Towards Climate and Extreme Heat Resilience: Lessons from African and Asian Communities

हवामान आणि अति उष्णतेच्या लवचिकतेकडे: आफ्रिकन आणि आशियाई समुदायांकडून मिळालेले धडे

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INTRODUCTION

At the Frontlines of a Changing Climate: Learning from Small Businesses in Africa and Asia

*By **Asha Metcalf,** Program Director, Global Fairness Initiative, United States of America; and **Mihir R. Bhatt**, All India Disaster Mitigation Institute, India*

Over the past two decades, the near and long-term effects of climate change have been cataclysmic as extreme heat, flooding, wildfires, cyclones, and prolonged droughts has swept across regions of the globe. The most vulnerable to the blunt impacts of changing weather patterns and natural disasters are informal workers—a global workforce of 2 billion people that is largely unsupported or protected by the state.[1]

As informal workers already lack financial and social safety nets, climate change is deleterious to their health and livelihoods, and their exclusion from official data and climate action planning at state and national levels leaves them particularly vulnerable.

This Special Issue of *Southasiadisasters.net* brings voices and experiences from informal worker communities who sit on the nexus of climate change and the future of work. Workers from India, Nepal, Bangladesh, Tajikistan, Ghana, and Kenya share how climate-related threats directly affect lives and livelihoods, and how communities have adapted to build climate resilience. It analyses the individual and collective responses to showcase how to recognise their essential contributions and integrate informal workers into climate solutions and policies.

Pathak shows how blending science and policy create safer, greener ecosystems within urban centres for small businesses. In Nepal, Timilsina underscores the strength of multi-stakeholder cooperation and municipality support to prevent, protect, and respond to surging climate crises caused by flooding and accompany landslides. Bhuju turns our attention to girls' education as a catalyst for awareness and adaptation that can last for generations. Mayo shares how small changes from traditional to electric vehicles have ripple effects on climate emissions, income, and broader equity, including transport workers' rights. From the crisis in the Tal village, the Youth Alliance for Environment (YAE) speaks to disaster preparedness and settlement planning that prioritise awareness and infrastructure. Paul discusses the importance of providing resources to farmers in Ghana to promote land restoration and agroforestry, while also building more resilient production seasons. Dickson showcases how, in Ghana, local community engagement and knowledge, coupled with nature-based solutions, have reverberating effects that encourage transformation. Muller walks us through Tajikistan's roadmap for early warning systems, positing that, through cooperation and the inclusion of local voices and public authorities, climate protection can be achieved. Azad's article on "Towards Climate Resilience: Lessons From Communities" highlights how everyday practices by families and leaders cause collective, sustainable changes that can be shared and scaled. Trivedi notes that climate resilience does not only refer to people, but to culture and sites as well, and conservation efforts like Shekhawati Havelis ensure heritage can be passed on. Haripriya and Dhyani emphasise that socio-ecological considerations and the restoration of greenery are critical to climate sustainability and resilience planning. The discovery of precipitation variability from dry and wet spells by Pathak et al. in Upper Assam points to the need for interventions to safeguard essential rural livelihoods. Shyamji's first-hand experiences demonstrate the power of co-produced practices in bringing about innovation in the face of climate change. And Kumari provides insight into the impacts and importance of youth in driving climate resilience.

Our aim in this issue is to recognise common challenges and turn them into opportunities for learning and exchange. It is through a cross-pollination of ideas, not siloing, that communities around the world can build scalable, sustainable resilience to the effects of our changing environment. Climate resilience is built together, and we must act now to ensure essential workers are protected and prepared.

[1] https://www.wiego.org/informal-economy/

How I/NGOs Can Do Better In Tackling Climate Change

International non-government organisations (I/NGOs) hold an important, but delicate, role. Although varied, I/NGOs serve to aid in humanitarian assistance, promote human rights and social justice, advocate for policy changes, and contribute to long-term sustainable development in areas like education, health, and poverty reduction.2 In recent years, climate change and its devastating impacts on the most vulnerable populations – the working poor, women, children, and migrants—have cut across these distinct pillars, and there is a need for I/NGOs to do more in tackling the pervasive effects of the current climate crisis.

In consideration of resources and connections, key actions that I/NGOs could take include:

- **Focus on local issues and leverage storytelling:** Through framing climate change in terms of local contexts, such as health or energy costs on a family or community, it connects large-scale problems to single individuals on a personal level, ensuring it is less abstract and more urgent. Using powerful, individual narratives makes climate communication more compelling and accessible, and moves beyond fear-mongering rhetoric towards solutions-oriented approaches that emphasise collective action.
- **Empower grassroots movements:** Going beyond traditional top-down policy-making and programs, I/NGOs can work within local communities to mobilise grassroots action, to put pressure on institutions, and centre the voices of those most affected by environmental injustice, who often have the most at stake.
- **Collaborate across sectors:** Forming strategic partnerships with local and national government, civil society organisations, public sector, and private companies, I/NGOs can combine grassroots knowledge, industry expertise, financial resources, and operational planning to scale sustainable solutions that meet the need of individuals, families, and communities undergoing distress due to climate change.
- **Build broader, more inclusive coalitions and amplify each other's work:** I/NGOs play a crucial role in climate advocacy, but they can be more effective by diversifying and expanding their alliances across regional and country borders to share perspectives and generate cross-cutting solutions.3 Larger I/NGOs should partner with and elevate smaller, local NGOs that provide valuable community context and connections. Sharing networks and expertise can lead to greater collective impact.

In utilising these strategies, I/NGOs can bridge knowledge, mobilise resources, and help achieve global development goals to eradicate poverty, improve health outcomes, and ensure environmental sustainability for all. ■

URBAN RESILIENCE

Building Heat-Resilient Cities: Lessons from Small Businesses in Urban India

उष्णता-प्रतिरोधक शहरे बांधणे: शहरी भारतातील लहान व्यवसायांकडून मिळालेले धडे

*By **Vishal Pathak** and **Aysha Imam,** All India Disaster Mitigation Institute (AIDMI), India*

Extreme heat has become one of the most pressing climate challenges confronting India's urban centres. Cities across the country are witnessing longer, hotter summers that strain public health, weaken livelihoods, and disrupt essential services. Among those most affected are small businesses who form the backbone of India's urban economy. Their exposure is direct, prolonged, and poorly shielded by existing infrastructure. Yet, their experiences also offer valuable lessons for shaping locally led adaptation.

A recent study conducted in Ahmedabad and Guwahati—two cities representing diverse climatic

[2] https://grantstation.com/gs-insights/nongovernmental-organizations-ngo-examples-purpose
[3] https://www.mdpi.com/2225-1154/1/1/12#:~:text=A%20capacity%20for%20knowledge%20construction,of%20developing%20countries%20%5B1%5D.)

and governance contexts—provides insights into how heat affects daily life and how communities and institutions are beginning to respond. While not a comparative study, both cities reflect the broader story of urban India: rapid growth, rising temperatures, and expanding initiatives to strengthen resilience.

The study found that extreme heat consistently reduces productivity, increases fatigue, disrupts food practices, and raises household expenses on water and cooling. Many small businesses shorten operating hours, especially in open markets where shade is limited. Electricity bills often rise by 25–50 per cent during the summer months, and access to drinking water becomes uncertain in many neighbourhoods. Women who balance both paid work and care responsibilities experience a disproportionate mental and physical burden.

At the same time, India's climate-resilience architecture is evolving rapidly. The National Disaster Management Authority's Heat Action Guidelines (2024), early warning services from the India Meteorological Department, and urban missions such as AMRUT 2.0 and DAY-NULM are steadily improving public preparedness. Ahmedabad's pioneering Heat Action Plan and Guwahati's growing emphasis on green infrastructure show that Indian cities are increasingly recognising the need for heat-aware urban governance. Community-level efforts—tree planting, temporary shading, shared water points—further indicate that adaptation is already underway.

> *"Resilience grows strongest when those in Asia and Africa closest to the risk are closest to the resources and decisions."*
> *– Mihir R. Bhatt*

However, the study highlights areas where policy attention can deepen impact. Heat-safe work standards, such as mandated rest breaks and hydration access, can be integrated into municipal labour regulations. Small businesses require access to climate-risk finance, including micro-insurance and low-interest credit for cooling upgrades. Urban planning codes—such as cool-roof standards, ventilation norms, and requirements for green buffers—can be strengthened to reduce surface temperatures in dense markets and informal clusters.

Effective heat resilience also depends on improved data systems. Ward-level dashboards that integrate IMD forecasts, health surveillance, and local observations can help municipalities shift from reactive to anticipatory action. Communication must become more localised: multilingual warnings, occupation-specific guidance, and market-level notice boards can translate early alerts into everyday decisions.

Most importantly, small businesses should be recognised as partners—not beneficiaries—in shaping urban resilience. Their place-based knowledge, coping strategies, and willingness to co-invest in cooling solutions make them important actors in India's climate transition.

It is important to recognise the substantial progress already made by national and local institutions in addressing extreme heat. The NDMA's updated Heat Action Guidelines, IMD's strengthened early-warning systems, and the proactive leadership shown by municipal authorities in cities like Ahmedabad and Guwahati demonstrate a growing commitment to heat-aware governance. State Disaster Management Authorities, public health departments, urban development agencies, and livelihood missions such as DAY-NULM are gradually integrating heat safety into their programmes. Civil society organisations, academic institutions, and community groups have also played a vital role by supporting awareness campaigns, piloting nature-based cooling solutions, and ensuring that the voices of small businesses and informal workers are heard. These collective efforts provide a strong foundation to build upon and offer encouraging evidence that multi-stakeholder collaboration is possible, scalable, and central to India's urban resilience journey.

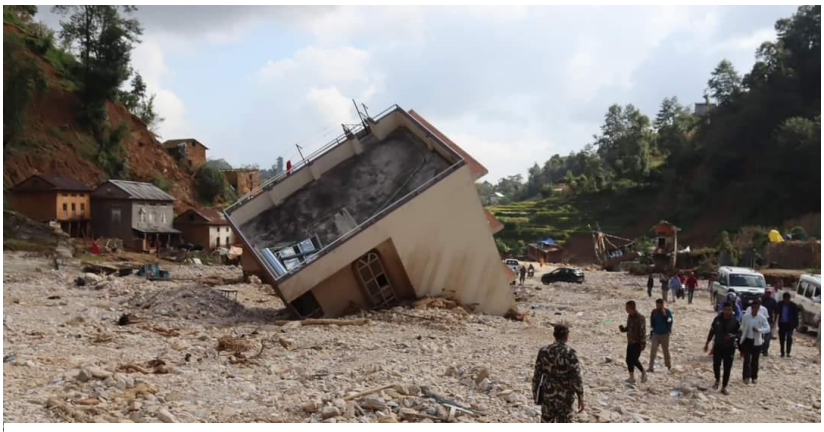
India's heat crisis is often portrayed as a challenge of infrastructure or meteorology. But as this study shows, it is equally a social and economic issue—one that can be addressed through inclusive urban planning, integrated governance, and community leadership. As temperatures continue to rise, India's cities must strengthen their commitment to resilience: greener neighbourhoods, safer work conditions, improved services, and financial protection for those who keep urban life running. The way forward lies in connecting science, policy, and lived experience to ensure that adaptation reaches every market, street, and household. ■

LOCAL COLLABORATION

Collaboration for Resilience: Linking Local Institutions, Communities, and Policy Lessons from Nepal

*By **Pralhad Timilsina,** Executive Director, Society for Integrated Allied Nepal (SIAN), Kathmandu, Nepal*

As climate hazards intensify across Nepal from heavier monsoon rains and flash floods in the Terai to increasing landslide and drought risks in the hills and mountains, resilience depends on strong links between communities, local institutions, and supportive policy. Practical experience from Nepal demonstrates that when these three pillars work in tandem, adaptive solutions are more inclusive, cost-effective, and scalable.



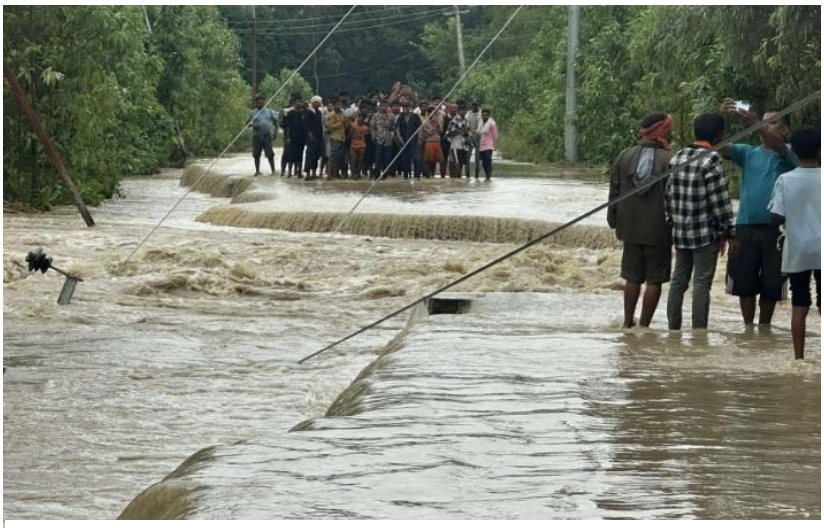
In September 2024, intense monsoon rains resulted in a destructive landslide and flooding in Bethanchok Rural Municipality, Kavre District, causing significant damage to residential properties and infrastructure.

Case study 1: Community-led landslide risk reduction in hilly wards (illustrative composite) In a cluster of rural wards, smallholder farmers and women's cooperatives faced repeated damage to terraces and footpaths from landslides. The local ward office, in collaboration with the Municipality and Rural Municipalities' engineering unit, facilitated participatory hazard mapping with community volunteers and schoolchildren. In support of various NGOs, community forestry groups contributed nursery stock and labour for slope stabilisation using vetiver and bamboo, as well as for reforestation. Additionally, a local youth club and community-based organisations maintained early-warning signposts on access routes. The municipality formalised a simple micro-grant to cover tool hire and technical backstopping, while the District Disaster Management Committee (DDMC) helped integrate the local maps into municipal planning. As a result, slope failures on critical paths were reduced, local response time was reduced, and municipal planning allocated a budget for community-managed slope protection.

Case study 2: Flood preparedness through institutional networking (illustrative composite) Along a flood-prone river corridor, a network formed among downstream farmers, municipal officials, a local FM radio station, and a community health post. The District Disaster Management Committee (DDMC) and the Municipal-level Disaster Management Committee (DMC) at the municipality shared simplified river-level thresholds with community volunteers. In return, the volunteer network provided real-time river observations and rapid messages to the FM radio and school committees. The health post utilised radio alerts to preposition medicines and prepare safe shelter lists, while the municipality allocated emergency transport from a participatory contingency fund. This simple institutional choreography led to earlier evacuations, the continuity of health services during floods, and stronger trust between officials and citizens.

Key Lessons Learned

1. **Local knowledge and technical support are powerful:** Communities know micro-hazards; local institutions can validate and scale solutions.
2. **Flexible local finance unlocks action:** Small municipal micro-grants or contingency funds allow communities to act immediately.
3. **Cross-sector networks matter:** Linking schools, health posts, media, NGOs, CBOs and cooperatives fills gaps in early warning, logistics, and social protection.
4. **Coordination among institutions is crucial:** Effective collaboration between municipal authorities, ward offices, and district disaster management committees helps mobilise resources quickly and prevents duplication of efforts.
5. **Women's leadership multiplies benefits:** Women-led groups



Intense rainfall on October 4 and 5, 2025, caused severe flooding in Sarlahi District of the Terai region, submerging roads, damaging houses and infrastructure, and placing communities at serious risk.

often drive preparedness, nutrition, and livelihood adaptations that protect the most vulnerable.

6. Building resilient infrastructure reduces future risks: Incorporating disaster-resilient designs in roads, housing, and drainage systems, along with regular maintenance, minimises damage from future extreme weather events.

Recommendations

Municipalities should be encouraged to institutionalise participatory hazard mapping, create community contingency funds, and establish formal communication channels between ward-level volunteers and municipal offices. National policy should continue to incentivise local ownership through conditional grants and technical backstopping, while simplifying procedures so that local actors can act quickly.

Nepal's multi-tiered governance system, vibrant community networks, and rich local knowledge offer a real advantage. Resilience is most durable when communities lead, institutions enable, and policies align, turning climate risk into opportunities for local empowerment. ■

CLIMATE EMPOWERMENT

Girls' Education: A *Sine Qua Non* for Climate Resilience

*By **Dinesh Bhuju,** Chair, Resources Himalaya Foundation, Nepal; Professor (Hon.) MICD, Mid-West University, Nepal; Visiting Professor, Northwest University, China*

Nepal is no exception to the global climate crisis—on the contrary, it is among the countries most vulnerable to its impacts. School education in Nepal plays an important role in addressing this challenge by teaching the causes and effects of climate change and raising public awareness. In its science and environment curricula, climate and disaster topics occupy a significant 21.18 percent of the total content (Bhuju 2017). Environmental education begins as early as Grade I, and by Grades IV and V, climate and disaster-related topics account for 31.3 percent of total teaching hours. Environmental themes are also integrated into other subjects such as social studies. Focus group discussions have shown that students at all levels find these topics engaging and relevant. However, many girls are unable to complete their education.

A popular saying goes: Climate change impacts everyone, but not equally. This is especially true for girls in Nepal and other developing countries, who are disproportionately affected by climate impacts due to existing gender inequalities. It is therefore crucial to strengthen education systems, empower girls with climate knowledge and green skills, and support communities in adapting to climate-related disasters. The climate crisis is fundamentally an intergenerational child rights crisis and represents one of the greatest threats to children's survival, learning, and protection. Without addressing it, achieving the Sustainable Development Goals—particularly for marginalized and vulnerable children and their families—will remain out of reach.

Gender inequality in education is deeply interlinked with climate change. Persistent educational disparities and the discrimination faced by marginalized groups are often exacerbated by climate-related challenges (Kwauk, 2021). In rural

Nepal, where piped water systems are rare, collecting water from natural springs is a daily necessity. As climate change causes springs to dry up or shift farther away, the burden of water collection grows heavier. A common sight in rural areas is school-aged girls fetching water rather than attending classes. Because of their caregiving roles and socially assigned responsibilities, girls are often the first to respond when water becomes scarce. Consequently, absenteeism among the girl students rises, disrupting their education. Studies estimate that at least four million girls in low- and lower-middle-income countries were unable to complete their education in 2021, and projections for 2025 suggest that number could exceed 12 million if current trends continue (Malala Fund, 2021).

Girls' education is central to global efforts to build environmental awareness and combat climate change. Educating girls is ranked sixth among the most effective solutions for limiting global warming to 1.5°C, due to its potential to reduce carbon emissions (Hawken, 2017). Education empowers girls to make informed reproductive choices—decisions that not only transform individual lives but also have measurable climate benefits. Combined with access to family planning, girls' education could prevent up to 85 gigatons of carbon emissions by 2050. Moreover, equipping girls with green skills prepares them for the evolving world of work and strengthens community resilience to climate shocks. Finally, girls' education fosters environmental leadership, enabling them to drive change and influence policy.

School education can thus serve as a powerful catalyst for both adaptation and mitigation, fostering awareness and action on climate issues. Yet, a study of 160 Nationally Determined Contributions (NDCs) reveals that only four mention girls at all—despite adolescent girls being among the most affected by the climate crisis (Kwauk, 2021). For developing countries seeking to empower citizens for climate action, investing in girls' education must be a top priority. Providing girls with climate literacy and green skills not only supports adaptation but also prepares them for a greener, more STEM-driven economy.

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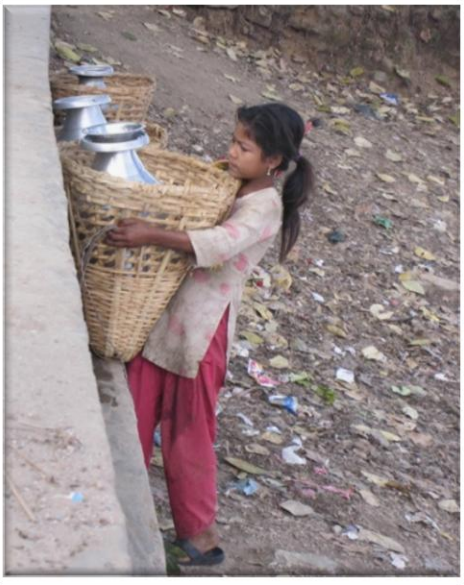
People waiting to collect drinking water in a village in Ramechhap, Nepal. Photo RHF 2012.



A girl child prepares her doko (bamboo basket) to carry a water vessel in a village in Ramechhap, Nepal. Photo RHF 2012.

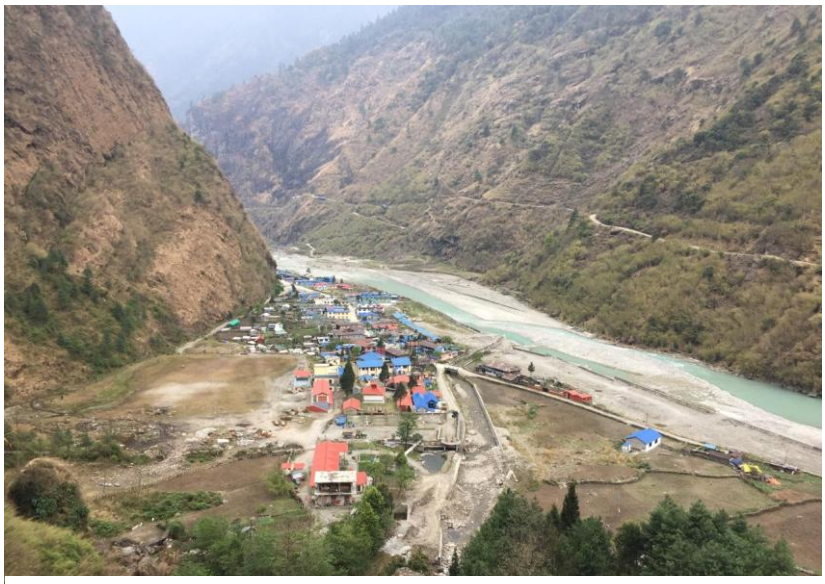
LOCAL RECOVERY

Disaster Preparedness and Resilience: Lessons from Tal

*By **Umesh Basnet** and **Bhawana Bhusal**, Youth Alliance for Environment (YAE), Kathmandu, Nepal*

Tal village, a tranquil settlement along the Marsyangdi River in Manang, holds a history of resilience and transformation. Once a vast grazing land known as a "goth" or "kharka," Tal attracted Tibetan settlers about a century ago, beginning with just four households. Today, it has grown to 61 households, mostly Gurung, followed by Tibetan, Dalit, and Tamang families. Traditionally dependent on agriculture and livestock, the villagers gradually embraced tourism as trekkers began flocking to the area for its scenic beauty. Over time, tourism became the main livelihood for more than half the households. However, Tal's proximity to the Marsyangdi River came with unseen peril. In 2009, the river swelled, damaging homes and infrastructure. The most devastating disaster struck in 2021 when relentless rainfall caused the river to flood catastrophically. The torrent destroyed 22 houses completely, severely damaged 28 more, and caused losses estimated at around 500 million Nepali rupees. The village school was washed away, forcing children to continue their education in distant districts like Lamjung and Chitwan.

Beyond physical destruction, the flood eroded the village's cultural and emotional fabric. Over 300 ropani of ancestral land vanished under the river, displacing families and disrupting age-old traditions. Tourism, the village's economic backbone, collapsed temporarily, further deepening hardship. Yet, amid the ruins, the spirit of Tal's people endures. Some homes have been rebuilt, and a few families have reopened lodges to welcome travellers once again. While Tal may never fully return to its former state, its people's determination to restore their lives and community stands as a testament to their unyielding resilience. The heart of Tal continues to beat strongly, awaiting the day it regains its lost beauty and strength.



Tal Village after Recovery.

Immediate response efforts were halted by road and communication disruptions, but later the Government of Nepal, local authorities, including the District Disaster Management Committee (DDMC) Manang, Nepal Army, and Nepal Police, initiated rescue and evacuation operations, ensuring the safety of affected households. Relatives of the affected families from neighbouring villages provided emergency relief, supplying food, tents, clothing, and basic medical aid. Temporary shelters were set up on higher, flat areas of the village, while children and elderly residents were airlifted by helicopter to stay safely with their relatives.

The disaster exposed major vulnerabilities in Tal's disaster preparedness and settlement planning. The community's proximity to the Marsyangdi River, lack of early warning systems, poor drainage, and absence of flood-resistant infrastructure made the settlement extremely vulnerable. Additionally, weak coordination among government bodies, limited local awareness of potential hazards, and a lack of land-use planning exacerbated the scale of loss and destruction.

Since the flood, efforts have been made to address these vulnerabilities. The local government and CSOs have focused on hazard mapping, awareness programs, and community-based disaster risk reduction (CBDRR) training. Retaining walls and embankments have been built along the riverbank, and most families have rebuilt their homes with support and financial assistance from relatives and loans from various banks. Early warning mechanisms and community coordination committees have been

established to improve response readiness.

The community has demonstrated remarkable initiative by rebuilding homes using stronger materials, planting vegetation to prevent soil erosion and mitigate flooding, and diversifying their livelihoods to reduce reliance on tourism alone.

Tal's experience offers valuable lessons globally: disaster preparedness must integrate local knowledge, scientific risk assessments, climate adaptation planning, including a robust early warning system. Key recommendations include investing in resilient infrastructure, constructing strong riverbank embankments, planting vegetation to stabilise the banks, and empowering local communities in decision-making. Tal's story serves as a powerful testament to human resilience and a reminder of the importance of proactive adaptation to a changing climate. ■

URBAN TRANSFORMATION

A Just Transition in Kenya

*By **Hanningtone Meyo**, Founder, Green Drivers Community, Kenya*

The rise and rapid growth of urban centres has led to an increase in pollution due to rapid industrialisation and people's need for transport for work and daily living. The transport sector in Kenya has recognised its important contributions towards attaining the goal of zero emissions and rallying workers and the community towards the adoption of clean and renewable energy. Drivers have come together to form an organisation of Green Drivers under the umbrella of the Kenya Bodaboda Tuktuk and Taxi Workers Union, aiming to be an active part of the climate change agenda by transitioning from fuel-engine-driven locomotives to electric motor-driven locomotives with zero emissions.

Detailed below are the direct and indirect impacts of e-vehicles on Kenya's transport workers and communities.

Positive Environmental Impact

Kenya's capital, Nairobi, has more than 40,000 drivers who operate across the city centre and work on various hours and shifts. An average driver working 15 hours consumes 19 litres of petrol, with 87% of that, or 652 grammes, of carbon per litre. This equates to emitting roughly 45,448 grammes of Co2 into the atmosphere every day. Through transitions drivers to electric cars, it empowers a widespread reduction of pollution Co2 from being emitted into the environment per day in Nairobi city alone

Economic Empowerment

Transition into electric vehicles provides an economic impact to drivers through savings and investments. First, full-time taxi drivers spend between Ksh. 1500 to Ksh. 2500 per day on fuel, depending on the number of trips and distance. As the taxi sector moves to driving electric vehicles, spending decreases, and a full-time taxi driver saves up to Ksh. 75000 per month on fuel. Second, as traditional cars need general regular service costs for the car and maintenance, drivers are expending between Ksh. 2500 to Ksh. 4500 every month. Electric vehicles are designed differently, and because they do not require monthly services, a single driver can save up to Ksh. 4500 every month. Third, as drivers enter into the gig economy, commission fees from apps average to Ksh. 1875 per driver per day. With the introduction of a driver-friendly app that will only charge 5% commission for the app, drivers can save at least Ksh. 1500 per day, amounting to Ksh. 45000 per month.

In total, switching to greener electric vehicles benefits drivers by saving an average of Ksh. 124,500 every month and Ksh. 1,494,000.00 every year. These benefits provide financial stability and an opportunity for transport workers to reinvest their savings into other economic pursuits, such as family and education.

Actions taken by the Green Drivers Community, and recommendations to support the transition to e-vehicles include:

1. Providing more opportunities to drive or own a new (zero-mileage) electric vehicle, which allows for savings of more than 90% from fuel cost alone, and an expansion of financial net worth and investment.
2. Acquiring e-vehicles directly from manufacturers with a warranty of eight years. Among the foregoing middlemen, electric vehicles are more affordable for transport sector workers.
3. Accessing subsidies and collective bargaining provided by the government and the private sector makes the vehicle more cost-effective.
4. Creating community ties with unions and worker associations within the formal and informal transport sector that can develop pathways to transition to green e-vehicles, and promote awareness of drivers' rights. ■

CLIMATE LIVELIHOODS

Building Climate Resilience through Community-Based Forest and Farm Producer Organisations in Ghana

*By **Takyi Ezekiel Paul**, Program Associate, Ghana Federation of Forest and Farm Producers (GhaFFaP), Ghana*

In Ghana, climate change variability has affected agriculture production, forest-based production systems, and value chains, and has contributed to the ever-widening poverty, food and nutrition insecurity, and forest deformation and land degradation. The combined effects of the heavy floods that occur during the rainy season, mainly destroying various production farmlands, and the long dry season, make it difficult for local communities to meaningfully adapt.

In northern Ghana and across the Savanna belt, water remains a critical resource for agriculture; however, the management and accessibility are out of reach for most farmers. Ghana's Environmental Protection Agency (EPA) revealed that every year, an increase in climate variability during the dry season induces farmers to change their farming systems in order to minimise the adverse effects of climate change. The region has one rainy season, lasting three to four months, followed by a nine-month period of dry season. To address water scarcity during the dry season, dams have been built. Yet this intervention had no positive impact due to its limited catchment areas with no wider accessibility to the water by communities. With increasing rates of crop failures and prolonged doubts each year, youths –especially women-- are abandoning their family farms and migrating to the city for jobs. Between untenable lands and a dwindling workforce, there is a growing existential threat to agriculture and forest-based livelihood production systems.

The changes in temperature, unpredictable rainfall, and the long period of drought in agrarian areas in the Savanna Region go beyond planting and harvesting and impact daily living. In Ghana, trees and shrubs are increasingly felled and used as a source of cooking energy and income, particularly in the northern parts of the country (Marchetta, 2011; Yaro, 2006). As trees and soil struggle to survive and are not as regenerative, the is growing scarcity of trees for cooking and encroaching loss of forest and land vegetation which exposes the land to erosion and detriments the soil's fertility.

Ghana has the long-term goal to turn the dry, degraded and deforested landscapes into green, integrated and climate-resilient production landscapes. This includes transforming the long dry season period into a major production season, and ensuring year-round production through the provision of solar-powered medium irrigation systems in selected landscapes covering multiple communities within the northern savanna belt. Resources are put in place to farmers to promote deforestation-free year-round, provide solar-powered medium irrigation systems, encourage landscape restoration and agroforestry, and building of carbon assets and multiple value chain products that enables smallholders to adapt to the effects of climate change and build back better.

Key Actions by GhaFFaP towards delivering Climate Resilient Landscapes

Trainings: ROAM, NbS, Gender & women and youth Climate, Demonstration sites and tree nursery production, Agro-ecology, Agroforestry, Partnering with Ministry of Lands & Natural Resources on –Green Ghana Project and Policy –Engagements ongoing on tree tenure and protection of NTFPs as key agents of change. ■

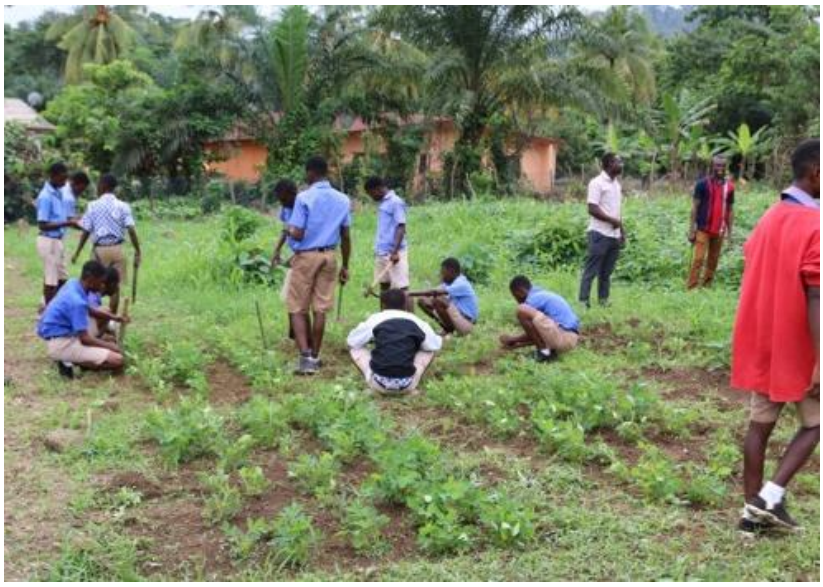
COMMUNITY LEADERSHIP

Empowering Rural Communities for Climate Resilience: Lessons from Ghana

हवामान लवचिकतेसाठी ग्रामीण समुदायांना सक्षम बनवणे: घानाकडून मिळालेले धडे

*By **Sandra Efua Attah Dickson**, Climate Programs Officer, Alliance for Empowering Rural Communities, Ghana*

As climate change intensifies across Ghana, rural communities face increasingly complex challenges from coastal erosion and saltwater intrusion to erratic rainfall, declining soil fertility, and the erosion of traditional livelihoods. In these contexts, resilience cannot be imported; it must be cultivated from within. At the Alliance for Empowering Rural Communities (AERC), our experience affirms a powerful truth: when communities are empowered to lead, climate adaptation becomes more inclusive, sustainable, and transformative.2



Students engaged in hands-on organic gardening. This Nature-based Solution builds climate awareness, food security, and environmental stewardship. (Photo: AERC, 2024)

Nature-Based Solutions Rooted in Local Leadership

Across Ghana's rural landscape, Nature-based Solutions (NbS) have become vital entry points for resilience. Through community-led tree planting and agroforestry, farmers restore degraded lands, improve soil health, and enhance food security. These efforts are often led by youth groups and women's cooperatives who recognise the link between ecosystem vitality and household well-being. Their leadership underscores a key lesson: climate resilience deepens when vulnerable groups are positioned not as beneficiaries but as co-creators of change.

In coastal areas, our Green Shores Ghana initiative exemplifies this approach. Residents engage in dune stabilisation, mangrove restoration, and shoreline monitoring actions that protect homes and fish landing sites while reviving ecosystems essential to fisheries and small-scale trade. Supported by district assemblies, these efforts show how grassroots action can influence policy and planning.

Governance, Climate Literacy, and Indigenous Knowledge

Resilience is not only ecological; it is also institutional. AERC's local climate dialogues give households platforms to assess risks, share coping strategies, and co-design solutions.

Integrating this knowledge into programme design has built trust and strengthened ownership. Traditional leaders and local authorities now collaborate to allocate resources for climate-smart initiatives, helping ensure adaptation continues beyond project timelines.

Diversified Livelihoods and Climate-Smart Innovation

Diversified, climate-resilient livelihoods are another pillar of resilience. Farmers are adopting drought-tolerant crops, composting, and low-cost irrigation, buffering against climate shocks while generating steadier incomes. In Ghana's Upper East Region, over 1,200 farmers "60 per cent women" have transitioned to climate-smart agriculture through AERC-supported cooperatives, reporting higher yields, lower costs, and greater food security.

Three Overarching Lessons

The experiences from Ghana point to three enduring lessons:

1. **Participation is foundational:** resilience is strongest when communities co-design and implement solutions.

2. **Nature-based Solutions are catalytic:** they restore ecosystems while reinforcing livelihoods and cultural values.
3. **Local governance and capacity matter:** empowered institutions and informed citizens ensure adaptation endures.

Conclusion

Building on these successes, AERC aims to scale its Nature-based Solutions to reach more rural communities across Ghana. The next phase will deepen partnerships with local governments, schools, and traditional authorities to embed NbS into district planning and community governance. By strengthening technical capacity, expanding climate education, and promoting green livelihoods, AERC seeks to move from pilot projects to lasting, systemic impact.

The future of climate resilience in Ghana lies in empowered communities equipped with the knowledge, resources, and leadership to drive transformation. As AERC refines and replicates its approaches, the goal remains clear: to build a network of climate-smart communities whose collective actions restore ecosystems, secure livelihoods, and inspire regional change across West Africa. ■

EARLY WARNINGS

Toward Climate Resilience with a Focus on Adaptation: Lessons from Communities

*By **Joy Muller**, Former, IFRC, Switzerland*

Abstract: This article reflects on the role of communities in climate change adaptation, highlighting Tajikistan's experience with the Early Warnings for All initiative. It illustrates how global commitments, when combined with inclusive local action, strengthen resilience and protect communities from climate risks.

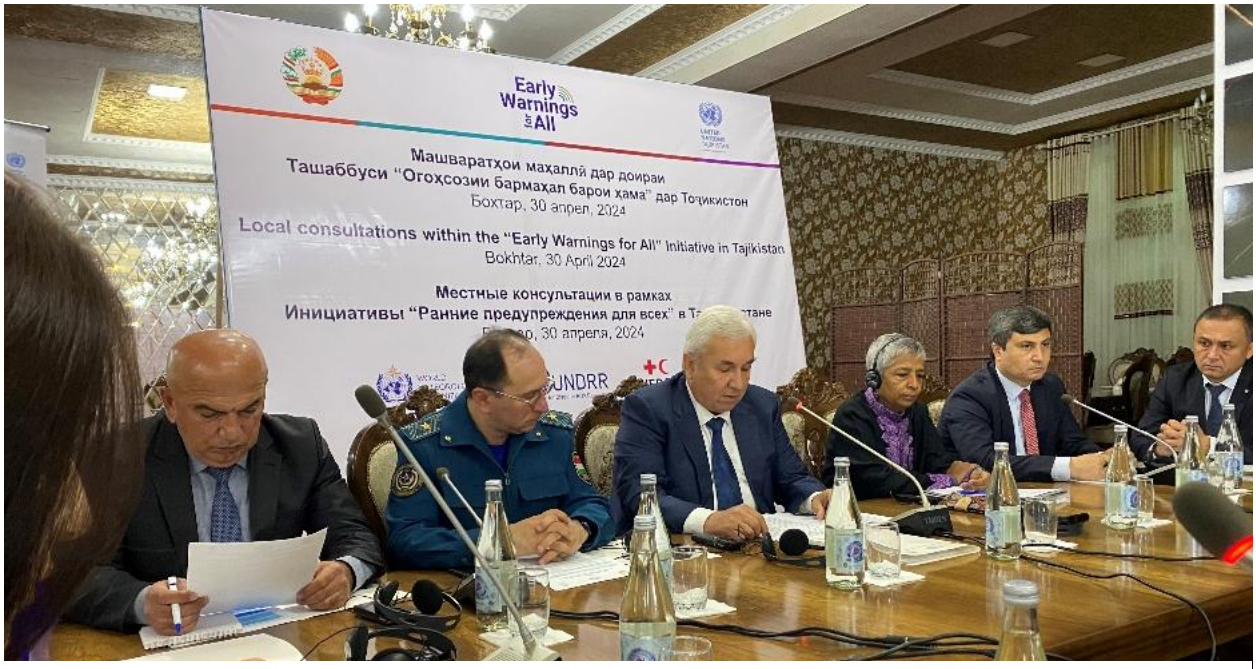
Public authorities and civil society organisations are key to bridging gaps and building community resilience against climate change. This article reflects on their roles and the role of communities, including local public authorities, in adaptation, drawing from the experience of support from the Red Crescent Society of Tajikistan and the Government of Tajikistan in the rolling out of the Early Warnings for All (EW4All) initiative. It argues that global frameworks such as the Paris Agreement and the Sendai Framework gain real meaning when translated into action at the community level.

The Paris Agreement, adopted in 2015 and ratified by 194 state Parties, sets a global framework for climate action.[1] Its success in implementation requires a whole-of-society approach, engaging governments, businesses, civil society, and communities. Its Article 12 and the UNFCCC framework of Action for Climate Empowerment (ACE) highlight six elements—education, awareness, training, participation, information access, and international cooperation—to empower people to engage in climate action.[2]

Launched by the UN Secretary-General in 2022, the EW4All initiative aims to ensure that by 2027 every person is protected by early warning systems for hazardous weather, water, and climate events.[3] Its four pillars—risk understanding, hazard monitoring, warning dissemination, and preparedness to respond—form an end-to-end system. EW4All complements the Paris Agreement, supports the Sendai Framework's global target on multi-hazard early warnings,[4] and contributes to the Sustainable Development Goals by reducing vulnerability and protecting livelihoods.

Tajikistan was among the first 30 countries selected to implement EW4All. Preparations began in June 2023, led by the Committee of Emergency Situations and Civil Defense (CoES) of its government with strong support from the UN system and the International Federation of Red Cross and Red Crescent Societies (IFRC).[5] The national launch in August 2023 was backed by high-level political leadership, including the appointment of a Deputy Prime Minister as the focal point. Coordination was anchored in the existing National Platform for Disaster Risk Reduction.

A major achievement was devolving EW4All from national to the local level, particularly in developing capacity for preparedness to respond (Pillar 4). Under the leadership of CoES, the Red Crescent Society of Tajikistan supported by IFRC worked together with local public authorities and communities.[6] National and provincial workshops



Third local consultations with stakeholders to finalise the roadmap to implement EW4All. (Photo by Joy Muller, IFRC)

in 2023–2024 discussed draft roadmaps that identified gaps in coverage of warnings and made action plans for the four pillars, particularly in areas prone to avalanches, floods, mudflows, and landslides. By July 2024, an integrated national roadmap was endorsed, setting time-bound actions for strengthening early warning systems nationwide.

Tajikistan's approach illustrates how global commitments can translate into local resilience. Success factors included: high-level political leadership; inclusive coordination across government, UN agencies, and civil society; active participation of stakeholders at all levels; time-bound, adaptable planning; and empowerment of communities to act effectively on warnings. This multi-level cooperation is an example of how to embed climate action into national and local systems.

Based on Tajikistan's experience, several recommendations emerge for other countries implementing EW4All or similar programs:

- Ensure strong government leadership at the highest political level to drive progress.
- Strengthen coordination across sectors and levels, with a clear role for each stakeholder.
- Invest in local capacity building so communities are not only recipients of warnings but active participants in preparedness.
- Develop time-bound roadmaps with monitoring to track progress and adapt when needed.
- Empower communities through education, awareness, and participation, ensuring early warning systems are people-centred and action-oriented.

The EW4All initiative in Tajikistan shows how governments, civil society, business and international partners can collaborate to localise global climate goals. Its inclusive and devolved approach provides a model for other countries seeking to protect communities from climate-related risks, including through EW4All, and move toward a more resilient future.

> *"Climate action becomes real when local knowledge is funded, respected, and scaled – not merely documented for evidence."*
>
> *– Mihir R. Bhatt*

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Towards Climate Resilience: Lessons from Communities in Bangladesh

*By **Md. Abul Kalam Azad,** Senior Environmental & Social Safeguard Specialist, Local Government Engineering Department (LGED), Dhaka, Bangladesh*

Background

Bangladesh is one of the most climate-vulnerable countries in the world, facing recurrent floods, cyclones, salinity intrusion, riverbank erosion, and urban waterlogging. Despite these challenges, communities across Bangladesh have developed unique coping mechanisms and adaptation practices that safeguard lives, protect livelihoods, and strengthen social cohesion. These experiences demonstrate that resilience is not only built through large-scale infrastructure or policies but also through everyday practices, collective action, and local innovations.

Theme

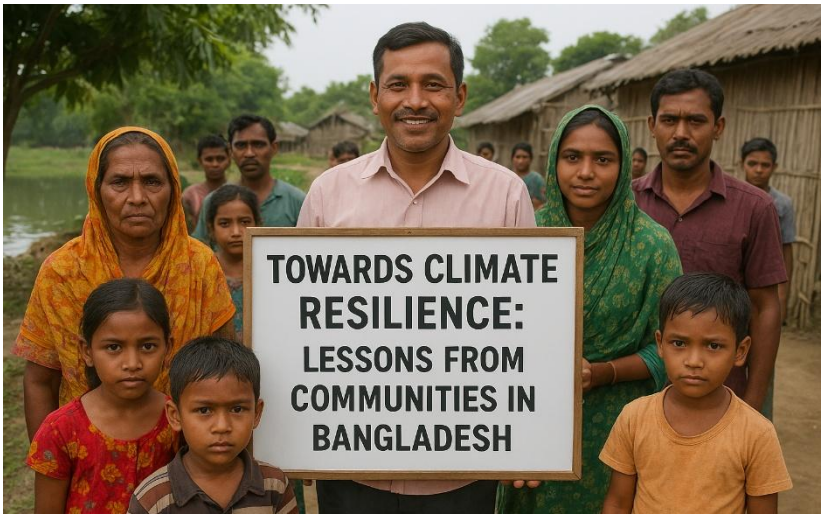
The event, "Towards Climate Resilience: Lessons from Communities", emphasises the central role of community-led solutions in building an inclusive and sustainable resilience framework. By bridging local knowledge and national policy, the event seeks to highlight how indigenous practices, women's leadership, social protection, and nature-based solutions can be scaled and integrated into national strategies for climate adaptation and disaster risk reduction.

Objectives

- Showcase proven community-based adaptation practices from diverse regions of Bangladesh.
- Identify pathways to integrate local innovations into national and local government planning.
- Promote inclusive governance by amplifying the voices of women, youth, and marginalised groups.
- Explore financing options to sustain and scale community-led climate resilience.
- Strengthen partnerships among government, NGOs, development partners, and communities.

Key Sub-Themes

- Community-based adaptation & indigenous knowledge
- Nature-based solutions and ecosystem restoration
- Climate-resilient livelihoods and social protection
- Inclusive governance and women/youth leadership
- Early warning and localised preparedness systems
- Financing and scaling local resilience solutions.



Expected Outcomes

- Documentation of practical, replicable community resilience practices.
- Policy recommendations for embedding community inputs into national strategies.
- Strengthened collaboration among stakeholders to scale grassroots innovations.
- Enhanced visibility of women and youth as leaders of resilience-building.

Conclusion

The journey "Towards Climate Resilience: Lessons from Communities in Bangladesh" underlines that true resilience emerges not only from infrastructure or policy frameworks but from the lived experiences, innovations, and collective actions of communities. By valuing indigenous knowledge, strengthening inclusive governance, and investing in climate-resilient livelihoods, Bangladesh can transform local practices into scalable models of adaptation. The event aspires to bridge grassroots insights with national strategies, ensuring that women, youth, and marginalised groups remain at the forefront of resilience-building. Ultimately, these lessons demonstrate that community-led approaches are crucial in shaping a sustainable, inclusive, and climate-resilient future for Bangladesh. ■

Climate Resilience and Cultural Heritage Conservation through Traditional Lime Technology

पारंपारिक चुना तंत्रज्ञानाद्वारे हवामान लवचिकता आणि सांस्कृतिक वारसा संवर्धन

*By **Dr. R. K. Trivedi,** Senior Consultant Heritage, Ex. Faculty. Dr. B.R. Ambedkar University, Delhi, Faculty of the National Archive of India, India*

Abstract

Climate change increasingly threatens heritage structures, especially in India, where historic buildings endure harsh monsoon cycles, salt ingress, and rising temperatures. Traditional preservation approaches, focused mainly on material authenticity, must evolve into resilience-oriented frameworks that include climate adaptation and low-carbon materials. This article explores the transition from preservation to resilience through lime-based binders, historically used in Indian masonry and essential for sustainable conservation.

Introduction

Climate change is a profound threat to cultural heritage, causing rapid deterioration of sites globally, with nearly a third of UNESCO's natural World Heritage sites already experiencing stress. Rising sea levels, extreme weather events, and environmental fluctuations like humidity changes and freeze-thaw cycles accelerate decay, rendering traditional, static preservation methods obsolete. The critical shift is towards a resilient and adaptive conservation paradigm that embraces sustainability. In this shift, lime-based binders are essential, offering compatibility, breathability, and lower embodied carbon for repairing historic masonry, making them a cornerstone of future-proof heritage management.

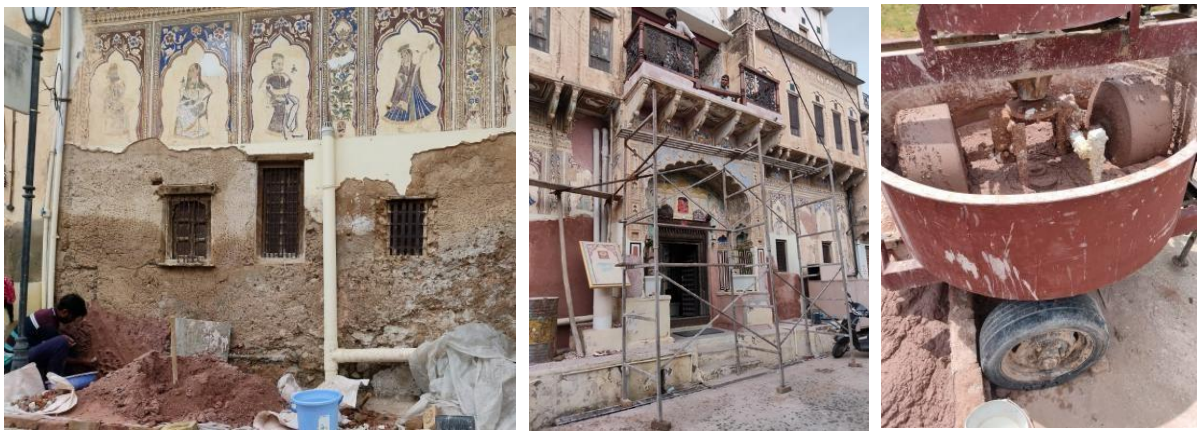
India's diverse heritage is rapidly degrading due to climate impacts—from monsoons in the south to desertification in the west. Unsuitable repair materials, especially Portland cement, worsen the problem by trapping moisture and accelerating salt damage. Cement's rigidity and high carbon content contrast sharply with the climate-resilient qualities of lime.

Indian fieldwork demonstrates that traditional formulations—lime-*surkhi*-sand mortars, with organic additives—can be tailored for climate resilience. Variations reflect regional techniques, and integrating lime into policies preserves both authenticity and sustainability.

Case Study: Shekhawati Haveli Conservation

The Shekhawati region of Rajasthan, known globally as an "open-air art gallery," features thousands of richly painted Havelis from the 18th and 19th centuries. The havelis were built by merchants and rulers during a prosperous period, and the region was a significant cultural and economic hub. These structures and their intricate frescoes depicting mythological and historical scenes are critically vulnerable to the region's arid extremes and the challenges posed by a changing climate.

The historic structures of Shekhawati suffer severe damage, including masonry stress fractures and fresco decay, driven by extreme temperature cycles, flash rains, and



Haveli of Ramgarh Shekhawati under Conservation.

salt attack. Previous repairs using rigid modern cement worsened the problem by trapping moisture and causing the original plaster to detach. To address this, conservation efforts now mandate the use of traditional lime mortar and plaster. Lime's key qualities vapour permeability, flexibility, self-healing, and compatibility—allow repairs to blend seamlessly and ensure long-term stability by honouring the original materials science and regional craftsmanship.

Resilience Outcomes

The Shekhawati Havelis provide a powerful model-Using lime in Shekhawati Havelis demonstrates that climate action can be effectively achieved through traditional materials. Lime's ability to manage moisture and temperature extremes is central to the long-term survival of these unique structures.

Conclusion

India's shift from static preservation to climate resilience is essential for safeguarding Cultural Heritage. The Shekhawati example shows that embracing indigenous lime technology is the most effective strategy for sustainable conservation. Lime integrates climate action through both mitigation and adaptation, ensuring heritage survives future climate challenges.

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अत्यधिक गर्मी में जलवायु लचीलापन: छोटे व्यवसायों के लिए AIDMI की पहल

By AIDMI, India

शहरी हीटवेव भारत के छोटे व्यवसायों के लिए उभरती हुई सबसे गंभीर जलवायु जोखिम चुनौतियों में से एक बनती जा रही हैं। इन जोखिमों को बेहतर ढंग से समझने के लिए, एआईडीएमआई ने 12 शहरों में 2,700 छोटे व्यवसायों का आकलन किया, जिसमें यह दर्ज किया गया कि अत्यधिक गर्मी उनके स्वास्थ्य, व्यवसाय संचालन, घरेलू व्यय और सेवाओं तक पहुंच को कैसे प्रभावित करती है।

आकलन से एक स्पष्ट पैटर्न सामने आया:

- गर्मी का तनाव डिहाइड्रेशन, थकान और गर्मी से संबंधित बीमारियों में वृद्धि करता है।
- कई व्यवसाय असहनीय तापमान के कारण काम के घंटे कम कर देते हैं या जल्दी बंद हो जाते हैं।
- गर्मियों में घरेलू खर्च बढ़ जाते हैं—विशेषकर पानी, दवाइयों और शीतलन से संबंधित जरूरतों पर।
- अत्यधिक गर्मी के समय आवश्यक सेवाओं तक पहुंच सीमित हो जाती है।
- निपटारे के उपाय अभी भी नाजुक और अनौपचारिक हैं, जैसे काम के घंटे बदलना या अस्थायी छाया का उपयोग करना।

जलवायु लचीलापन मजबूत करने के लिए, AIDMI ने 2,003 छोटे व्यवसायों को प्रत्यक्ष सहायता प्रदान की, जिससे वे अत्यधिक गर्मी और अन्य जलवायु घटनाओं के दौरान सुरक्षित और सक्रिय रह सकें। इस सहायता का उपयोग उन्होंने छाते, तिरपाल, पंखे, रिफ्लेक्टिव सामग्री और ग्रीन नेट खरीदने में किया, जिसने उन्हें गर्मी के संपर्क को कम करने, सामान की सुरक्षा करने और अपना काम जारी रखने में मदद की।

AIDMI ने हीट सेफ्टी और जलवायु अनुकूलन पर जागरूकता कार्यक्रम भी आयोजित किए, जिससे स्थानीय ज्ञान और सामुदायिक लचीलापन मजबूत हुआ। यह कार्य एक महत्वपूर्ण सीख को उजागर करता है: शहरी जलवायु लचीलापन का निर्माण उन्हीं छोटे व्यवसायों से शुरू होना चाहिए, जो शहरों की अर्थव्यवस्था को आगे बढ़ाते हैं। ■

हीटवेव्हमुळे छोट्या व्यवसायांवर आरोग्य, उत्पन्न आ ण सेवांपर्यंत पोहोच यावर गंभीर परिणाम होतात. AIDMI ने 12 शहरांतील 2,700 व्यवसायांचा अभ्यास करून 2,003 व्यवसायांना छत्र्या, ताडपत्री, पंखे आ ण ग्रीन नेटसह मदत केली. उष्णता-सुरक्षा आ ण अनुकूलन प्र शक्षणांनी त्यांची जलवायु लव चकता मजबूत केली. *(Extreme heat severely affects small businesses by harming health, reducing work hours, raising household expenses, and limiting access to essential services. AIDMI surveyed 2,700 businesses in 12 cities and supported 2,003 owners with umbrellas, tarpaulins, fans, and green nets. Heat-safety and adaptation training further strengthened their climate resilience.)*

COMMUNITY LEADERSHIP

Community-Led Ecosystem Services for Climate Resilient India

*By **Haripriya P S** and **Shalini Dhyani,** CSIR-National Environmental Engineering Research Institute, Maharashtra, India*

South Asia is considered to be one of the most vulnerable regions to global warming (Dhyani et al.,2024), owing to its geographical conditions and socio-economic challenges. Indian Himalayan highlands and the coastal mangroves represent two distinct yet climate-sensitive environments. Mountain and coastal communities, rooted in indigenous knowledge, have long adapted their cultural and livelihood practices to withstand climatic pressures, glacial melt, and sea-level rise (Rai and Dhyani, 2022), and these communities are nourished by the Ecosystem Services (ES) they receive.

Mountain agriculture and agro-biodiversity enhance global food security through climate resilient practices effective in water management, reducing soil erosion, and building adaptive capacity (Dhyani et al., 2021, 2022). In the central Himalaya, Community-managed forests are found to absorb 2-4 tc/ha/yr, making them a potential source of income through carbon trading (Dhyani & Dhyani, 2020), and fodder banks reduce climate-driven vulnerabilities and forest degradation while supporting local livelihoods (Dhyani & Dhyani, 2016). This proves, Traditional Ecological Knowledge (TEK), when properly applied, supports sustainable forest use, management, and conservation and can lower disaster risks in mountain regions through community-driven, cost-effective Nature-based Solutions (NbS) like Ecosystem-based Disaster Risk Reduction (Eco-DRR) (Dhyani & Dhyani, 2016; Sood et al., 2025).

Odisha's Bhitarkanika and Mahanadi delta, which occupies 150,000 people, who are directly or indirectly dependent on the mangrove ecosystems for their various subsistence (Kadaverugu et al., 2021). Scenario-based research conducted here estimates that optimistic, community driven restoration could increase blue carbon and reduce sediment/nutrient loss (Kadaverugu et al., 2022). Mangroves protect coasts by reducing cyclone impacts, groundwater salinity, and trapping sediment, shifting community and policy focus toward their cost-effective, sustainable benefits (Kadaverugu et al. 2021). Such community-driven and culturally sensitive approaches can enhance both ecological resilience and social well-being, promoting more inclusive and sustainable governance of coastal regions globally (Nayal et al., 2025).

> *"From mangroves to mountains, India's communities are restoring ecosystems and resilience together. Their stewardship shows that ecosystem services thrive most when guided by local knowledge and collective action."*

In rapidly urbanising settings where indigenous histories may not be directly present, Urban Green Spaces (UGS) continue to play an essential role as natural buffers, storing carbon stocks (Lahoti et al.,2024; S. Dhyani et al., 2021). Urban foraging from UGS has been able to bridge the gap in demand-supply (Sood and Dhyani, 2024; Das et al.,2024), contributing to urban resilience and sustainability, further localising SDG 11. Campus greenery lowers urban temperatures by up to 3°C (Dhyani et al., 2021), yet its value remains underutilized in policy frameworks. The City Biodiversity Index (CBI) and 3-30-300 rule are practical tools for tracking ES and integrating NbS such as urban wetlands, forests, and green roofs (Dhyani et al., 2020; Das et al., 2022; Lahoti et al.,2025; Pimpalshende & Dhyani, 2025). Therefore, documenting and maintaining these UGS is important amid rapid urbanisation.

Across coastal, mountain, and urban systems, a central lesson emerges: socio-ecological systems supporting the unrestricted flow of ES are most effective for climate resilience. The integration of TEK into policy and climate change research is vital for climate resilience planning. Policies focusing on participatory approaches, building interactive governance, and incentives for community-led action can transform local expertise for sustainability and resilience. ■

CLIMATE EXTREMES

Rainfall Extremes and Rural Climate Vulnerability in Upper Assam, India

By ***Binita Pathak, Aniket Chakraborty, Shukla Acharjee, Niki Gogoi, Anindita Borah, Bikash Deka, Palash Dutta, Rizwan Rahman, Barsha Dutta, Jiban Saikia, Surajit Konwar,*** *and* ***Kalyan Bhuyan,*** *Dibrugarh University, Assam, India*

This study examines climate-driven dynamics of dry and wet spells across five Upper Assam districts — Dhemaji, Majuli, Lakhimpur, Sibsagar, and Dibrugarh —spanning 1950 to 2024, using ERA5-Land daily precipitation data. Dry and wet spells are defined based on consecutive days' rainfall characteristics. A dry spell is considered a continuous period of at least five days during which daily precipitation remains below 1 mm, indicating sustained dry conditions. Conversely, an extreme wet spell consists of at least five consecutive days in which rainfall exceeds the 90th percentile for wet days (≥ 1 mm), representing prolonged, intense rainfall events.

The livelihoods in these districts depend heavily on agriculture, pisciculture, and poultry, which are highly vulnerable to rainfall variability driven by climate change. Dry spell analysis reveals considerable interannual and spatial variability across the districts. The number of dry spell events ranges from 4 to 21 in Lakhimpur, with the highest in 2007, and from 5 to 17 in Majuli and Dibrugarh. Notably, Majuli and Dhemaji record the highest total dry spell days annually, with 142 and 135 days, respectively, highlighting prolonged drought-like periods even in riverine floodplain areas. Lakhimpur and Sibsagar generally experience shorter cumulative dry durations. These extended dry spells impose severe stress on crop production, water availability, and livestock health, intensifying the rural communities' economic vulnerabilities. The variations in the frequency and duration of dry spells indicate increasing challenges in water resource reliability across Upper Assam's rural landscapes.

In contrast, extreme wet spells — periods of rainfall above the 90th percentile threshold for at least 5 consecutive days —occur less frequently but have significant localised impacts. Dibrugarh and Sibsagar recorded many years (42 and 48 years, respectively) without any extreme wet spell events, underscoring their episodic and irregular nature. Districts like Dhemaji and Sibsagar experience intense rainfall events with up to 14 consecutive days during extreme wet spells, potentially causing flooding and damage to croplands and infrastructure. The maximum annual 90th percentile precipitation values reached above 32 mm in Dhemaji and Sibsagar, signalling intense rainfall bursts that contribute to flood risks. These events exacerbate land degradation and income instability for farmers, particularly affecting those whose livelihoods depend directly on agricultural output. This is reflected in the village survey conducted across 30 villages in these districts.

The dual pressure from prolonged dry spells and episodic extreme wet spells not only disrupts agricultural calendars but also deteriorates soil health and water management capabilities, forcing many households to diversify livelihoods, migrate seasonally, or adopt indigenous coping mechanisms like the construction of elevated 'Chang Ghar' houses and food preservation technologies. Such strategies represent initial steps towards climate resilience but are insufficient without broader adaptive planning. The observations from this detailed dry and wet spell analysis strongly indicate that climate change is increasingly influencing precipitation variability and extremes in these Upper Assam districts. Prolonged dry spells are becoming increasingly prevalent, particularly in low-lying floodplain areas, escalating water scarcity and agricultural stress. Simultaneously, intense, sometimes prolonged, extreme wet spells contribute to flooding and related socioeconomic disruption. Effective adaptation requires focusing on district-specific vulnerabilities and enhancing water resource management, climate-resilient agricultural practices, early warning systems, and community-led adaptation initiatives to safeguard rural livelihoods in Dhemaji, Majuli, Lakhimpur, Sibsagar, and Dibrugarh. Hence, this assessment provides a critical scientific basis for policymakers and local stakeholders to prioritise interventions that mitigate the impact of shifting dry and wet spells on the socio-economic fabric of Upper Assam's rural population. ■

> *"Our regions in Africa and Asia do not lack solutions. They need systems that trust and invest in community leadership."*
>
> *– Mihir R. Bhatt*

LESSONS FROM COMMUNITIES

Climate Resilience: What Can We Learn from Coastal Communities in Bangladesh?

*By **Rafiqul Islam Montu,** Independent Environment Journalist, Bangladesh*

Coastal communities in Bangladesh are facing extreme crises due to climate change. Rising sea levels, cyclones, tidal surges, floods, salinity, and extreme heat are severely affecting their lives and livelihoods. Their lives and properties are being severely damaged. As the crises increase, people's struggle for livelihood is becoming increasingly difficult. But how do people survive in the face of so many crises? What strategies are they adopting for climate resilience? We have sought answers to those questions, which are lessons in climate resilience for us.

Women are discussing the conservation and cultivation of local varieties of rice and vegetables. Photo taken from a village in Shyamnagar Upazila of Satkhira district on the southwest coast of Bangladesh. Photo: Rafiqul Islam Montu

From Kalabogi village in Dakop upazila of Khulna district on the west coast of Bangladesh. Hundreds of houses in this village are hanging like this from bamboo poles. Wooden planks are level with the poles. They have been living on these for years. No, no one has taught this technique to the people of this area. They have learned from the disaster that if they want to live here, they have to build their houses like this. 'Look at the waves of the Shivsa River; this is where my house used to be. My days were going well with work. There was a little land. I used to cultivate. But Aila came and finished us off. We have lost our land. Now our means of earning income are closed. We don't even have a place to live. In the end, we are building our houses like this. Where will we go? There is no other option but to stay here. The tide water rises; so we have raised the foundation. Now this is our house,' said Elias Hossain.

Elias is not alone, there are many other stories of men and women in my notebook, which bear great examples of climate resilience. Like Kalabogi village, the people of Rekhamari village, adjacent to the Sundarbans, also survive by fighting high tides in a way. These people of the hanging village are forced to raise their houses every year as the tide water rises. After Cyclone Aila in 2009, the lives of the people here changed drastically. Their houses were washed away by the waves of Aila that day. No one's house was intact. On the other hand, people are unable to leave the area for livelihood. The higher the water rose in Aila, the higher the houses were built to get lofts. The people of Kalabogi's hanging neighbourhood are living in those houses.

The cyclone, intense heat, drought and salinity caused extensive damage to the crops on the southwestern coast of Bangladesh. Families faced food shortages. Many people then moved to other areas for work. A women's initiative in the region for climate adaptation in agriculture has been successful. They have brought back the cultivation of rice and vegetables by saving local varieties of seeds, using organic fertilizers in the land, conserving fresh water, etc. The land that was uncultivated is now producing green crops.

Being very close to the sea and the embankment is very low, it is difficult to keep the houses safe. The roof is almost attached to the ground around the house, so that it cannot be damaged by storms. Numerous such houses have been seen in the Tabalar Char area south of Kutubdia in Cox's Bazar on the east coast. To escape the effects of cyclones, coastal communities use ropes to strengthen their houses. They use various strategies so that people can survive easily during tidal waves or cyclones.

The coastal communities of Bangladesh take various steps to deal with the climate crisis. That is why they can survive even in such a crisis. But the stories of these adaptations are unknown to everyone. People have real experiences in adaptation. These experiences need to come to the fore. These experiences can be helpful in our climate resilience. ■

Community-Centred Disaster Risk Reduction: Integrating Climate Resilience into Local Planning

समुदाय-केंद्रित आपत्ती जोखीम कमी करणे: स्थानिक नियोजनात हवामान लवचिकता एकत्रित करणे

*By **Shyamji,** Research Scholar in Disaster Management, Jamsetji Tata School of Disaster Studies, Tata Institute of Social Sciences (TISS), Mumbai, Maharashtra, India*

The disasters caused by climate change are on the rise in the South Asian region, worsening the situation of marginalized societies that are highly vulnerable to these disasters, despite contributing the least to emissions. In its sixth report (2022), the IPCC recommends that localised adaptation and mitigation should be integrated as an essential element in achieving effective climate resilience, as global strategies often overlook the realities at regional, local, and community scales. Communities are not merely targets of climate extremes, but also sources of resilience, the adaptive knowledge and practices of which can be successfully applied in context-specific disaster risk reduction strategies.

During my work in the Health and Family Welfare Department in Hamirpur district of Himachal Pradesh, I also witnessed how integrating climate considerations into local health planning increases local resilience. The frequent occurrence of landslides and flash floods disrupted rural healthcare delivery, isolated communities, and stretched resources. The department organised a participatory review of the indicators of vulnerability by aligning the district operations with the Sendai Framework on Disaster Risk Reduction (UNDRR, 2015) and the National Disaster Management Plan (NDMA, 2019), which connected disease surveillance to the changing patterns of rainfall and temperature as a result of climate change. Institutional participation in collecting climate-sensitive information demonstrates how risk governance can be localised by training community health workers and local panchayats (WHO, 2021).

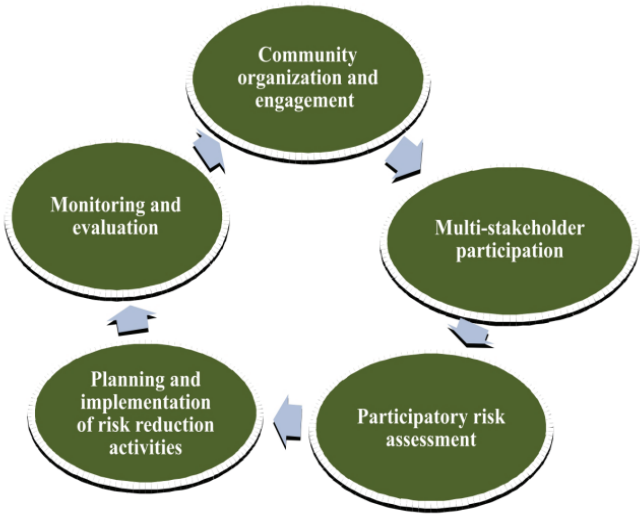

Figure 1: The Process of Community Based Disaster Risk Reduction (Source: Adapted from ADPC, 2008)

On the same note, during my field research at the Airoli node in Navi Mumbai, it was discovered that the locals, particularly women and informal workers, played an active role in designing flood control measures in collaboration with the municipality. Mangrove replantation, drain desilting, and waste segregation were the priority activities in the area aimed at minimising monsoon flooding. Such practices can be considered in line with the NITI Aayog (2023) focus on the concept of community-owned green infrastructure as a part of resilient urban planning. With the introduction of ecological literacy into local governance, communities were able to share in climate adaptation efforts and not rely solely on external help.

Climate resilience requires a change from top-down to co-produced practices to effectively implement climate resilience into local DRR (UNDP, 2022). This can be operationalised by District Disaster Management Authorities (DDMAs) and Urban Local Bodies (ULBs), and through:

- Integrating community climate indicators at the local vulnerability assessment (NDMA, 2020).
- Community-led resilience initiatives allocation of micro-grants (World Bank, 2021),
- Including women and the youth in the disaster planning processes (UN Women, 2022).

Community-based DRR epitomises the notion of the 2030 Agenda of Sustainable Development of leaving no one behind. Financial autonomy, access to information, and institutional space that empower local actors will build up an anticipatory resilience rather than a reactive response. Successful disaster management policies adapt to the local socio-cultural and economic realities, drawing on community insights to refine communication and response strategies. In this light, stakeholders, including government agencies, NGOs, and the private sector, need to invest in developing and implementing inclusive communication strategies.

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YOUTH LEADERSHIP

Youth and Innovation in Climate Resilience: Lessons from Indian Communities

*By **Monu Kumari,** Independent Researcher, India*

In a world that is warming, young people are positioned under a uniquely heightened degree of tension. They encounter the risks of climate change early in their lives and carry the longest load of the effects—socially, mentally, and physically—while their bodies and minds are still in formative developmental stages (Lee et al., 2020). In many areas of rural India, this current pressure is even forcing youth to migrate to cities, often after a disaster disrupted their livelihoods or in search of work (Baez et al., 2017). This generation also has key advantages that are essential elements for climate resilience: curiosity, adaptability, and a willingness to rethink the outdated systems of the past. As highlighted in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, "youth-led ideas and innovation are critical contributors to effective adaptation and long-term climate solutions" (IPCC, 2022). There is no doubt that today's youth can act as agents of change in the path towards resilience.

"With the climate emergency now woven into our daily lives, a future generation of changemakers is emerging-perceptive, outspoken, and unwilling to accept the illusion that the danger is far away."

Climate Voice 1: Transforming Water Conservation Through a Simple Idea- Garvita Gulhati

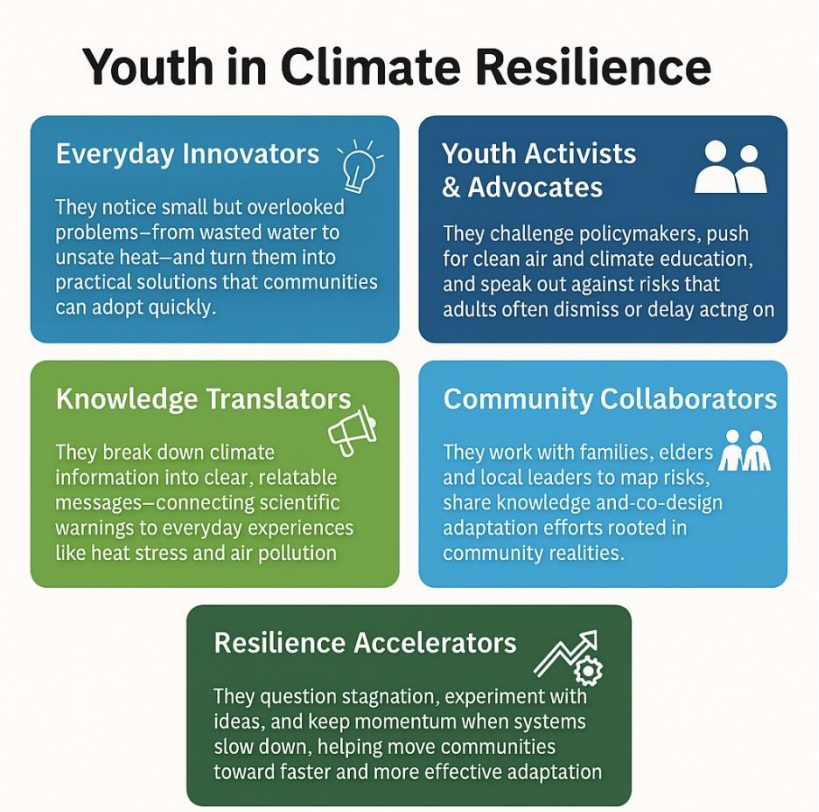
The drought crisis in 2015 left 330 million Indians affected – a number that made the then 15-year-old Garvita Gulhati frantically look for answers (Thakur, 2022). As a teenager, she noticed how much water was wasted in restaurants through untouched half-filled glasses and started Why Waste? to change that pattern (The Logical Indian, 2025). Put together, this initiative shows how youth-led innovation can transform a simple behaviour change into systemic water-resilience action.

Climate Voice 2: Youthful Activism of India's Greta-Licypriya Kangujam

Despite being only nine when she earned a Forbes 30 Under 30 "People to Watch" mention, Licypriya Kangujam has pushed India to confront climate pollution by demanding disaster-risk awareness, clean-air action and

environmental education in every school, driven by what she has witnessed families endure in natural disasters (Dutta, 2025). She combines youthful boldness with a clear aspiration for an overhaul of systems, serving to make clear to young people everywhere: activism is not just speaking up, but working through institutions, mobilising peers, and bringing the future into today's discussion.

Drawing from my experiences with young people from areas affected by disasters, I have seen how quickly they connect climate impacts to what they experience in their homes, schools and communities. Whether it is conducting risk-mapping exercises, supporting their youth-led adaptation projects or helping them transform local concerns into action plans, I have observed a level of clarity and urgency that often exceeds that of the adults. Young participants ask clear-cut questions about disproportionate exposure to impacts, unanswered policy dilemmas and the repetition of specific hazards year after year. They prototype, iterate, and ask for action that is real, not just symbolic. What is most impressive is their instinct to unite: to gather friends, community leaders and elders together to co-create responses that are rooted in place. These experiences further substantiate research that shows when given space, guidance and authority, it becomes necessary to reposition youth to be not just a part of resilience but a necessary part of the acceleration of resilience.



"Yet for many young leaders, awareness doesn't stifle - it motivates. Understanding the task at hand, they are taking action instead of taking a back seat; they are acting on belief rather than acting out of comfort. They know awareness isn't a passing cause, but a fight that will define the world they grow up in."

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WAY AHEAD

From Lessons to Leadership: The Next Step in Climate and Extreme Heat Resilience in Africa and Asia

*By **Mihir R. Bhatt,** AIDMI, India*

A clear message emerges from this special issue: **communities in Asia and Pacific are not waiting.** Across South Asia and Africa, they are building resilience every day—through early warnings in Tajikistan, girls' education in Nepal, agroforestry in Ghana, coastal ingenuity in Bangladesh, climate-safe transport in Kenya, and youth-led innovations across India. Their leadership shows that the centre of climate action has already shifted to the local level, and money and expertise will help achieve results.

AIDMI's own work of mutual aid with **extreme heat resilience for small businesses in Indian cities** reinforces this truth. Small business owners—one of the most climate-exposed groups in urban India—are already adapting through altered work hours, shared water points, and makeshift shade. Through direct support to **small businesses**, AIDMI has helped unleash their coping capacities by using umbrellas, green nets, fans, reflective materials, and heat safety awareness action programmes. The learning is unequivocal: **local action saves lives, protects livelihoods, and strengthens climate resilience long before formal top-down systems intervene.**

> *"Extreme heat, floods, droughts, and storms cross borders — but so can our solutions, if we in Africa and Asia choose collaboration over isolation."*

The way ahead requires systems to match the speed and energy of these communities.

First, climate finance must become simpler, faster, and more accessible to local governments, producer groups, youth networks, and women-led collectives. Micro-grants, community contingency funds, and livelihood-focused climate finance must move from *pilot to policy* that supports mutual aid.

Second, early warning must evolve into **early action**—with last-mile communication, local risk verification, and preparedness budgets that reach schools, health workers, panchayats, and small businesses. Tajikistan's EW4All experience shows that when global frameworks devolve power to communities, resilient results follow.

Third, both urban and rural planning must fully integrate **Heat Action Plans, nature-based solutions, and climate services**. From Ahmedabad to Guwahati, AIDMI's heat assessments show that cities need neighbourhood-level cooling strategies, safe work standards, and finance for micro-enterprises—because heat is now also a major economic risk to the national economy.

Fourth, youth leadership must be recognised as a **core climate resilience asset**. Their clarity, experimentation, and coalition-building—whether in water conservation, green skills, or activism—are shaping more ambitious and inclusive climate action in Africa and Asia.

> *"The next decade of climate resilience will be shaped not by declarations, but by the daily leadership of communities of Asia and Africa."*

Fifth, regional learning must accelerate. Bangladesh's coastal resilience strategies can inspire India's delta regions; Ghana's dryland restoration can strengthen India's arid zones; Kenya's transport transition can inform South Asian just-transition dialogues. **South–South learning is the emerging link in scaling community-led resilience.**

The future of climate and extreme heat resilience will not be built in rooms or public halls alone—it will be built in **farms, markets, workshops, riverbanks, slums, forests, and neighbourhoods**. Our task now is to listen to communities, invest in their leadership, and remove the barriers that slow them down taking actions.

If we do so, the next decade can be one of **shared learning, faster adaptation, stronger cooling solutions, and climate justice for those who face the greatest risks in Asia and Africa.** ■

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