

**A Stakeholder Dialogue**  
**On**  
**Enhancing the Disaster Resilience of Housing: Challenges and Pathways**



**Summary Document**

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## Executive Summary

A Stakeholder Dialogue on *Enhancing the Disaster Resilience of Housing: Challenges and Pathways* was convened by the Coalition for Disaster Resilient Infrastructure (CDRI) at its Secretariat in New Delhi on 19 February 2026, with Kamal Kishore, Special Representative of the United Nations Secretary-General for Disaster Risk Reduction and Head of the United Nations Office for Disaster Risk Reduction (UNDRR). It brought together senior representatives from national and state governments, multilateral organizations, academia, technical institutions, civil society, and international partners (See Annexure).

The dialogue examined the essential building blocks of resilient housing, including codes and standards supported by knowledge systems and technical capacities, which can be enabled by governance arrangements, regulatory and policy frameworks, financing mechanisms, and inclusive, people-centric approaches that recognize housing as a lived space shaped by its occupants. During the dialogue, participants engaged in a roundtable discussion, exploring these dimensions through multiple lenses, such as post-disaster reconstruction, public housing programmes, urban contexts, informal and incremental settlements, and the growing challenge of heat, thereby providing a structured framework for advancing the resilient housing agenda.

The exchange underscored the need for sustained engagement through continued dialogues, thematic exchanges, and communities of practice, with follow-up collaboration to deepen collective efforts. The expertise represented in the room, was acknowledged as a resource that could be mobilized to support countries facing large-scale reconstruction challenges. Finally, the dialogue reflected a shared commitment to translating insights into tangible action and measurable progress in strengthening the disaster resilience of housing.

## **KEY MESSAGES**

### **Rethinking Housing Beyond Structures**

- Housing must not be reduced to buildings alone; it encompasses broader social, economic, and service ecosystems. Resilience in housing should address not just high-impact events but also recurrent, extensive risks.
- Resilient housing must be understood beyond the structural shell, incorporating essential services such as schools, primary health centres, and last-mile access.
- Resilient housing must be data-driven, inclusive, and realistic, with governments relying on updated demographic and housing stock data and building codes that reflect evolving climate risks.

### **Supporting Owner-Driven Housing Effectively**

- People need clarity on how much to invest in resilience, and which measures make a house resilient, with participatory construction serving as an effective demonstration.
- Technical facilitation should be locally embedded, training diploma engineers, masons, and carpenters at the grassroots level to provide doorstep techno-managerial support and ensure accessible guidance for owner-driven housing.
- Large-scale, owner-driven housing without adequate techno-managerial support can become a liability rather than an asset to society.
- Creating social demand for resilient housing presents a significant opportunity, but owner-driven housing requires support to avoid becoming a liability.
- It is important to distinguish between self-built and market-supplied housing, as well as between low-rise and high-rise typologies, since policy incentives often favour high-rise development while much resilience discourse focuses on low-rise contexts.

### **Addressing Tenure and Investment Barriers**

- Secure tenure is a foundational requirement for resilient housing, particularly in rural and informal contexts; without it, household investment and external financing cannot effectively support housing improvement or retrofitting.

### **Building System-Level Support and Policy**

- System-level reform requires parallel engagement with governments to develop housing policies and programs that are both scalable and sustainable.
- Regulatory and policy frameworks must support incremental construction while ensuring safety and resilience.
- Market forces and service ecosystems are critical to resilient housing. Effective implementation relies on trained service providers, robust material supply chains,

and vocational capacity. Linking funding streams with educational and vocational institutions is essential to develop sustainable service markets.

### **Integrating Climate and Heat Resilience**

- Heat resilience can serve as a compelling entry point to advance the broader agenda of resilient housing.
- Heat resilience requires not only making individual housing units resilient but also providing designated refuge spaces for people and livestock during extreme heat events.
- Since much housing growth occurs through incremental additions and household-led rehabilitation, heat resilience must be integrated into both new construction and retrofitting or upgrading efforts.

### **Prioritizing Retrofitting and Seismic Safety**

- Retrofitting existing housing should be a central priority in high-risk seismic regions, where hazards have historically been underestimated.
- While revised building codes require more robust systems, clearer guidance is needed to promote safer building typologies.
- Platforms like the World Housing Encyclopaedia could be expanded into a comprehensive global repository of housing typologies beyond earthquake-specific documentation.

## Segment 1: Opening Remarks and Context Setting

**Amit Prothi, Director General, CDRI**, delivered the welcome address and set the context for the stakeholder dialogue. He expressed appreciation to NDMA and UNDRR for reaching out to CDRI to host the discussion, noting that there was strong institutional alignment and historical significance in convening this dialogue at CDRI's new office. He reflected on India's journey in disaster management, the establishment of international platforms such as CDRI, and the importance of collectively examining where the global agenda on disaster resilience must now head. He emphasized that the session was not intended to be a one-off event, but rather an opportunity to bring together leading experts to initiate a substantive and forward-looking discussion on an issue that is becoming increasingly complex and urgent.

Framing the discussion on resilient housing, he highlighted three intersecting trends: rapid urbanization across Asia and Africa, the intensifying impacts of extreme heat and other hazards such as floods, and a diminishing global focus on climate. He noted that millions are moving into cities at unprecedented scale and pace, often into housing that is increasingly exposed to disaster risks. Referring to CDRI's research, he stated that global infrastructure losses amount to approximately USD 800 billion annually, with nearly half, around USD 400 billion, attributed to buildings and housing, excluding unrecorded losses in the informal sector. He underlined that resilient housing requires urgent attention and acknowledged that CDRI has not yet examined the sector in depth. He indicated that the dialogue should serve as an agenda-setting exercise to guide how CDRI may engage more systematically on resilient housing.

## Segment 2: Stakeholder Dialogue

**Kamal Kishore, Special Representative of the United Nations Secretary-General for Disaster Risk Reduction and Head of the United Nations Office for Disaster Risk Reduction (UNDRR)**, expressed appreciation for the opportunity to engage in an open dialogue and emphasized that the session should be viewed as a collective discussion. Reflecting on 11 years since the adoption of the Sendai Framework, he noted that many countries, including India, have made significant progress in reducing disaster-related mortality, which corresponds to Target A of the Framework. However, he underscored that there has been far less progress in reducing the number of people affected by disasters, as well as economic and infrastructure losses. He observed that while events are often considered successful because mortality figures are low or even zero, the number of people losing their homes frequently remains unchanged or, in some cases, increases. While acknowledging efforts around post-disaster reconstruction and building back better, he clarified that the discussion on resilient housing must extend beyond post-disaster recovery and instead focus on embedding resilience within the housing sector itself.

He further noted that housing was explicitly recognized by United Nations Member States as a critical component under the Sendai Framework, being the only sector with two dedicated indicators under the target on people affected, namely destroyed and

damaged housing. Despite this recognition, he observed that reporting has been limited and progress insufficient. To initiate the discussion, he raised three issues that influence the transition toward resilient housing.

First, he highlighted the **global housing market crisis and political economy of housing**, noting that in many countries housing functions increasingly as an investment asset rather than as shelter, which weakens social demand for resilience.

Second, he emphasized the **decline of housing as an academic and professional discipline**, observing that dedicated housing programmes have diminished over time, narrowing the way housing challenges are studied and addressed.

Third, he pointed to the **gap between standards, regulations, and implementation**, explaining that while national building codes may be robust, they often cater to only certain segments of the housing market, leaving rural and informal settlements outside effective regulatory oversight.

He highlighted the importance of enforcement capacity while citing examples of limited supervisory mechanisms, and suggested the need for new regulatory imagination, including potential self-regulation models and stronger professional engagement. He stressed that without addressing these structural issues, advancing resilient housing would remain difficult.

**Krishna Vatsa, Member & Head of the Department, National Disaster Management Authority (Government of India)** thanked CDRI for convening the dialogue and welcomed the opportunity to deliberate on housing as a central pillar of resilience. He emphasized that housing is one of the most tangible and visible indicators of resilience, representing the core of how communities withstand and recover from disasters. Reflecting on the policy evolution in India, he noted that in the 1970s and 1980s there was limited engagement with post-disaster housing, as private housing was largely considered outside the scope of public intervention. It was only in the 1990s that India began investing in large-scale post-disaster housing recovery, often supported by multilateral institutions such as the World Bank and the Asian Development Bank. However, he observed that recovery has still not been fully mainstreamed within national systems. While large-scale disasters trigger structured housing recovery programmes, medium-scale events often leave households to manage reconstruction on their own. He further pointed out that post-disaster housing assistance was historically treated as part of relief rather than recovery, resulting in minimal financial support, particularly for repair works.

He highlighted several significant policy shifts that have taken place in recent years.

First, **the establishment of a dedicated recovery and reconstruction funding window** has enabled states to implement structured recovery programmes beyond the relief phase, ensuring that housing becomes a defined area of intervention.

Second, he described the **decision to treat “kacha” (semi-permanent) and “pakka” (permanent) houses at par in assistance norms as a major equity-based reform**, ending the earlier disparity where poorer households received substantially lower support.

At the same time, he noted ongoing challenges in determining appropriate assistance levels, particularly where post-disaster housing support is linked to social housing schemes. He argued that post-disaster reconstruction involves debris removal, site improvements, higher technical specifications, and compressed timelines, making it fundamentally different from incremental social housing, and therefore deserving of enhanced financial assistance. He emphasized the need for strong technical facilitation mechanisms to support homeowners, rather than relying solely on financial transfers. He also cautioned against over-reliance on loans, which can burden affected households with long-term debt, and suggested exploring innovative financing approaches. Further, he called for re-examining the dominant owner-driven reconstruction model, suggesting that hybrid or more structured approaches may be necessary in certain contexts. Concluding his remarks, he stressed that housing must move beyond being seen only as a recovery measure and instead be positioned as part of risk mitigation and long-term disaster risk reduction, including large-scale retrofitting in hazard-prone areas.

**Ramraj Narasimhan, Senior Director, Programme Management and Technical Support, CDRI**, thanked Dr. Krishna Vatsa for his reflections, particularly the emphasis on reimagining housing not only as part of recovery but also as an element of mitigation.

He noted that this framing provided a useful bridge into the roundtable discussion. For the same, he emphasized that the backbone of resilient housing lies in **codes and standards, supported by adequate knowledge systems and technical capacities to implement them effectively**. Beyond this backbone, he identified enabling frameworks, including **governance arrangements, regulatory mechanisms, policy environments, and financing structures** that determine how housing is planned, constructed, and reconstructed. He further highlighted the importance of approaches and principles, particularly inclusion and people-centric, owner-driven processes that recognize housing not merely as a finished product, but as a lived space shaped by its occupants. He also stressed key considerations such as the **integration of traditional and indigenous designs, technologies, and practices, including nature-based solutions**, which in many contexts have proven resilient over time.

He noted that these building blocks apply both to the **design of new housing and to the retrofitting of existing and vulnerable housing stock**, given the scale of exposure in current settlements. He suggested that resilient housing can be examined through multiple lenses, including **post-disaster recovery, public or mass housing programmes, urban development, informal settlements, and the increasingly pervasive challenge of heat in a rapidly warming world**.

## Discourse 1: Post Disaster Reconstruction

### Thematic Focus: Cultural Adequacy and Tenure Security

**Pragya Pradhan, Programme Manager, UN Habitat Nepal**, noted that from UN Habitat's perspective, access to adequate housing, land, and basic services forms the core of its institutional strategy, including its forthcoming Strategic Plan for 2026 to 2029. She emphasized that when discussing adequate and resilient housing, it is important to consider its seven dimensions, including tenure security, services, affordability, habitability, accessibility, location, and cultural adequacy. She indicated that she would focus on two aspects that are often less discussed, namely cultural adequacy and tenure security, drawing on Nepal's post-2015 earthquake experience.

Referring to reconstruction efforts following the 2015 earthquake, which damaged nearly one million houses, she explained that while there was pressure to rebuild quickly, particularly in rural and heritage settlements, there was also a parallel imperative to preserve indigenous knowledge and architectural traditions. In response, the Government of Nepal, in collaboration with partners, developed a design catalogue comprising 17 housing typologies, including bamboo, mud, random rubble with GI wire, and timber constructions. These typologies were analytically tested and structurally assessed, even though they were not originally part of the National Building Code. She described this as a breakthrough that demonstrated that indigenous technologies need not be sacrificed for resilience, and that providing diverse, locally appropriate options can enhance resilience, sustainability and cost efficiency. However, she also observed that the preference for concrete construction continues to outpace traditional technologies, indicating the need to address perceptions around safety and modernity.

On tenure security, she underscored that land tenure is foundational to resilient housing. After the 2015 earthquake, access to the government's reconstruction grant of USD 3,000 required proof of land ownership. Given that approximately 1.4 million households in Nepal were landless, many were at risk of exclusion from the housing reconstruction programme. In response, the government introduced policy interventions, including an additional USD 2,000 grant to support land purchase for reconstruction, which benefited around 2,000 households and facilitated both relocation and regularization. She noted that subsequent land policy reforms and the Land Act have led to the identification and verification of over one million landless and near-landless households. She emphasized that the next critical step is the issuance of land certificates and the regularization of informal settlements, as secure tenure is essential for accessing basic services and enabling investment in resilient housing.

### Thematic Focus: Inclusion and Facilitation Gaps in Implementation

**Vivek Rawal, Director, People in Centre Consulting**, reflected on his experience working across both post-disaster housing and social housing, observing that the two areas have increasingly begun to learn from one another. In his view, one of the most persistent gaps in practice is the facilitation process. In many disaster situations, communities lose confidence in their own traditional materials and construction

practices, even when those practices have evolved and sustained them over generations. At the same time, newer construction approaches tend to rely heavily on engineers and technical experts, which can make them difficult to access and afford. This disconnect, coupled with the migration of skilled masons to urban centres, often leads to poor-quality reconstruction in rural areas, where rebuilding is left to less experienced or untrained workers.

He also pointed to the growing communication gap between local building traditions and formal technical systems. Many households and masons do not work with drawings or formal plans, but instead rely on lived knowledge and shared understanding. Engineers and architects, on the other hand, depend on codes, models, and documentation. Bridging these two ways of working remains a challenge. He noted that even if existing building codes were implemented properly, they could substantially improve safety outcomes. The issue, however, is not only about revising standards but about finding practical ways to introduce improvements into vernacular construction systems. In his view, the difficulty lies less in technical complexity and more in ensuring that improvements are conveyed in ways that people can understand, adopt, and afford. Unless this facilitation gap is addressed, poorer and more vulnerable households are likely to remain excluded from resilient housing outcomes.

### **Thematic Focus: Capacity Building and Implementation**

**Hari Kumar, Regional Coordinator (South Asia), GeoHazards International**, reflected on his professional journey across organizations working on shelter and housing, including UNDP and Habitat Technology Group. He noted that housing as a discipline is no longer given sufficient emphasis in formal education, and emphasized the need for engineers who are trained with a specific orientation toward housing. Building on earlier remarks, he underscored that capacity building is perhaps the most scalable and impactful investment that can be made in strengthening housing resilience. While codes and standards are important, he observed that their effectiveness ultimately depends on the individual mason or builder who physically constructs the house. Therefore, strengthening local technical capacity remains central to ensuring that standards translate into practice, and he noted that this has been a consistent focus in many reconstruction programmes.

He further highlighted the importance of aspiration in shaping housing choices. In his experience, people are more likely to invest in resilient housing when it aligns with their aspirations and when the house is perceived as desirable. Appropriate housing technologies, when demonstrated effectively, can generate demand if communities see their value and appeal. He also reflected critically on the concept of owner-driven reconstruction, observing that it can sometimes become “owner-burdened.” For many households, building a home is already a complex and stressful process even under normal circumstances. In post-disaster contexts, where families are simultaneously coping with trauma, livelihood loss, and uncertainty, placing full responsibility for reconstruction on them may not be fair. He emphasized the importance of providing

technical support and facilitation alongside financial assistance, noting that access to trusted technical guidance can make a significant difference in achieving resilient outcomes.

### **Thematic Focus: Codes, Standards, Technology Validation, and Retrofitting**

**C.V.R. Murty, Professor, Department of Civil Engineering, IIT Madras**, noted that India stands at a critical juncture as it has a revised earthquake code while simultaneously confronting broader housing challenges. He emphasized that the central issue is technology. In his view, many construction approaches currently being adopted are treated as “technologies” without adequate research, testing, or validation. He cautioned that proposals entering the housing market without rigorous R&D and technical verification could compromise public safety. He underscored that safety must not rely on untested systems, particularly in a country with significant seismic exposure.

He further pointed to gaps in land use planning in greenfield developments, observing that construction often takes place in low-lying or flood-prone areas, leading to avoidable risk and inefficient expenditure. He also expressed concern about the speed of construction driving the adoption of suboptimal typologies, such as thin precast concrete walls that fail to respond adequately to climatic conditions. He noted that systems such as precast, pre-engineered, and cold-formed construction are entering the market without sufficient due diligence. At the same time, traditional construction systems, which were often more climate-responsive and sustainable, have been abandoned in favour of concrete, sometimes resulting in greater vulnerabilities.

He emphasized that retrofitting existing housing stock must become a central priority, particularly in seismic regions such as the Himalayas, where earthquake risk has long been underestimated. He acknowledged that the revised earthquake code is moving toward permitting only robust systems in high seismic zones and suggested that a clearer and more decisive stance may be necessary to guide the public toward safer typologies. Reflecting on past efforts such as the World Housing Encyclopaedia initiative, he proposed expanding such a platform beyond earthquake-specific documentation to a broader global repository of housing typologies. He suggested that India, with its wide diversity of housing forms, could contribute significantly to such an initiative. In conclusion, he stressed that hazard awareness alone is insufficient unless accompanied by decisive action to improve safety standards and implementation.

### **Thematic Focus: Resettlement, Land Constraints, and Build Back Better Implementation**

**Chinthaka Rathnasiri, Senior Scientist, National Building Research Organisation, Sri Lanka**, outlined the context of recent large-scale landslides in Sri Lanka’s Central Highlands, noting that more than 1,400 landslides had occurred, marking an unprecedented level of devastation in the region. He shared that over 30,000 houses have been inspected, with approximately 15,000 identified for resettlement, affecting nearly 50,000 families. He explained that the Government has introduced an implementation framework for post-disaster housing reconstruction and resettlement,

with a clear objective of promoting disaster-resilient construction under the Build Back Better principle.

He noted that compensation packages have been structured to include allocations for both housing reconstruction and land purchase, with multiple options available to affected families. Technical guidelines have been issued for land selection, housing design, and construction, alongside grievance mechanisms to monitor the reconstruction process. However, he highlighted key challenges, including completing detailed investigations in heavily affected hilly terrain, identifying suitable land for relocation while preserving livelihoods and socio-economic continuity, and deploying adequately trained technical teams at scale. He also pointed to the continued reliance on traditional construction methods and limited access to newer technologies. At the same time, he observed that the disaster has created an opportunity to strengthen long-term land-use regulation in the Central Highlands and has accelerated discussions on establishing a national building code as a national priority.

### **Thematic Focus: Leveraging Narrative and Social Memory to Institutionalize Resilience**

**John Smith-Sreen, Former USAID Senior Foreign Service Officer**, reflected on resilience as part of India's broader institutional journey. Responding to the question of how to mainstream resilience concepts and generate demand, he emphasized that while studies, assessments, data, and analytical tools are essential, storytelling plays an equally powerful role in shaping behavior and embedding ideas within institutions and communities. He noted that stories can influence men, women, boys, and girls, and can help institutionalize resilience within governments and public systems.

He referred to a publication series "*I witnessed*" that documents disaster experiences in India, highlighting a volume on the Gujarat earthquake. He described the story of two girls who survived the earthquake because their grandfather had learned traditional construction techniques following an earlier seismic event. He noted that the narrative illustrates how traditional knowledge, combined with updated technical standards, supported owner-driven reconstruction in their village. He emphasized that such stories can resonate with the public and contribute to embedding resilience thinking more deeply within society and institutions.

### **Thematic Focus: Institutionalizing Owner-Driven Reconstruction and Embedding Resilience through Public Investment**

**V.K. Sharma, Indian Institute of Public Administration (IIPA)**, reflected on his experience working in Sikkim following the earthquake and subsequent reconstruction efforts. He noted that rather than undertaking new research, the state drew upon lessons from earlier reconstruction experiences in Maharashtra and Gujarat, incorporating both good and bad practices into its approach. He emphasized that the owner-driven, in-situ reconstruction model adopted in rural areas proved to be successful and was widely accepted by communities. Through structured training and

awareness initiatives, households were educated on earthquake-resistant features, and technical teams were strengthened to support implementation.

He highlighted that monitoring mechanisms were institutionalized to ensure compliance, and that whenever public funds are provided for housing reconstruction following disasters such as landslides or floods, resilience standards are made mandatory. He observed that over time, this practice has become embedded within the state's systems. Referring to collaboration with CDRI in the health sector, he noted that hospitals reconstructed after the earthquake were designed to be disaster resilient, and that new health facilities in Sikkim are now being constructed in accordance with updated resilience norms. He concluded that sustained public investment tied to resilience standards can gradually shape a broader culture of disaster-resilient construction across states.

## **Discourse 2: Public Housing**

### **Thematic Focus: Tenure Security, Services Integration, and Systems-Level Resilience**

#### **Aromar Revi, Founding Director, Indian Institute for Human Settlements (IIHS)**

emphasized that housing must not be reduced to buildings alone. Housing encompasses far more than structural construction, and resilient housing must be understood as part of a broader social, economic, and service ecosystem. He cautioned against equating disaster risk reduction solely with large, high-impact events such as earthquakes and tsunamis. He highlighted the significance of extensive risk, referring to the everyday and recurrent risks faced particularly by rural populations and those living in informal settlements. Drawing from global risk assessments, he noted that a substantial proportion of losses arise from these recurring, smaller-scale events, and that climate-related risks now constitute a growing share of exposure compared to tectonic hazards.

He identified tenure security as a foundational barrier to resilient housing, particularly in rural and informal contexts. Without secure tenure, neither household investment nor external financing can effectively flow into housing improvement or retrofitting. While acknowledging that tenure reform often lies beyond CDRI's direct mandate due to its political and institutional complexity, he stressed that it remains central to any meaningful housing resilience strategy. Moving beyond structural resilience, he underscored the importance of service access, including water, sanitation, energy, health, education, and digital connectivity, noting that housing cannot be considered resilient if essential services fail. He further emphasized the role of physical accessibility, particularly in informal settlements prone to minor flooding or fires, and highlighted livelihood security, recognizing that many low-income households live and work within the same structure. He stressed the importance of community resilience and the incremental nature of housing development, observing that much of future housing growth in South Asia and sub-Saharan Africa will be self-built and financed incrementally. He emphasized the need for regulatory and policy frameworks that accommodate incremental construction while ensuring safety and resilience.

## **Thematic Focus: Systems Change, Financing, Capacity Building, and Incremental Resilience**

**Ariana Karamallis, Global Advocacy and Development Manager, Build Change**, shared practical perspectives on mainstreaming resilience in housing through what she described as a homeowner-driven systems change approach. She noted that resilient housing must move beyond strengthening individual buildings to strengthening the systems that support homeowners. In response to earlier concerns about the limitations of purely owner-driven models, she explained that their approach seeks to reduce burden on households by addressing barriers across policy, finance, and technology simultaneously. This includes creating pathways for easier access to technical guidance and financial resources while empowering homeowners to make informed decisions and lead improvement processes.

She emphasized that system-level reform requires parallel engagement with governments to design housing policies and programmes that are scalable and sustainable. Citing work in Haiti, she described support provided in collaboration with CDRI for revising the National Building Code to integrate climate-resilient practices and retrofit priorities for hurricane and seismic risks. Drawing from long-term field engagement, this process localized international standards, incorporated vernacular and timber housing practices, and embedded stakeholder consultation. She underscored that updating standards alone is insufficient without local implementation capacity. As an example, she referred to the REZO initiative launched after the 2010 Haiti earthquake, which created a network of construction professionals to strengthen resilience of informal housing. The initiative expanded local enterprises, generated employment, and increased the production of quality construction materials, enabling locally led recovery following the 2021 earthquake.

She further stressed that resilient housing must be data-driven, inclusive, and realistic. Governments require updated data on demographics and housing stock conditions, and building codes must reflect evolving climate risks. However, compliance mechanisms must remain feasible for low-capacity institutions and low-income households. She highlighted the importance of incremental approaches that prioritize risk reduction over immediate full compliance. Referring to Build Change work in collaboration with CDRI, in Dominica, she described how baseline data collection informed tailored retrofit guidance and financing mechanisms, including grants for the most vulnerable and lending products for others. She concluded that combining data, practical tools, financing solutions, and capacity building can make resilience actionable and accessible rather than theoretical.

## **Thematic Focus: Preparedness, Demand Creation, and Grassroots Technical Facilitation**

**P.K. Das, Independent Expert**, emphasized his experience working directly with communities at the grassroots level, describing his role primarily as a facilitator. He underscored his long-standing belief in preparedness rather than reactive approaches, suggesting that resilience must be embedded before disasters occur. Referring to earlier remarks on creating social demand for resilience, he noted that a significant opportunity exists in India's current housing expansion agenda. With 30 million additional houses planned between 2025 and 2029, including both rural and urban housing, he described this as a critical moment. However, he cautioned that large-scale, owner-driven housing without adequate techno-managerial support could become a liability rather than an asset to society.

He stressed the importance of promoting less cement- and steel-intensive construction and encouraged the use of locally available materials, citing the example of bamboo-rich states such as Assam where limited treatment infrastructure constrains practical adoption. He observed that demonstration projects often fail when they are externally driven and instead advocated for demonstration houses built with, and by communities. According to him, people need clarity on two key questions: how much to invest in resilience and what specific measures make a house resilient. Demonstration through participatory construction can help answer both. Concluding, he emphasized that technical facilitation must be locally embedded. Rather than relying solely on professional engineers and architects, he suggested training diploma engineers, masons, and carpenters at the grassroots level to provide techno-managerial support at the doorstep, ensuring that owner-driven housing is supported with accessible technical guidance.

## **Thematic Focus: Regulatory Reform, Risk-Informed Planning, and Financial Due Diligence**

**Jagan Shah, CEO, The Infravision Foundation**, welcomed the inclusion of housing within CDRI's agenda and reflected on earlier efforts to prioritize building regulations, particularly in Small Island Developing States. He emphasized that quality must be central to resilient housing outcomes. While quality is often perceived as an abstract or expertise-heavy concept, he argued that it can and must be institutionalized through enforceable standards and regulations. However, he cautioned that India's current push toward deregulation and self-certification in construction presents a significant challenge. As inspection regimes are reduced and compliance mechanisms simplified, there is a risk that critical safeguards may be diluted. He suggested that this evolving regulatory landscape presents an important area for engagement to ensure that resilience standards are not compromised in the process of reform.

He further highlighted urban planning as a key entry point. Referring to the nationwide rollout of GIS-based master plans under ongoing urban development programmes, he noted that many cities are now preparing spatial plans without systematically embedding resilience or risk assessment layers. He suggested that integrating hazard

and risk data into these master plans would establish a replicable paradigm for risk-informed urban development. He also drew attention to the vulnerability of historic urban cores, where aging building stock, density, and economic centrality intersect, yet policy responses remain limited and often confined to heritage conservation rather than resilience strengthening. He emphasized the need to distinguish between self-built and market-supplied housing, and between low-rise and high-rise typologies, noting that policy incentives currently favor high-rise development while much resilience discourse focuses on low-rise contexts. He identified financial systems as another strategic lever, particularly through strengthening due diligence processes by banks and financial institutions when approving housing loans. Concluding, he pointed to emerging mechanisms such as the Urban Challenge Fund as opportunities to embed resilience criteria within funding frameworks, thereby incentivizing innovation and risk-informed urban development at scale.

### **Thematic Focus: State Capacity, Retrofitting at Scale, and Market Ecosystem Development**

**Angela Lusigi, Resident Representative, UNDP India**, reflected on UNDP's ongoing work in India in partnership with NDMA to strengthen state capacity for implementing disaster risk reduction aspirations. She emphasized that while financing mechanisms may exist, effective implementation requires systemic capacity. One priority area she highlighted is retrofitting at scale, particularly of social infrastructure such as hospitals and schools. She noted that states are increasingly examining how to integrate multi-hazard assessments into actionable retrofitting programmes, but scaling these efforts remains a significant challenge.

She further underscored the importance of market forces and service ecosystems. While building codes and regulatory frameworks may be in place, implementation depends on the availability of trained service providers, materials supply chains, and vocational capacity. She emphasized the need to link funding streams with educational and vocational institutions to create sustainable service markets. She also pointed to the importance of strengthening the connection between risk-informed planning processes and the development or updating of codes. In post-disaster housing recovery, she emphasized the need for participatory approaches grounded in local leadership, including traditional leaders, and highlighted community-level capacity building, including models such as barefoot engineers. She concluded by noting that heat-responsive housing, institutional roles, industry participation, and community engagement must all be integrated to achieve resilient outcomes.

### **Discourse 3: Heat**

#### **Thematic Focus: Livelihood Impacts, Market-Based Financing, and Climate-Responsive Incremental Housing**

**Siraz Hirani, Director - Programmes, Mahila Housing Trust**, emphasized that for residents of informal settlements, heat is emerging as one of the most significant climate stresses. He noted that heat not only affects health but increasingly disrupts

livelihoods. Referring to a survey conducted across four districts in Bihar under the Vika programme, he shared that households reported livelihood losses of approximately 40 percent during peak heat seasons. In response to these findings, he explained that the Government of Bihar integrated heat resilience into livelihood asset support schemes. Where homes also function as livelihood spaces, beneficiaries were permitted to use cash assistance to strengthen their housing, including redesigning or modifying roofs to improve heat resilience.

He further highlighted that most housing in informal settlements continues to be self-constructed incrementally, often without access to formal bank finance. Drawing on experience from Gujarat, he described a partnership model between Mahila Housing Trust and credit cooperative societies that provide housing finance to low-income households. Under this model, applicants seeking loans for construction or repair are offered technical support from engineers and architects who assess sites, recommend climate-responsive design options, and suggest appropriate materials. If households choose to incorporate resilience measures, including heat-responsive solutions such as improved roofing, they receive an interest subsidy of approximately 2 percent as an incentive. He noted that over the loan period, this incentive effectively offsets the additional investment required for climate resilience. He emphasized that this approach is market-driven, does not rely on grants, and intervenes at the moment when households are already making investment decisions, thereby enabling incremental housing improvements to become climate-responsive.

### **Thematic Focus: Leveraging Heat as an Entry Point, Data Platforms, and Institutional Scaling**

**Anshu Sharma, Co-Founder, SEEDS**, suggested that heat resilience could serve as a compelling entry point to advance the broader agenda of resilient housing. He observed that efforts to promote vernacular materials, climate-responsive design, and appropriate construction technologies have often struggled against the dominance of steel and concrete. However, he argued that these traditional and settlement-level approaches are among the most effective responses to the escalating heat crisis. Given that heat is currently receiving heightened policy attention, he suggested that this momentum could be strategically leveraged to mainstream resilient housing within institutional and public discourse.

He emphasized that resilient housing must be understood beyond the structural shell, incorporating essential services such as schools, primary health centres, and last-mile access. Referring to CDRI's previous initiatives, including the Heat Smart Schools community of practice, he highlighted the importance of linking infrastructure resilience with community-level systems. He proposed strengthening the GIRI platform by integrating the housing ecosystem more comprehensively, similar to ongoing work on hospitals and schools. He suggested creating a unified pipeline architecture spanning risk reduction, recovery, and resilience building, potentially incorporating artificial intelligence and consolidating fragmented global data platforms. He also proposed exploring the development of a national digital stack for disaster risk reduction, drawing inspiration from India's digital public infrastructure models such as CoWIN and UPI.

Concluding, he encouraged scaling up initiatives such as UNDRR's masterclasses on resilient recovery, noting that sustained institutional platforms can generate long-term traction and global engagement.

### **Thematic Focus: Codification of Heat Resilience, Urban Heat Impacts, and Market-Based Incentivization**

**Tanmay Tathagath, Director, Environmental Design Solutions**, emphasized that heat resilience should not remain a reactive or knee-jerk response to climate events, but rather be systematically integrated into both post-disaster reconstruction and new housing development. He noted that the impact of heat is immediate and perceptible to residents, whether in rural or urban housing. In his experience across countries including India, Nigeria, Indonesia, and Bangladesh, feedback from occupants consistently highlights thermal discomfort as one of the first concerns in newly constructed housing. He further pointed out that beyond individual houses, the cumulative effect of construction patterns contributes to neighbourhood-level and city-level heat stress, including the urban heat island effect, which is rarely factored into planning decisions at the outset.

He observed that in cases of heat waves, there is limited structured thinking around the provision of dedicated heat shelters, unlike other disaster contexts where temporary shelters are standard. He suggested that alongside making individual housing units heat-resilient, there must also be designated spaces for refuge during extreme heat events, including provisions for both people and livestock. Referring to recent analysis of housing construction trends, he noted that while large formal housing projects attract attention, a significant proportion of housing growth occurs through incremental additions and rehabilitation by households themselves. Therefore, heat resilience must be integrated not only into new projects but also into retrofitting and upgrading efforts. He also highlighted ongoing work on developing thermal comfort standards for housing, noting that while such standards exist, their implementation remains challenging within current rural and urban housing programmes. He suggested that heat resilience may need to be positioned not only as a regulatory requirement but also as an aspirational and market-driven feature, aligning thermal comfort with household aspirations rather than treating it as a minimal compliance add-on.

### **Thematic Focus: Development and Delivery Systems (Market Ecosystem, Supply Chains, Capacity Building)**

**Agence Française de Développement (AFD)** shared their inputs and stated that for heat, green building is key. Based on their experience with NHB on green affordable housing, its development does not rely only on public policy but also a strong handholding of the housing developers, creation of a complete value chain/supply chain of adequate design, adequate material and solutions closely available to the construction sites.

## **Thematic Focus: Thermal Comfort as Core Climate Infrastructure and Localized Implementation**

**Saswati Chetia, Director, Green Technology Solutions Private Limited**, drew on the experience from the Indo-Swiss Building Energy Efficiency Project, which evolved from a focus on energy efficiency to a stronger emphasis on thermal comfort in housing. She noted that as housing programmes such as Pradhan Mantri Awas Yojana expanded, evidence-building became important in understanding how different construction materials influence indoor operative temperatures. She referred to comparative studies conducted in cities such as Delhi and Rajkot to assess thermal performance under different construction typologies.

She emphasized that housing must be recognized as basic climate-resilient infrastructure, particularly in the context of heat waves. She noted that advising people to “stay indoors” during extreme heat is ineffective if indoor environments are hotter than outdoor conditions. She highlighted that significant progress in integrating heat-responsive design has often been driven by proactive municipalities. Drawing on experience from Nepal, she described how municipal-level bylaws were developed to incorporate energy efficiency measures, including small but impactful design interventions such as reflective paints and shading. She also referenced a case where a post-earthquake school required retrofitting due to thermal discomfort that was affecting students’ health. She concluded by emphasizing the importance of localized action, climate mapping at the city level, and the role of narrative communication in translating technical evidence into relatable stories that can influence behavioural change.

## **Discourse 4 Urban**

### **Thematic Focus: Beneficiary-Led Construction, Urban Density, and Vernacular Mainstreaming**

**P.S.N. Rao, Professor, Department of Housing and Dean (Faculty Welfare), School of Planning and Architecture**, reflected on the long academic engagement with housing as a discipline, noting that housing must be understood not merely as a product but as a process embedded within a broader ecosystem. He emphasized that housing extends beyond engineering considerations and requires engagement with social, institutional, and economic dimensions.

He highlighted the accelerating pace of urbanization and the growing pressure to build within cities where land is scarce, leading to increased high-rise construction. He expressed concern over design compromises such as reduced floor-to-ceiling heights and multi-storied slum rehabilitation projects that result in severely overheated living spaces. Referring to the Pradhan Mantri Awas Yojana, he noted that a large proportion of housing under the Beneficiary-Led Construction component is self-built by households, often without professional guidance or awareness of building codes. This raises a significant challenge in bridging the gap between evolving technologies and the

realities of self-constructed housing. He called attention to earlier institutional mechanisms such as building centres and Nirmitti Kendras promoted by HUDCO, suggesting that their revival could help disseminate appropriate technologies at scale. He also emphasized the need to revive and mainstream vernacular construction systems, noting that traditional building knowledge existed long before formal professional systems intervened, and that there is value in systematically adapting and propagating such approaches within contemporary housing programmes.

### **Thematic Focus: Integrating Disaster Risk into Urban Planning, Enforcement, and Policy Reform**

**Tora Saikia, Technical Expert, GIZ**, emphasized the importance of learning from traditional knowledge systems, particularly in Assam's floodplains where communities have historically adapted their housing patterns to recurring floods and livelihood needs. She noted that resilience must address multiple vulnerabilities together, including flood, heat, and earthquake risks, rather than treating hazards in isolation.

She observed that in practice there is often little connection between disaster management frameworks and city master plans. She questioned how this gap can be bridged through better integration of technology, practical examples, and knowledge sharing, and suggested that institutions such as CDRI could support cities in drawing from global experience. Referring to work underway in Guwahati under the GSG project, she described efforts to develop a city-level dashboard to coordinate departments responsible for drainage and stormwater management. She noted that frequent urban flooding is often linked to blocked drainage systems and the absence of integrated drainage master planning, underscoring the need for coordinated action across departments.

She further highlighted enforcement as a critical issue in Indian cities, noting widespread violations of regulations. She suggested that both incentives and penalties could be considered to encourage climate-resilient construction practices among public and private actors. Drawing on her experience working with the Ministry of Housing and Urban Affairs over the past decade, she observed that the National Housing and Habitat Policy formulated in 2007 requires updating to incorporate climate resilience and green economy considerations, including skill development for urban contexts.

### **Thematic Focus: Housing Affordability, Investment Pressures, and Strengthening Institutional Frameworks**

**Alfredo Stefan, First Secretary, Embassy of the Dominican Republic in India**, noted that as a hurricane-exposed Caribbean nation, resilient housing remains a national priority, particularly for vulnerable communities and post-disaster recovery contexts. He highlighted that in coastal and tourism-driven areas of the Dominican Republic, rising housing prices are increasingly linked to properties being acquired as investment assets or secondary homes. This trend has affordability implications and can push lower-income families toward more vulnerable and hazard-prone locations.

He shared that tourism expansion and investment demand are contributing to housing market pressures, even as the government continues to promote access to safer and more adequate housing. He noted ongoing efforts to strengthen institutional planning frameworks, disaster risk reduction mechanisms, and the implementation of building standards, including in rural and hazard-prone areas where challenges persist. He also reaffirmed the Dominican Republic's engagement with CDRI through governance participation and technical cooperation, and expressed interest in exploring ways to further deepen collaboration in line with the themes discussed.

### **Thematic Focus: Backbone (Codes, Standards, Risk-Informed Planning), Enabling Frameworks (Governance and Regulation), Approaches and Principles, and Risk Financing**

**Agence Française de Développement (AFD)** shared their inputs and stated that Risk-informed master plans must become a standardised and institutionalised process, instead of a one-off exercise. Clear guidelines should mandate how disaster and climate data are integrated, how vulnerable housing and populations are identified, and how multi-hazard risks shape land-use decisions. This process should translate into enforceable development control regulations including resilient building codes, retrofitting standards, thermal comfort norms, passive cooling provisions, and no-development zones. Resilience cannot remain advisory; it must shape urban growth decisions from the outset. To declare no-development zones is necessary, but it is a very difficult decision to enforce for local politicians : strong handholding of local bodies on how to explain to their population the necessity of such no development zones is needed : outreach, simple information created from scientific data etc (feedback from our work in Kerala on risk informed master plans)

Resilient housing should not rely solely on engineered interventions. Community knowledge systems and climate-responsive local design offer low-carbon, culturally appropriate and maintainable solutions. Economic value of Nature-Based Solutions in water management and urban greening shows that green approaches can deliver measurable resilience dividends. Similar principles can be tested in housing- piloted, adapted to context, and scaled based on evidence.

As climate and geological hazards intensify, housing and ancillary infrastructure are increasingly exposed. In most disasters, governments ultimately bear the fiscal burden of compensation and reconstruction. To reduce this liability, risk reduction must be complemented by risk transfer mechanisms including parametric and indemnity-based insurance products designed to protect vulnerable households and increase insurance penetration. Mature systems demonstrate that risk-informed zoning, disaster risk adaptation action plans and effective action and insurance frameworks must work together. Insurers and reinsurers will only insure if they see a concrete commitment by a municipality/a developer to mitigate the disaster risk.

## Close of Dialogue

**Ramraj Narasimhan, Senior Director, Programme Management and Technical Support, CDRI**, underscored that the dialogue marked a beginning rather than an endpoint. He noted that the discussion had helped frame the broad contours and emerging priorities of the resilient housing agenda, effectively outlining a foundation for deeper and more sustained engagement. The rich insights shared, he observed, would require further exploration through continued dialogues, thematic webinars, and communities of practice.

He informed participants that follow-up communication would be shared to enable continued collaboration and to invite them to remain engaged in an ongoing platform focused on advancing the themes discussed. He concluded by expressing appreciation to all participants for their thoughtful contributions and active engagement throughout the session. He invited Mr. Kamal Kishore to offer his concluding reflections to formally close the roundtable.

## Closing Remarks

**Kamal Kishore, Special Representative of the United Nations Secretary-General for Disaster Risk Reduction and Head of UNDRR**, thanked participants for their time and for engaging collectively in what he described as a rich and wide-ranging conversation. He emphasized that housing is a clear priority for the United Nations Office for Disaster Risk Reduction and noted that during his tenure, greater attention will be given to advancing the housing agenda. He observed that the forthcoming UNDRR strategic plan identifies four priority areas, all of which intersect directly with housing.

He reflected on several themes raised during the discussion. On risk knowledge, he underscored the importance of integrating risk layers into planning tools such as GIS-based master plans. On financing, he noted the need to structure housing finance and due diligence processes in ways that account for resilience considerations. He also referred to the discussion on building back better, acknowledging that while owner-driven reconstruction has delivered important outcomes, its limitations must now be examined and reforms considered. Emphasizing the importance of local action, he reiterated that resilience ultimately materializes at the local level, echoing the examples shared throughout the session.

He described the dialogue as the beginning of an ongoing process and expressed interest in working closely with participants to carry the conversation forward. He welcomed the idea of strengthening platforms such as the masterclasses and noted that the collective expertise present in the room, from India and internationally, could be mobilized to support other countries facing large-scale reconstruction challenges. Referring to Sri Lanka's housing recovery efforts following landslides, he suggested that lessons from this dialogue could inform and accelerate such programmes. He concluded by encouraging continued engagement through the emerging community of

practice and expressed hope that the ideas discussed would translate into tangible action and measurable progress in advancing resilient housing.

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## ANNEXURE: PARTICIPANTS TO THE DIALOGUE

<b>In-person Participants</b>			
<b>S.No</b>	<b>Name</b>	<b>Organization</b>	<b>Designation</b>
1	Krishna Vatsa	NDMA	Member & HOD
2	Rita Missal	NDMA	Member
3	Sujit Mohanty	UNDRR	Chief, Intergovernmental, Interagency cooperation and Partnerships Branch
4	Marco Toscano-Rivalta	UNDRR	Chief, Regional Office for Asia and the Pacific
5	Angela Lusigi	UNDP India	Resident Representative
6	Sarbjit Singh Sahota	UNICEF	DRR Specialist
7	Alfredo Stefan	Embassy of the Dominican Republic in India	Focal point of the Embassy of the Dominican Republic in India for CDRI
8	Kane Amandus (H.E.)	High Commission Republic of Nauru	High Commissioner of Republic of Nauru to India
9	Laurent le Danois	Delegation of the European Union to India & Bhutan, Cooperation Section	Team Leader
10	Dinakar Radhakrishnan		Development / Economic Advisor
11	Camille Severac	AFD	Deputy Head of Mission, New Delhi
12	Anshula Menon		Sector Portfolio Manager- DRM & Resilience
13	Tora Saikia	GIZ	Technical Expert
14	Anshu Sharma	SEEDS	Co-Founder
15	Tanmay Tathagath	Environmental Design Solutions	Director
16	Hari Kumar	GHI	Regional Coordinator (South Asia)

17	Vishwas Chitale	CEEW	Fellow
18	Saswati Chetia	Greentech Knowledge Solutions	Director
19	Chinmaya Acharya	NRDC	Director Programs
20	Vivek Rawal	People in Centre Consulting	Director
21	Shiren Pandita	TERI	Associate Fellow, Transport & Urban Governance division
22	Jagan Shah	The Infravision Foundation	CEO
23	Sanjeev Hada	Habitat for Humanity	Associate Director, Asia Pacific - Regional Office
24	Vinod Sharma	IIPA	Professor
25	PSN Rao	SPA	Professor, Dept of Housing & Dean (Faculty Welfare)
26	Siraz Hirani	Mahila Housing Trust	Director, Programmes
27	Balaji Singh Chowhan	-	Independent Expert
28	PK Das	-	Independent Expert
29	John Smith-Sreen	-	Retd. USAID Senior Foreign Service Officer
30	Tara Nath Adhikari	Embassy of Nepal	Minister (Economic)

<b>Online Participants</b>			
<b>S.No</b>	<b>Name</b>	<b>Organization</b>	<b>Designation</b>
1	Ariana Karamallis	Build Change	Global Advocacy and Development Manager
2	Aromar Revi	IIHS	Head - Infrastructure and Climate
3	CVR Murty	IIT Madras	Professor, Dept of Civil Engineering
4	Agostino Goretti	Italian Civil Protection Department	Head of the Italian Civil Protection Department
5	Chinthaka Rathnasiri	National Building Research Organisation, Sri Lanka	Senior Scientist

6	Kashif Naseer	NDMA, Maldives	Director Policy and Planning
7	Shubhagato Dasgupta	UN Habitat	Chief, Planning and Finance, Global Solution Division
8	Pragya Pradhan	UN Habitat Nepal	Programme Manager
9	Jaya Dhindhaw	WRI	Executive Program Director, Sustainable Cities and Director, WRI India Ross Center