was provided by the design team, with some members spending extended periods in the area.

The linear settlement consists of a set of contiguous homesteads. Each house was built on a homestead, an earthen platform raised about a metre above the water level. Houses were raised three metres above

the plinth level on four reinforced concrete (RC) columns as part of a frame structure. Because there were no nearby cyclone refuge shelters, each house was built to be a 'mini cyclone shelter'. The raised houses, with their robust reinforced concrete frames, kept people safe from winds and storm surges and demonstrates the 'building back better' approach.

Through the design process, the community and the design team reached an agreement on building timber walls and using clay tile roofing. These materials are, however, uncommon, and subsequently, it became difficult to ensure the quality of the products and workmanship. The exposed timber walls suffered in the humid and saline environment, and because of inadequate construction, rain penetrated through gaps between the timber siding and roofing tiles. To address these problems, following further community consultations, the UNDP provided support to replace the timber walls with brick and the tile roofing with corrugated iron (CI) sheet, which are locally familiar and accepted materials. This also increased the resilience of the housing to local hazards.

Over the years, after the project was completed in 2013, many of the beneficiary households enclosed the undercroft to create extra living space and also built additional structures on their homesteads. In many cases, they were not able to afford durable materials such as bricks and, therefore, used organic materials such as bamboo and palm leaves, which are vulnerable to cyclones. However, the sturdy upper floor still allows inhabitants a safe refuge. Households have also extensively planted trees around the homesteads. They are now fully grown, offering protection from strong wind and also providing fruits and other products.

Case Study



The reconstructed housing in Satkhira soon after being built (Above) Photo Source: Author, and five years later (Below) Photo Source: K.H. Kabir Note the material upgrading, extensions and tree plantations indicating an incremental improvement over time.

Housing in such rural communities in Bangladesh usually follows an incremental process of extending and upgrading, seldom a completed product. Thus, the housing provided in the project served as the basis for household investments and improvement initiatives, so that after some years, the disaster-affected

community is in a more stable and improved situation. The housing was provided in the aftermath of devastation by a fierce cyclone that left people homeless and in critical need of housing reconstruction. Together with the range of supports provided, it helped stabilise the community, serving as a stepping stone towards resilience. ■

Acknowledgements: This article is partly derived from the following publications by the author:

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Charlesworth, E. and Ahmed, I. (2015). *Sustainable Housing Reconstruction: Designing Resilient Housing after Natural Disasters*. Abingdon (UK): Routledge. (The article was further informed by recent communications with K.H. Kabir, BRAC University, who was the lead architect of the disaster resilient housing project in Satkhira, Bangladesh).

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Effective Use of Existing Public/ MultiPurpose Buildings as Disaster Relief Shelters

Relief shelters are a critical element of disaster response and recovery phases. In India, we currently do not have proper and designated relief shelters ready to be used immediately after any disaster. Either temporary shelters are erected, or some existing facilities are used to shelter the victims. This contingency approach is right; however, it has many drawbacks. A temporary shelter is a huge sum of investment and a threat to the environment. Using such existing public and private multipurpose buildings can be a potential relief shelter. This research work focuses on the categorization of such multipurpose buildings (MPB) out of the existing options of a public and private building. Key indicators that are important to sort such buildings are found based on various parameters referencing international standards and guidelines from WHO, UNHCR, UNDP, etc.

Multipurpose buildings are public buildings that can be used for various kinds of activities involving public or mass gatherings such as rallies, festivals, or as an emergency shelter. Public buildings

such as schools, temples, churches, playgrounds, stadiums, etc., come under this category. As the name suggests, multipurpose buildings need to have various facilities to serve various functions. So, it is apparent that all public buildings cannot be used as multipurpose buildings. It could be understood from the diagram shown below.

Some private buildings such as marriage halls, convention centres, lodges or hotels, parking places, etc., can also be termed as multipurpose buildings as they, too, can be used for various purposes as mentioned.

Difference between Public Buildings and Multipurpose Buildings

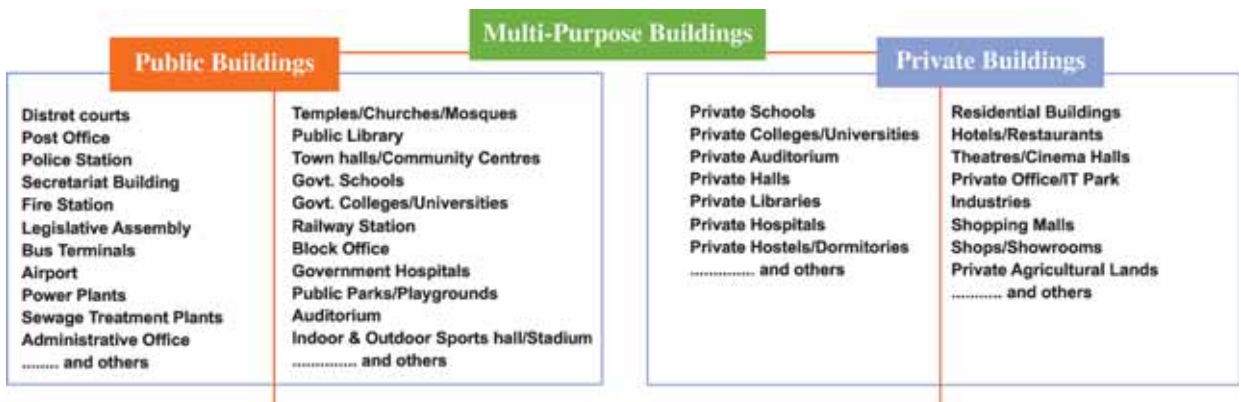
As discussed above, not all public buildings can be considered multipurpose buildings. Public buildings are generally those buildings accessible to citizens and used for purposes like administration, education, law and order, postal service, railway and bus services, indoor and outdoor stadiums for sports activities, town



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halls for cultural activities, etc. Similarly, private buildings which can accommodate masses or used for public gathering events can be treated as public buildings.

The designing and space management of a building depends on the functions carried out in that particular building. For example, a police station will have various sections such as the Inspector’s Office, Waiting Area, Reporting Section, Prisoners Processing Area, Detention Area and Washrooms. The building is,



therefore, planned to serve these functions and requirements. The space requirement for each of these requisites varies based on the scale of the building.

Buildings have their designated functions and value in society. In the case of a police station, it stands as a centre for maintaining law and order in society. Similarly, an Assembly House signifies the centre of power and administration. Some buildings are centres for emergency responses.

Buildings with various functions and values

Keeping both aspects, i.e., the function and value of a building in consideration, not all buildings are for multipurpose use. There should be specific criteria to differentiate a multipurpose building from an ordinary, public or private one.

Criteria for Categorisation of a Multipurpose Building

A building that can serve multiple activities with some necessary modifications can be called a multipurpose building. These activities could be training or awareness programs, religious functions, relief operations, indoor games, or other recreational activities. Such events have massive public participation. For the smooth functioning of such events, there are specific requirements like



accessibility, area requirement, universal design, water and power supply, etc.

A multipurpose building should have various facilities, which makes it different from a typical public building. Some of the significant factors are:

1. Area requirement per person
2. Flexibility in the building design
3. Accessibility
4. Proximity to critical facilities
5. Prime location
6. Universal design/barrier-free design of the building
7. Water supply
8. Power supply

9. Sanitation
10. Thermal comfort and ventilation
11. Lighting

Facilities Required at a Disaster Relief Shelter

A disaster relief shelter offers the basic needs required by victims of any disaster. It is not just a roof to live under, but it should also have facilities like enough clothing, mattress, blankets, and access to food, water, and proper sanitation (United Nations, 2004). Though the facilities may not be of excellent quality, they should be of acceptable quality.

List of necessary facilities available in a disaster relief shelter:

- Safety and security - Physical and social
- Shelter - Thermal comfort and protection from unfavourable weather
- Food - Sufficient quantity and quality
- Water - Drinking as well as for personal usage

Category: Functions	Category: Values
School/College/University - Education	Temples/Religious Centre – Religion
Hospital/Nursing Homes – Medical Facility	Administrative/Secretariat – Power
Police/Fire Station – Law and Order/Security	Heritage/Cultural Buildings – Culture
Commercial Complexes – Business/Trading	Tourism/Monuments – National Pride



Importance of Disaster Relief Shelters

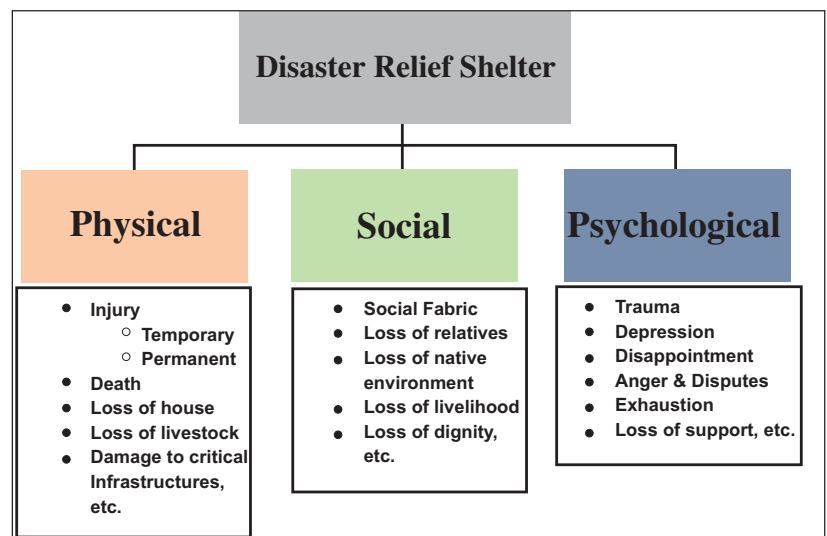
Food (including drinking water), clothes, and shelter are the current basic needs of humans (Maslow's Hierarchy of Needs). People lose their homes, food stock, clothes, and family members in a disaster. They need these basic facilities immediately after the disaster is over. In some cases, when the scale of the disaster is not very large, people repair their homes and personally arrange their food. However, when the scale of the disaster is huge, it causes enormous damage to both lives and livelihood. People are not able to regain control over these situations on their own. Sometimes it takes a lot of time and resources to regain the original condition. In such a situation, they need a temporary shelter and other basic facilities to get back on their feet. Here comes the role of disaster relief shelters. They offer temporary residence, safety, security, food, sanitation and medical facility to the victims. Apart from these points, it also provides moral and psychological support. A person needs physical safety and social security (Barakat, 2003) from issues like overcrowding, delay, and psychological support to overcome the trauma of the disaster. Physical,

- Mattresses – Sufficient quantity
- Clothes - Warm clothes in cold regions
- Medical Facility - Physical and psychological
- Special care unit for children
- Proper sanitation – Toilets, urinal and bathing area
- Separate unit for cattle and animals
- Proper waste management system

there are many people at a time. Similarly, uninterrupted power supply, emergency communication system, management, etc., are also crucial at both places to facilitate smooth functioning. Emergency medical facility, special care unit for children and differently-abled persons, food availability, mattresses, warm clothes in cold regions, a separate unit for cattle, etc., are also vital at a disaster relief shelter. Space availability in a multipurpose building can serve many of the facilities required in a disaster relief shelter, such as gender-based separate sections, unit for cattle, recreational space for children, etc.

Overlapping Facilities at Multipurpose Buildings and Relief Shelters

The facilities mentioned above are essential for the smooth functioning of a disaster relief shelter. This research aims to establish the usage of multipurpose buildings as disaster relief shelters, so it is essential to overlap the facilities required at both places. As discussed earlier in the report, necessary facilities such as water supply, proper sanitation, and solid and waste disposal management are significant in both cases. These facilities are essential to ensure a clean and hygienic environment. It becomes more critical in multipurpose buildings and disaster relief shelters as



social, and psychological factors can be called the three leading essential roles of a disaster relief shelter.

Physical Importance

As discussed above, disasters cause many casualties. Houses, schools, roads, and other structures experience significant damage, sometimes leading to their collapse. People suffer significant injuries due to these reasons. They are relocated to these disaster relief shelters and provided medical support and a safe place to live, where they will be safe from further physical injuries. There have been cases where people continue staying in damaged buildings even after the disaster. They would eventually collapse, resulting in significant injuries and loss of precious lives. All buildings affected by a disaster should be accessed on structural grounds by experts before they are reused. This process takes time, sometimes months. Until then, disaster relief shelters are safe havens for the affected people.

Social Importance

Disasters not only cause damage to structures and settlements but also damage the social fabric of a place. People lose their family, relatives, and friends. Disaster relief



shelters bring all these affected people together under one roof. It reconnects them and helps in social integration. When people stay together, they come to know about each other's problems and help each other. This strengthens community bonding.

Apart from this, disaster relief shelters are also vital for maintaining people's dignity. Every member of society, i.e., men, women, children, the aged and the physically-challenged, are affected when a disaster strikes. Separate living spaces and washrooms for women makes them feel safe and secure from social vulnerabilities. Individual attention and facilities for

children, the aged, the physically-challenged, and the injured brings a sense of social safety.

Psychological Importance

A disaster brings poignant scenarios that leave long-lasting impacts on the victims. With so much devastation, destruction, death, loss of livelihood, belongings and property, it is difficult for the affected to remain strong mentally. These situations result in trauma in many people. Moreover, if they stay in the same damaged environment, it will be difficult for them to overcome this trauma. Psychological help after a disaster is essential. If not treated immediately and with urgency, it will leave a lifelong impact on the victims. Disaster relief shelters act as an escape from these adverse situations. People are taken care of physically as well as psychologically through counselling. With a team of doctors and psychologists, victims are treated and helped to move forward. Children are most affected by trauma. It is challenging for them to see people dying in front of their eyes. They are provided proper counselling and are engaged in various recreational activities, aiding their quick recovery from the trauma. ■



India Among Top 10 Most-Affected Countries in Global Climate Risk Index 2021: Germanwatch

India is among the Top 10 most-affected countries in the Global Climate Risk Index 2021 published by Bonn-based environmental think tank, Germanwatch. It said vulnerable people in developing countries suffered the most from extreme weather events like storms, floods and heatwaves, while the impacts of climate change are visible around the globe. Being the deadliest and costliest tropical cyclone in the South-West Indian Ocean, tropical Cyclone Idai was labelled 'one of the worst weather-related catastrophes in the history of Africa' by UN Secretary-General, Antonio Guterres. It caused catastrophic damage and a humanitarian crisis; making



Mozambique and Zimbabwe the two most-affected countries in 2019. The Bahamas rank third after the devastation of Hurricane Dorian.

In the past 20 years (2000-2019), Puerto Rico, Myanmar and Haiti were most affected by the impacts of such weather events. ■

India Gets its First Women's Team in Disaster Combat



More than 100 women personnel have joined the NDRF over the last

few months and they are being deputed with its battalions across

the country as soon as they finish their pre-induction course and training. The number is expected to go over 200 in the coming months. In yet another example of shattering of the proverbial glass ceiling, the first batch of over 100 women disaster combatants and rescuers has been inducted into the country's federal calamity force - NDRF.

An all-woman team of freshly-trained National Disaster Response Force (NDRF) personnel was recently deployed for contingency duties on the banks of the Ganga river in Uttar Pradesh's Garh Mukteshwar town. ■

Ageing Dams in India, US, Other Nations Pose Growing Threat: UN Report

Over a thousand large dams in India will be roughly 50 years old in 2025. Such ageing embankments across the world pose a growing threat, according to a UN report, which notes that by 2050, most people on earth will live downstream of tens of thousands of dams built in the 20th century. The report, titled "Ageing Water Infrastructure: An Emerging Global Risk" and compiled by United Nations University's Canadian-based Institute for Water, Environment and Health, says most of the 58,700 large dams worldwide were constructed between 1930 and 1970 with a design life of 50 to 100 years. It said at 50 years, large concrete dams 'would most probably begin to express signs of ageing'. Ageing signs include increasing cases of dam failures, progressively increasing costs of dam repair and maintenance, increasing reservoir sedimentation, and loss of a dam's functionality



and effectiveness, 'strongly interconnected' manifestations, the report said. According to the UN University analysis, by 2050, most people on earth will live downstream of tens of thousands of large dams built in the 20th century; many of them already operating at or beyond their design life.

In India, there are over 1,115 large

dams that will be roughly 50 years old in 2025. More than 4,250 large dams in the country will be over 50 years old in 2050, and 64 large dams will be more than 150 years old in 2050, it said. The report said that approximately 3.5 million people are at risk if India's Mullaperiyar Dam in Kerala, built over 100 years ago, were to fail. ■

Telcos Call on Disaster Relief Bodies to Upgrade to Advanced Tools in India

India's telecom operators have called on public protection and disaster relief (PPDR) agencies to replace old and inefficient communication technologies with 4G LTE for better coordination with digital tools such as images, videos, location and mapping.

PPDR agencies that work for rescue and relief operations during floods, earthquakes, coastal cyclones and pandemic currently use analog and digital systems supporting narrowband voice and data communications. The Cellular Operators Association of India (COAI), which represents Reliance Jio, Vodafone Idea and Bharti Airtel, besides equipment vendors such as Ericsson and Nokia, called for an overhaul of PPDR communication for public safety and first responder agencies such as police department, fire department, medical teams and armed forces, which is based on legacy technologies such as TETRA, P25 or old analog systems. ■



India to Get UN Tag of International Disaster Response Force for NDRF



India could soon be a part of the United Nations (UN) mandated international disaster rescue operations as the country's federal contingency force, NDRF, is expected to obtain a globally-recognised standardisation later this year, a top-ranking official has said. The authorisation will be done by the Switzerland-headquartered INSARAG (or the International Search and Rescue Advisory Group) which is a network of more than 90 countries and organisations under the UN umbrella to deal with urban search and rescue-related issues. ■

Climate-induced Migration Set to Treble in South Asia by 2050, India to Face Displacement of 45 million People

Over 62 million people in South Asia will be forced to migrate from their homes due to climate change-fueled disasters by 2050 — a three-fold increase from current displacement figures — unless countries act now to mitigate effects of climate change, stated a report released by Climate Action Network South Asia (CANSA) and ActionAid International.

"South Asia is already experiencing some of the highest fatalities due to extreme weather conditions. Future projections see South Asia as an epicentre of deadly heatwaves, chronic droughts, rising sea levels, and intensified cyclones," Harjeet Singh, Global Lead on Climate Change at ActionAid told The Citizen. "The severity of such climate-related hazards is either directly displacing people or pushing them to migrate at any cost," Singh said. According to the report, over 14 million people in India were forced to migrate in



2020 due to slow-onset impacts of climate change — including sea-level rise, water stress, crop yield reductions, drought and ecosystem loss. This number is estimated to increase to over 45 million by 2050.

The report titled 'Costs of Climate Inaction: Displacement and

Distress Migration' was released on December 18, 2020, on International Migrants Day. The research was undertaken by Bryan Jones of Baruch College, New York - one of the authors of the Groundswell Report on Internal Climate Migration, released by the World Bank in 2018. ■

India Ranks 10th in the Climate Change Performance Index 2021

India is ranked 10th place in the Climate Change Performance Index (CCPI) 2021, released on December 7, 2020. The overall score of India is 63.98. It is for the second time in a row that India has emerged among the Top 10 countries with higher climate performance from among 58 economies. India was at 9th spot last year in the index. Like CCPI 2020, the first three places in 2021 ranking also remains unoccupied, since none of the countries is on the path compatible with the Paris climate targets to implement strategies to limit global warming below 2 or even 1.5°C. Sweden (4th), the United Kingdom (5th), Denmark (6th), Morocco (7th), Norway (8th), Chile (9th) were among the top 10 rankers in the index. It was also noted that from the G20 countries, only the EU as a whole, along with the UK and India, ranked as high performers. ■



Chamoli Disaster, a Reminder of Vulnerability of Himalayan Glaciers, Glacial Lakes

For a long time, scientists have been pointing out climate change posing a big threat to these glaciers and the populations that rely on them. Himalayan glaciers in the South Asian Region plays a pivotal role in providing water for various purposes, such as drinking purposes, agriculture, hydropower and biodiversity. Around 240 million people of the region, including 86 million Indians - roughly the equivalent of the country's five biggest cities combined - are dependent on the glaciers in the Hindu Kush Himalayas for water supply.

Glacier melting increases the risk of runoffs and floods, as seen in the case of the bursting of a lake which was formed with the melting of Chaurabari Glacier in



Kedarnath in 2013 and the recent glacier lake burst on February 7 in Chamoli district of Uttarakhand, which claimed 35 lives, while 204 persons are still missing.

A 2005 inventory of glaciers and glacial lakes in the Himalayan Region, documented by the

Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD) and Wadia Institute of Himalayan Geology had identified 127 glacial lakes in Uttarakhand, using satellite images. The study identified 1,439 glaciers (with a total area of 4,060 sq. km) and 127 glacial lakes (with approximately 2.5 sq km total area). The research found most of these lakes small and not dangerous. ■

Cyclone Nivar, 2020



A well-marked low-pressure area formed over the southwest and adjoining the southeast Bay of Bengal in the third week of November 2020. The deep depression intensified into a cyclonic storm - Nivar - and made landfall on the east coast of Tamilnadu

near to Puducherry coast on the early morning of November 26, 2020. The Nivar Cyclone affected Tamil Nadu, Andhra Pradesh and the Union Territory of Puducherry. Nearly 3400 relief camps were opened, and people from the coastal districts were evacuated.

The most affected regions include Nagapattinam, Cuddalore, Viluppuram, Chengalpattu, Chennai, and Tiruvallur. Twelve lives were reportedly lost, and assessments are in progress to evaluate the damage. ■

Disaster Risk Reduction in India: Status Report 2020 Released by UNDRR & ADPC

The disaster risk reduction (DRR) status report provides a snapshot of the state of DRR in India under the four priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030. It also highlights progress and challenges associated with ensuring coherence among the key global frameworks at the national level and makes recommendations for strengthening overall disaster risk management (DRM) governance by government institutions and stakeholders at the national and local levels.

As this report is based on information



available at the end of 2019, an update on the COVID-19 impact, response and recovery using a risk-informed approach by countries is provided at the beginning of this report. This report has been prepared by the Asian Disaster Preparedness Center (ADPC) on behalf of the United Nations Office for Disaster Risk Reduction (UNDRR) through country consultations and a desk review of key documents, including legal instruments and DRR policies, plans, strategies and frameworks, etc. ■

U.S. Rejoins Paris Climate Agreement

The U.S. has officially rejoined the Paris Climate Change Agreement as President Biden puts environmental policy at the centre of his agenda and prepares to work with world leaders to cut global greenhouse gas emissions.

On his first day in office last month, Mr Biden took the initial step of rejoining the global accord, which was a signature achievement of former President Barack Obama, and from which, former President Donald Trump subsequently withdrew. Under the Agreement's rules, a country can formally re-enter the pact 30 days after it gives notice to the United Nations. ■



Ice-Related Flood Risks

The recent floods in Uttarakhand in India and in Michigan in the U.S. have brought ice-related risks to the fore. These two recent events, however, were very different in nature.

Glacial Lakes

By far, the most dramatic of the two was the flash flood in northern India on February 7, which sent a lethal torrent of water, ice, rock, and debris surging down a steep and narrow gorge in Chamoli district in the western Himalayan State of Uttarakhand. Houses were destroyed and bridges were washed away, cutting off 13 villages. The Rishiganga Power project and its small hydroelectric dam were wrecked. Downstream, a larger hydroelectric plant was seriously damaged. Harm to other hydroelectric infrastructure further downstream was averted only by the timely opening of sluice gates. At least 26 people are known to have been killed and more than 160 are reported missing.

It is still too early to be sure of the



root cause of the disaster, but a significant landslide appears to have struck a portion of the Nanda Devi glacier on India's second highest mountain, breaking off its end. A flood of melted water and debris was released into the Alaknanda and Dhauliganga rivers below. One preliminary report has cited climate change as a factor, but heavy snowfall in the region in the preceding days may prove to have been a more significant, contributing factor.

Advancing glaciers are a powerful force of nature, scouring rock, mounds of sediments and boulders called moraines, and creating depressions in the land. As glaciers retreat, however, melted water can fill those depressions or be dammed by moraines to form glacial lakes. A surge in the volume of melted water triggered, for example, by the collapse of a glacier can overwhelm the natural barriers that contain those glacial lakes or cause them to fail.

There are many glacial lakes around the world that are at risk, and outburst floods from them are a growing concern—particularly in the Andes, in the Himalayas, and in Alaska. When a glacial lake in Peru flooded the town of Huaraz in 1941, for example, 6000 people died. Highly destructive glacial floods have also occurred in Nepal. In Chile, the Colonia Glacier dammed Lake Cachet II, which emptied into the Baker River in 2008, wrecking bridges, buildings, and farms downstream. The ice front that dammed Lake Cachet II has failed and reformed on 11 occasions since.

Ice Jams

The February 3 flood in southeastern St. Clair County, northeast of Detroit in Michigan, was caused by ice jams. Chunks of ice or ice brash (smaller pieces of ice) floating downstream can collect around obstructions and block the flow of a river, backing it up, elevating its level, and causing flooding upstream. If the dam breaks suddenly, flash flooding can result downstream.

On this occasion, the northerly

winds sent unusually large amounts of ice down the St. Clair River from Lake Huron. Several ice jams formed, causing the level of the river to rise rapidly in some locations to a record height of about two feet above its major flooding stage. Flooding was experienced in multiple communities from Algonac to Port Huron, impacting houses, businesses, and roads. The St. Clair River defines a portion of the border between Michigan and Ontario, and Coast Guard cutters from both the U.S. and Canada worked for several days to break and disperse the ice to alleviate the situation.

Ice jams, also known as ice dams, are frequent occurrences and can cause serious flooding and property damage. On one memorable occasion, they even stopped the immense flow of water over Niagara Falls. At about midnight on March 29, 1848, an ice dam slowed the Niagara River to a trickle for 30 hours. Wind had blown massive quantities of ice from Lake Erie into its source and formed a huge ice dam. Water-powered mills along the river ground to a halt; thousands of people came

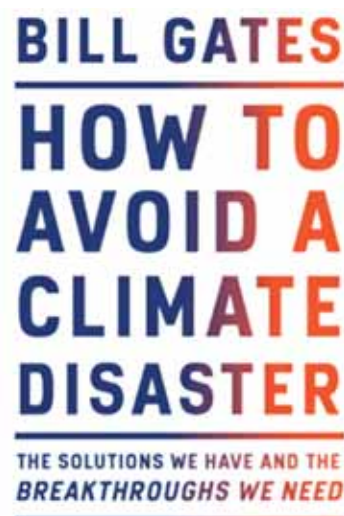
to see what had happened; and muskets, bayonets, and other relics of the War of 1812 were exposed and recovered. Workers from the Maid of the Mist excursion steamer took the opportunity to blow up navigational hazards in the dry river bed and people rode horses and drove carriages in it. Loud cracking noises on March 31, however, heralded the break-up of the ice dam and a resumption of the usual flow.

Different Threats

Floods can be caused by natural processes, such as heavy precipitation or snowmelt, or the failure of man-made structures such as levees, dams, and drainage systems in urban areas, or by a combination of these factors. Floods caused by ice jams are principally, but by no means exclusively, associated with thaw in late winter or spring, but glacial lakes represent a threat year round. The dramatic flash flood in India tragically inflicted damage and caused serious loss of life; fortunately, the flooding in Michigan was, on this occasion, of relatively minor significance. ■

Bill Gates Offers Real-World Plan to Avoid Climate Disaster

From the first pages of Bill Gates's third and most impassioned book, 'How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need', one gets the feeling of being on an expedition. That odyssey is Gates's own—a journey of discovery that seems to enthrall the author even as it becomes clear how monumentally hard it will be to reach the destination. ■



Countries Prepared for Climate Emergency Have Had Fewer COVID Deaths



Countries where individuals look after each other and the environment, are better able to cope with climate and public health emergencies, research by King's Business School has found. The paper published in *World Development* explores the role of climate risk, preparedness and culture in explaining the cross-country variation in the COVID-19 mortality rates. The research highlights the crucial need for investment in both climate action and public health infrastructure as key lessons from the COVID-19 crisis, so countries can be better prepared for similar disasters in future.

The researchers used data from

110 countries empirically linking the COVID-19 mortality rates and a set of country-specific factors, consisting of pre-COVID-19 characteristics and a set of social, economic and health responses to the outbreak of the virus.

Key findings include:

- Individualistic societies fared significantly worse than collectivist ones in coping with COVID-19, resulting in much higher mortality rates. In the context of COVID-19, individualistic societies are known to be less engaged with social distancing and other measures as they are likely to be less concerned about the favourable impacts of

such actions on others.

- The greater the climate risk and the lower the readiness to climate change, the higher the risk of mortality from COVID-19.
- Countries that were better prepared for the climate emergency were also better placed to fight the pandemic. The data showed that these had consistently lower fatality rates.
- Public health capacity in terms of both health expenditures and number of hospital beds, share of elderly population and economic resilience are important factors in fighting a pandemic. ■

Climate Change Termed as 'Global Emergency' in Biggest-Ever Poll

Almost two-thirds of over 1.2 million people surveyed worldwide have said that climate change is a "global emergency", urging greater action to address the crisis, results from climate poll revealed. The UN Development Programme (UNDP)'s

"People's Climate Vote" poll also showed that people supported more comprehensive climate policies to respond to the challenges, reports Xinhua news agency. The survey covered 50 countries with over half the world's population. "The results

of the survey clearly illustrate that urgent climate action has broad support amongst people around the globe, across nationalities, age, gender and education level. ■

Leading Scientists Release Top 10 Insights in Climate Science in 2020

With impacts of climate change threatening to be as abrupt and far-reaching in the coming years as the current pandemic, leading scientists have released a compilation of the 10 most important insights on climate from last year to help inform collective action on the ongoing climate crisis. In a report presented to Patricia Espinosa, Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), the authors outlined some of 2020's most important findings within the field of climate science, ranging from improved models that reveal the need for aggressive emission cuts to meet the Paris Agreement,

to the growing use of human rights litigation to catalyze climate action.

1. Improved understanding of Earth's sensitivity to carbon dioxide strengthen support for ambitious emission cuts to meet Paris Agreement
2. Emissions from thawing permafrost likely to be worse than expected
3. Tropical forests may have reached peak uptake of carbon
4. Climate change will severely exacerbate the water crisis
5. Climate change can profoundly affect our mental health

6. Governments are not seizing the opportunity for a green recovery from COVID-19
7. COVID-19 and climate change demonstrates the need for a new social contract
8. Economic stimulus focused primarily on growth would jeopardize the Paris Agreement
9. Electrification in cities pivotal for just sustainability transitions
10. Going to court to defend human rights can be an essential climate action. ■

One of the World's Fastest Supercomputers to Study Climate Change and Severe Weather

A new supercomputer in Wyoming will help study phenomena including climate change, severe weather, wildfires and solar flares. Houston-based Hewlett Packard Enterprise won a bid to provide the \$35 million to \$40 million machine for a supercomputing centre in Cheyenne, the National Center for Atmospheric Research in Boulder, Colorado announced.

The power will enable some of the most sophisticated simulations yet of large-scale natural and human-influenced events. The supercomputer should rank among the world's 25 fastest after it is installed this year and goes into operation in early 2022, according to the National Center for Atmospheric Research. It "will support basic research in ways that will lead to more detailed and useful predictions of the world around us, thereby helping to make our society more resilient to increasingly costly disasters and contributing to improved human health and well-being," Center Director Everett Joseph said in a news release. More than 4,000 people from hundreds of universities and other institutions worldwide have used the



supercomputing centre since it opened in 2012. The facility's current supercomputer, named Cheyenne, is over three times faster than its predecessor, which was named Yellowstone. A contest among Wyoming school children will decide the new supercomputer's name. ■

G7 Urged to Create Permanent Fund to Deal with Future Crises



A permanent disaster fund to deal with future pandemics, the climate

crisis and natural disasters should be proposed by the G7, senior UN

and humanitarian figures have said. Such a fund would reduce the need to resort to an emergency begging bowl. When COVID-19 hit the globe, just 2% of the needed funding was ready in advance, advocates of the plan say.

The alliance includes Mark Lowcock, Head of the UN's Office for the Coordination of Humanitarian Affairs, Amir Abdulla, Deputy Director of the UN food programme, David Miliband, Head of the International Rescue Committee, Jagan Chapagain -Head of the International Red Cross, and Prof Paul Collier - one of UK's Number 10 most trusted development advisers. Support also comes from UNICEF, and a host of other humanitarian agencies. ■

New System Uses Smartphones to Respond to Natural Disasters in Japan

Japan's government will use communications among smartphones as well as a satellite to quickly assess damage from natural disasters and implement rescue operations in areas where telecommunications have been disrupted. The system, currently being tested in 24 municipalities, would be implemented when cellphone-base stations and other telecommunication infrastructure have been damaged. It uses Bluetooth technology to collect information from private phones via smartphone-to-smartphone communication. The system uses an app that allows residents to enter data on injuries and situations, and will help to speed up evacuation after a disaster. Data is relayed to nearby smartphones, which



continue the chain of relaying the information to other phones.

When a resident with data loaded in a smartphone approaches an evacuation center, the information is sent to the Michibiki 3 satellite,

which is connected to military, police and other related organizations. Data can also be shared with family members outside a disaster area. The technology, developed by Tohoku University, is expected to launch in a few years. ■

More Than 260 Airports at Risk of Getting Submerged Due to Sea Level Rise, Coastal Flooding: Study



260 airports around the globe are currently at risk of coastal flooding, and dozens could be below mean sea level by the turn of the century, the research published in the journal *Climate Risk Management* found. Hundreds more could be in danger depending on the amount of sea level rise driven by global warming between now and 2100. Airports in Asia and the Pacific topped the list. Researchers looked at several different factors to come up with the rankings, including the likelihood of flooding from extreme sea levels, flood protection and the impact on flights. They found that up to one-fifth of air travel routes could be affected. ■

Flights at hundreds of airports worldwide are in danger of being disrupted by rising sea levels, according to a new study. More than

Global Risks Report 2021 Released

COVID-19 has exacerbated the ongoing geopolitical and societal challenges, and the existential crisis of climate change looms large. More innovative and collaborative approaches to resilience are needed more than ever. The 16th edition of the Global Risks Report, published by the World Economic Forum with support from Marsh McLennan, highlights the disruptive implications of major risks, including the COVID-19 pandemic that may reshape our world in 2021 and over the next decade. The report draws on the survey results from nearly 700 experts and decision-makers globally who were asked about their concerns for the next decade, how global risks interact and where opportunities



exist to collectively act to mitigate these threats. The 2021 report reflects the depth and disparity of the pandemic's impact, explores how critical global challenges have

been exacerbated and reshaped, and highlights the need to address these risks in a more collaborative way. ■

International Lawyers Draft Plan to Criminalize Ecosystem Destruction

International lawyers are drafting plans for a legally enforceable crime of ecocide – criminalizing destruction of the world’s ecosystems – that is already attracting support from European countries and island nations at risk from rising sea levels. Plan to draw up legal definition of ‘ecocide’ attracts support from European countries and small island nations. The Panel coordinating the initiative is chaired by Prof Philippe Sands QC, of University College London, and Florence Mumba, a former judge at the International Criminal Court (ICC). The aim is to draw up a legal definition of “ecocide” that would complement other existing international offences such as crimes against humanity, war crimes and genocide. ■



Adaptation Gap Report 2020: UNEP



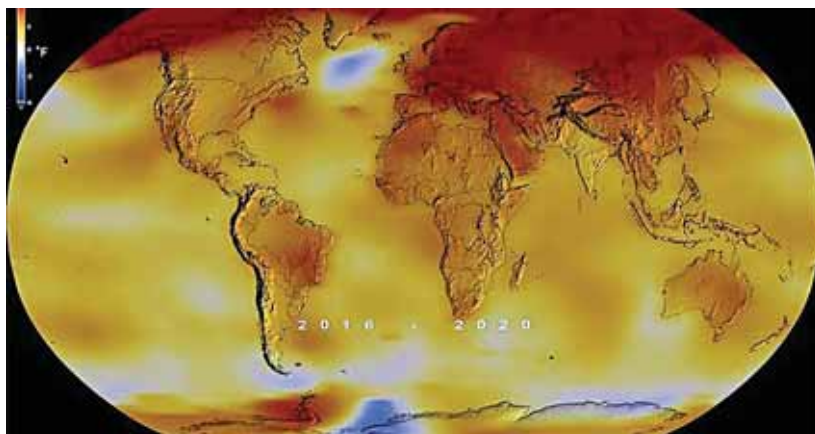
Capping a year that was one of the three warmest on record, the UN Environment Programme (UNEP) released its fifth Adaptation Gap Report, finding that although

many nations have advanced in adaptation planning, developing countries face a significant gap in adaptation finance.

The importance of national-level adaptation planning processes, the report notes, is reflected in the Paris Agreement on climate change, which commits all countries to report on progress. According to the publication, 72% of countries have adopted at least one national-level adaptation planning instrument, and most developing countries are now preparing National Adaptation Plans (NAPs). However, as in previous years, the pace at which public and private adaptation finance is increasing is being outpaced by increasing adaptation costs. The report estimates that developing countries currently face USD 70 billion in adaptation costs, a number expected to rise to USD 140 - 300 billion by 2030 and USD 280 - 500 billion by 2050. ■

2020 Tied Hottest Year Ever Recorded, But Disasters Fueled by Climate Change Set it Apart

Global average temperatures last year were tied for the hottest on record, capping what was also the planet's hottest decade ever recorded, according to new data analysis was released. The last six years are now the hottest six on record, with 2020 on par with 2016 as the hottest year ever recorded. The new analysis comes from the European Union's Copernicus Climate Change Service, one of several datasets which track global temperatures and climate change impacts. Last year's temperatures were 0.6 degrees Celsius (1.08 degrees Fahrenheit) warmer than



the 1981 to 2010 average, and 1.25 degrees Celsius (2.25 degrees

Fahrenheit) above the pre-industrial average. ■

Pakistani Project Wins International Award for Shielding Villages from Natural Disasters



A project that combines satellite images, mapping technologies and the local knowledge of villagers to help build climate-

proof settlements in disaster-prone areas of Pakistan has won an international award. More than one million people have benefited from

the Aga Khan Agency for Habitat (AKAH) Pakistan project, which was a gold prize winner at the World Habitat Awards organized with the United Nations housing agency (UN-Habitat). AKAH has trained about 50,000 residents to better protect their villages from disasters in the mountainous northern areas which are vulnerable to earthquakes, floods and environmental degradation, and are home to some of the poorest communities.

"It's not just responding to the effects of the climate emergency, but being proactive in protecting people from its effects, using technology and the knowledge of communities," said David Ireland, Chief Executive of UN-Habitat. ■



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Yamuna River in Danger at Delhi NCR

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Yamuna River is one of the important river systems in northern India. It could be referred to as a lifeline for Delhi's livelihood. In the past, River Yamuna stood as a scenic beauty and a major source of water for the area. At present, the river's health has degraded to dangerous levels. Its current state depicts the negative impacts of modern age on nature. The very existence of the Yamuna is in danger. Its degradation could

be traced post-1920 due to heavy industrialization and urbanization trends on its river banks.

Okhla is one of the tehsils near to River Yamuna. I interviewed many families, upto three generation, who had been living there for at least 50 years and more. They shared their wonderful memories of Yamuna and explained the scenic beauty of bygone days. The clean water from the river was their main source

of water. The beautiful migrant birds were the seasonal attraction. Children used to frolic in the clean river water, and most people living in and around the river had their first swimming lessons there. Earlier in 1920, when the Jamia Millia Islamia University was established in the Okhla region, near the banks of the Yamuna, many university professors resided in this zone, Many more people moved in over the years. By 1947, the Okhla region was heavily occupied with new settlements. People bought land in the region and constructed houses for a better life and livelihood opportunities. When almost all the available land was occupied, people started encroaching on the Yamuna's original course. The original river plain was filled with soil, and houses were constructed on those landfills. This led to the loss of the original river course and encroachment shadowed the original river line to such an extent



that most of the current residents do not even know the original river line anymore. The settlements built on the covered river areas are considered “unauthorized colonies” and “unauthorized settlements”.

Many of the families in the Okhla region migrated from Uttar Pradesh. One of the ladies from a local family told me that they bought the land where the river water was very close to their plot when they settled down. Her father bought that land in the year 1990, and at that point, their plot and other horizontal neighbouring houses were the last lines of settlement by the river. However, today, the settlement has stretched far beyond them, encroaching more of the river’s course.

As we know, change is the only constant; some of those changes are positive, while some have negative impacts. Urbanization, industrialization, and the changed behaviour of human beings impacted the river ecosystem. Today, the Yamuna is so polluted that people cannot swim in it, migratory birds are no longer seen in the area, and the scenic beauty



Yamuna has turned into a black spot on the city’s face. The water is so polluted that its stench can be felt even from a distance. What was once a recreational spot for its inhabitants has now turned into a sore spot where no one wants to

visit. Is the Yamuna in danger or is it a danger to others in its current polluted state?

According to many researchers and scientists, Yamuna is in danger; some of the reasons are industrial effluent discharge, unnecessary construction on the river’s floodplains, improper management of sewage treatment plants, and political disturbances.

An updated map of the Yamuna River and the Drainage System of Delhi prepared by the Irrigation and Flood Control Department, Government of Delhi.

Light Blue colour indicates the Yamuna River, and navy blue colour indicates the drains.

There are five primary drainage systems: Alipur, Najafgarh, Kanjhawala, Trans Yamuna and Mehrauli. and around 61 secondary drainage systems in Delhi.

Source:

Irrigation and Flood Control Department, Government of NCT, Delhi.



Women and Disaster Management in India

Gender is an important issue that needs to be addressed in disaster management. Existing inequalities and discrimination towards women make them more susceptible to disasters. Any disaster hits women hard. Restricted to their home, bound by responsibilities and cultural bias, women are often isolated and unaware of their rights and choices. Women are seen as a dependent population in our society. Lack of education and information amongst women in our patriarchal society gives them no sense of ownership. Due to their lower economic, social, and political status, women tend to be more vulnerable to disasters. They have no say in decision-making and suffer traditional routine and gratuitous gender-biased oppression.

Women in our society assume even greater responsibility for caring for their families during times of disaster. The special health needs, especially those of pregnant and lactating women, are ignored. Highly vulnerable women have specific needs and interests before, during, and after disasters. Gender shapes capacity and vulnerability.

Women are active and resourceful disaster responders, but most often, are regarded as helpless victims.

The status of women in modern India is a sort of paradox. The sex ratio shows that Indian society is still prejudiced against females. According to the 2011 Census, there are 943 females per thousand males in India, which is much below the world average of 990 females. There are many problems which women in India have to go through daily. The main problem which Indian women face includes malnutrition, poor health, maternal mortality, lack of education, mistreatment, overwork, lack of power, marriage, dowry and female infanticide.

It is observed that women's groups who participate in emergency relief, resettlement and reconstruction efforts following a natural disaster acquire significant knowledge and expertise that can greatly benefit communities that subsequently experience similar crises. When mechanisms are established to promote the transfer of knowledge from one community to another, women can come out of their homes and form groups to assess



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their situation, organize and participate in a range of decisions and programs.

If affected women can meet and benefit from the experiences of other women who have managed to deal successfully with disaster-related issues, much valuable time can be saved and mistakes avoided. Gender issues must be urgently and effectively integrated into disaster research, planning, and organizational practice. Women have a definite role to play in disaster relief and reconstruction activities.

With this in mind, a new approach to disaster needs to be developed. Disaster research, planning and practice should look into the vulnerabilities and requirements. Women play a predominant role as far as the use of resources is concerned. Women's role in rural areas remains circumscribed by the domestic sphere. However, the relationship of women strengthening the groups most vulnerable to disasters is an essential part of building disaster-resilient communities. ■



Disability Inclusive Disaster Management

Komal Priya Singh

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While disasters threaten the wellbeing of people from all walks of life, few are as disproportionately affected as people who live with disabilities. As per 2011 Census, there are 2.68 crore (2.21%) of the total population of India living with disabilities.

Persons with disabilities are especially vulnerable when disaster strikes not only due to aspects of their disabilities, but also because they are more likely, on average, to experience adverse socio-economic outcomes than persons without disabilities, including higher poverty rates. Disasters and poorly planned disaster response and recovery efforts can exacerbate these disparities, leaving persons with disabilities struggling to cope even more both during and after the emergency.

The United Nations Convention



on the Rights of Persons with Disabilities (UNCRPD) is an optional UN protocol. It was adopted on December 13, 2006, at the United

Nations Headquarters in New York. India signed the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and subsequently ratified the same on October 1, 2007. The Convention came into effect on May 3, 2008. Being a signatory to the Convention, India has an international obligation to comply with the provisions of the Convention. India passed The Rights of Persons with Disabilities Bill - 2016. The Department of Empowerment of Persons with Disabilities in the Ministry of Social Justice & Empowerment facilitates empowerment of the persons with disabilities (PwDs) in India.

December 3 is observed as the International Day of Persons with Disabilities. The UNCRPD, in Article 11 and 32, requires that persons with disabilities benefit from



Study

and participate in disaster relief, emergency response and disaster risk reduction strategies.

A report titled “Disability Inclusion in Disaster Risk Management” from the Global Facility for Disaster Reduction and the Recovery (GFDRR) and the World Bank, suggests five actions that development institutions, governments and other key stakeholders can take to ensure that persons with disabilities are not left behind in the aftermath of a disaster.

Ensure that persons with disabilities have a seat at the table -

Persons with disabilities and disabled persons’ organizations (DPOs) have invaluable knowledge, experience, and expertise on how to make disaster risk management activities responsive to their needs. It is vital to include them in the design, implementation, and monitoring of these activities.

Remove barriers to full participation of persons with disabilities -

It is not enough, however, for persons with disabilities to have a seat at the table. Far too often, they face physical, informational, communication and other barriers that prevent them from participating in full. Accordingly, development institutions, governments, and other key stakeholders must make

every effort to break down these barriers. This includes ensuring that physical or virtual sites for meetings and consultations are barrier-free, providing accommodations such as sign language interpretation and Braille materials when needed, and providing information in accessible formats.

Increase awareness among governments on the needs of persons with disabilities -

Awareness about the vulnerabilities of persons with disabilities both during and after disaster remains limited among some governments. Regrettably, this means that they may not give priority to the wellbeing of persons with disabilities during disaster response and recovery. It is, therefore, critical to build government awareness about the needs of persons with disabilities.

Collect data that is inclusive of persons with disabilities - In far too many parts of the world, data and statistics disaggregated by disability is simply not available. This can make it challenging to design and implement disaster risk management activities which are responsive to the needs of persons with disabilities. Countering data gaps requires support for data collection activities, such as censuses and household surveys.

Build back better by improving



accessibility for persons with disabilities -

Across the disaster risk management community, the movement to “build back better” continues to gain traction. But as GFDRR’s “Building Back Better” report recently pointed out, there is a need to ensure that reconstructed infrastructure is not only more resistant to future hazards, but also more inclusive of vulnerable populations, including persons with disabilities, the elderly, and pregnant women. Disaster recovery efforts should strive to improve accessibility for persons with disabilities.

Everyone affected by a disaster has the right to receive protection and assistance, thereby guaranteeing the prerequisites for a dignified life. The inclusion of persons with disabilities is part of the humanitarian imperative to act to prevent and relieve human suffering caused by disasters and armed conflicts, and nothing should be permitted to prevail against this principle. ■



We are delighted to share a few insightful views received as feedback about the first edition of our magazine from different parts of the world. We take note of these suggestions and will try to ensure that they are incorporated in the forthcoming issues



Shivani Balu Zite
Programme Coordinator,
Sphere India

Having studied Disaster Management during my Master's degree and having worked as a disaster governance and risk reduction fellow at Sphere India, Know Disasters has been a great source of learning for me. The magazine has helped me understand various aspects of Vulnerability and Disaster Risk Reduction. The topics covered in the second edition of the magazine are engaging and engrossing for young researchers like me. Not only does the magazine enrich our information about the scientific and technical aspects of disaster studies, but it also highlights the new trends and issues related to the growing problems and offers solutions to combat and reduce them. I would recommend young researchers in this field to look up this magazine to gain more insight and knowledge regarding the disasters that we face.

As a newbie in the field of disaster management, this magazine is of immense help to me in understanding the technical details of disaster management and grasp numerous aspects of Vulnerability and Disaster Risk Reduction. The magazine enriches our knowledge concerning the scientific and technical aspects of disaster studies, highlights new trends associated with various disaster-related issues while offering solutions to combat and scale them back. I encourage young researchers to subscribe to this magazine to gain insight and information concerning different disasters.



Vibhanshu Maurya
M.Tech, IIT Kharagpur

Our reader's responses



Gagandeep Singh

Student - Civil Engineering - DTU

Know Disasters is a great initiative to create awareness amongst the community at the ground level. The straightforward and uncomplicated use of the English language is appreciated as it gives a smooth reading experience. The magazine layout is modern and up-to-date, giving it an elegant look. The well-edited images used adds value to every article. The magazine is not overloaded with information but includes the key information the reader wants to know. It would be great if you can cover the voice of the voiceless too. This magazine has helped me in understanding the core of vulnerability. I appreciate the efforts made by the team in making it a valuable read.

Know Disasters is quite informative and a very well put together magazine. Its last edition raised the bar to a level where we can safely say that it won't take much time for it to hit popularity across the globe. I have read a few other magazines on disasters in India but there is a void of standard magazines which are as rich in content as this magazine. Therefore, I strongly feel that it needs better visibility and a wider reach as soon as possible for everyone's benefit. It can also create a space for firsthand opinion and voices of common citizens, community leaders and students on Disasters and Development, Climate Change, Resilience, Risk, Vulnerability and different prevailing coping mechanisms. Stories from the grassroots would add value to the magazine, and make it more relevant to the people who need it the most.



Akanksha Pandey

Disaster Management Professional and Researcher, Pune

Hello everyone. This magazine highlights the impact disasters have on the environment and livelihoods. It will be a boon for everyone to know about Disaster Management, and this magazine provides that information. I have a suggestion. Please bring out a Hindi version of this magazine so that the Hindi-speaking population can also benefit from its rich content.

Yusuf Khan

*Staff Car Driver
Ministry of Railways,
Govt. of India*



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