From Crisis to Community

Adaptive, People-Centered Housing Strategies for Disaster Resilience & Recovery

Introduction

"It came as a large ocean wave of hundreds of windows flexing in and out. I woke at 4:31 am and felt that wave as it rolled down the street until it hit my two-story apartment building. The building was thrown backward, then forward, jolting up and down, taking me with it. The sound of all those flexing windows continued rolling through the building and you could both feel it and hear it rolling down the street, every window being pushed in and pulled out followed by a big jolt over and over again. Then it was over. I was told later the 6.7 magnitude earthquake lasted only 20 seconds at the epicenter in the San Fernando Valley, but the force of that quake rippled outward from there, causing damage across the Los Angeles basin, including where I lived in Culver City. But all of that was still unknown.

In the immediate aftermath, training took over. I was grateful not to be injured. Only very later would I realize my large dresser had ripped away from its earthquake straps, flown across the room, and come within two inches of landing directly on me. There was no electricity and no hot water. In the dark I found jeans, work boots, and my hard hat. My cell phone worked - and it was one of the only phones working as I was on a different provider than the City so the signal was still open. Later, in the Emergency Operations Center (EOC), it became the official phone for reaching outside the area to request mutual aid and coordinate response. But right now, there were neighbors to check on and immediate triage assessment before heading to the EOC to report.

As the Housing division manager, my next stop was to the Armory to determine its post-earthquake safety should we have to open emergency housing and then on to staff the EOC. In the aftermath, the biggest public focus was on the Interstate 10 collapse in Culver City, which was a few blocks from my office. But the freeway falling down was just icing on the cake in a densely populated, older city. In the days and weeks afterward, we worked to stabilize community members, sent our Housing Inspectors to help Building and Safety conduct safety inspections, made hard choices about saving or demolishing historic buildings. We reprogrammed our annual budgets and moved funds to recovery programs, worked with red- and yellow-tagged property owners, insurance providers and FEMA. Our new rehabilitation and emergency programs were built from the ground up and focused not just on repair, but also on seismic retrofit and what it takes to adapt to a seismically active land. We started working towards recovery. Somewhere in there, we found time to tell our families we

were ok and start assessing our own losses and repairing damage at our own homes. And there was grief, loss, and coping.

I learned many lessons from this first, but not my last, disaster response. They are: preparation matters, training staff in response requirements works. I also learned that there isn't enough emphasis placed on having a recovery plan before you need it, everything will take longer than you think, cost more than you expect, and rebuilding won't be automatically equitable or adaptive unless there is a shift in viewpoint and attention." *(First person account, Lisa Baker, NAHRO IRGE member.)*

At the end of 2023, the International Research and Global Exchange (IRGE) Committee completed a white paper published in the Journal of Housing and Community Development (JOHCD). Titled "Embracing Indigenous Wisdom to Build More Resilient and Adapted Communities," it explored different aspects of resilience and adaptation from an indigenous perspective around lessons learned from populations with a long term history of adaptation.(Embracing Indigenous Wisdom to Build More Resilient and Adapted Communities - The National Association of Housing and Redevelopment Officials (NAHRO)) IRGE outlined areas for future research including not only economic resilience and prosperity, but also adaptations in housing and community types as ways to cope with both the immediate impacts of a natural disaster and ways to consider long term housing recovery in a time of increasing uncertainty and new emerging needs.

As housing and community development professionals, we see first hand how crisis delivery unfolds, how immediate impacts are felt, met, where efforts fall short. We are the professionals tasked with community recovery and re-housing once the crisis has ended. We very often have to do this while being a part of the community and often being disaster victims ourselves. In this follow up paper, we look at disaster response, preparation, and recovery from an international perspective, using the lens of adaptation strategies learned in our last paper.

Lessons from Last Whitepaper - Framework for Adaptation

The biggest takeaways we learned were not about housing and infrastructure development. Instead, they were about how to adopt a resilient mindset and a framework that accommodates change and adaptation as a normal part of the work. Successful indigenous populations do this through development of a deep appreciation for the interconnectedness of people with each other and with the entire biosphere. This policy mindset can be summed up as:

- Change starts with intention - change your thinking in order to change your outcome.
- Focus on stewardship rather than on extraction. Create plans that prioritize local natural resources.
- It's about systems - whatever we do to the web of life, we do to ourselves.

(See Appendix for a table showing some of how that plays out in action)

America's Current Emergency and Recovery Framework

"Concern for our own happiness recommends to us the virtue of prudence; concern for that of other people, the virtues of justice and beneficence—of which the one restrains us from hurting, the other prompts us to promote that happiness." Adam Smith, father of capitalism, from his book The Theory of Moral Sentiments, 1759

Before we can dive into international perspectives on response, resilience, and community adaptation, we need to take a moment and frame our perspective by looking at the current U.S. model and framework.

In 1979, America's disaster response system was established with the creation of the Federal Emergency Management Agency (FEMA). Prior to this, disaster relief was a collection of federal, state, and local ad hoc programs fragmented across agencies. FEMA was designed to centralize operations and provide points of coordination for disaster relief. Although the federal government had been involved to some extent in disaster response as early as the beginning of the 19th century, FEMA was a response to both patchwork programs and rising large scale disasters such as hurricanes. **FEMA was designed and operationalized as an independent federal administrative agency working across federal agencies to provide support to state and local governments during a crisis response**. After 9/11, it was restructured to be a unit in the new Department of Homeland Security, which eliminated its autonomy and its direct reporting to Congress. In the wake of increasing size, scope, and timing of disasters, as well as in FEMA's response, there are increasing calls for how America should again restructure its disaster readiness and recovery programs to meet new needs.

How does FEMA and Disaster Response Actually Work?

There is often a sense of mystery around disaster planning, preparedness, recovery and the role of FEMA. Often, in our public mind, we believe that FEMA is directly responsible for responding to crises and the federal government directly deploys disaster relief. Public criticisms often revolve around how long it takes FEMA to arrive, FEMA's assistance, and the time it takes FEMA to effect community recovery.

In reality, **American disaster response is a tiered approach** with the primary focus on response and recovery at the local level. Local governments are designated first responders. When an event is too large to be handled at the local level, local governments can ask the State to provide state level assistance and funding. You might have heard the media refer to a "local disaster declaration" or that the community has asked the State to declare a State emergency. When the State agrees that the scope exceeds the local ability to respond, the State issues a "state disaster declaration." When the State determines that the scope is beyond the resources of the state, it will ask the Administration to declare a national disaster or emergency. Once there is a declared national state of disaster/emergency where local and state capabilities are insufficient and assistance is requested, FEMA is able to step in with federal coordination between agencies, funding and expertise to help local jurisdictions respond. This includes reimbursement funding for mutual aid assistance from surrounding communities. Outside of emergency response, FEMA provides training and guidance, supports exercises, provides planning framework documents, and some funding to assist local emergency planning/response development and management. Most of these resources have to be applied for at the local level to a variety of federal and/or state agencies.

Overview of Life cycle of disaster planning, response, recovery

Source: FEMA, National Disaster Recovery Framework, December 10, 2024

The Local and State View

Every jurisdiction must have emergency and recovery plans to address hazards and support community resilience. Plans are based on FEMA guidelines, but which are designed, created, adopted and implemented at the local and state levels. Plans are developed to manage a variety of local issues. Planning guidance is provided by FEMA through guides, such as the Comprehensive Preparedness Guide (CPG) 101. Plans that local jurisdictions develop and should have on hand for implementation include:

- Comprehensive Emergency Management Plan (CEMP) Also known as an Emergency Operations Plan (EOP)
- Continuity of Operations Plan (COOP)
- Hazard Mitigation and Hazard Specific Plans
- Emergency and Interoperable Communications Plans
- Recovery Plans - including pre-disaster recovery and recovery support strategy for economy, health and social services, infrastructure, housing

FEMA's guidance on local jurisdictional planning emphasizes standardized approaches built on several core principles: **collaboration** with internal/external partners including neighboring communities and community groups; **coordination** with clear command structure and assigned roles for cohesive response; **continuity** to maintain essential local government functions during the crisis to help ensure the community can recover; **community empowerment** to ensure that all members including vulnerable populations are included in planning and recovery.

However, since planning takes place at the local level, availability of expertise, funding, competing priority needs and community attention can vary widely. This means there can be very different on the ground planning, preparation, and implementation outcomes in different jurisdictions. Where climatic and/or environmental conditions may be shifting quickly, local and state planning efforts may not be able to respond to changing conditions as quickly as necessary. This can mean large scale impacts to a community and its recovery when an unplanned event occurs. Even with funding, robust planning and preparation, a large-scale disaster may overwhelm immediate response and the subsequent priority needs to clear debris, contaminated materials, ensure safe access, and restore public order and utilities will all prolong recovery issues and have immediate and long term housing impacts, especially where the issues haven't been previously identified

and planned for. All of these issues highlight the importance of good coordination, good communication, and the need to have many partners, including private entities, NGOs, and housing authorities at the table from the very beginning long before there is a disaster.

This matters because information from the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) shows that the US has averaged about 23 **billion dollar disasters per year** in the period of 2020-2024. In 2024 alone, there were 90 major disaster declarations, which, according to the International Institute for Environment and Development (IIED), was one of the worst years for disaster declarations in the last three decades. Researchers at the London based think tank found that 41% of the US population lives in a county where a major disaster or emergency was declared. As Trump works to cut FEMA, data shows there was a major disaster declaration every four days in 2024 | CNN

The Role of Public Housing Authorities

Public Housing Authorities (PHAs) are not only providers of deeply affordable housing in their respective jurisdictions and communities, depending on state/territory, they are also either local government or quasi-governmental entities administering federal housing assistance programs. In many places, PHAs not only provide federal housing programs and assistance, but also state housing assistance, affordable housing development, community improvement and redevelopment, and may administer other federal and/or state community development and housing grants funds.

PHAs not only have a role to play in disaster and recovery planning from the perspective of their own housing portfolios and their business operations, but also have a wealth of market, housing, community data, experience in community engagement especially with vulnerable populations. In addition, they have practical on the ground experience in working with non-profit and for-profit housing partners, executing eligibility requirements for affected households, estimating housing adequacy, and property management skills for a large range and number of households.

Over the past decade, the federal government, and HUD in particular, has recognized both the need to have PHAs prepared for disasters affecting them and their portfolios, as well as the broader expertise they can bring to the overall emergency management umbrella of local entities charged with pre-disaster planning, disaster response, recovery planning, and recovery implementation. To facilitate PHA preparation and participation, HUD has created a variety of tools and resources for PHAs located on HUD Exchange, and, in 2022, HUD published the "Public Housing Agency Disaster Readiness, Response, and Recovery Guidebook" (Public Housing Agency Disaster Readiness, Response, and Recovery Guidebook) to help guide PHAs through individual PHA disaster planning, readiness, recovery.

In "Examining public housing authorities' roles, responsibilities in state-level disaster planning," (Examining public housing authorities' roles, responsibilities in state-level disaster planning) researchers from the University of Washington found that, as weather continues to become more extreme and the US continues to experience a large shortfall of affordable homes for lower income households, there is a lack of engagement with PHAs on planning and recovery initiatives, with most of that engagement focused solely on post-disaster housing activities. Researchers recommend that PHAs have a greater role in state-level disaster planning to improve future planning and recovery policies.

Where Recovery Planning and Implementation Fall Short

While FEMA provides training, sample plans, guidance and funding for its identified elements - pre-disaster, disaster response, recovery planning, and recovery - real life implementation by local jurisdictions is different. In the University of Washington paper, **researchers reviewed State Emergency Operations Plans (EOPs) from 44 states. Of those plans, only 18 had recovery plans and only five (5) had plans specific to disaster housing**.
Planning, preparation, and implementation have impediments and constraints all along the system. At the local level, there may be a lack of communication by first responder agencies with other partners who they do not see as having a natural role in emergency planning. There is often a lack of financial resources and expertise in planning, grant writing, and reporting. Localities, especially in rural and marginalized areas, can lack accurate risk data for their locale, or have troubles adapting state and federal data sets to their own jurisdiction. Even worse, on the ground issues are outpacing current risk models due to increasing weather volatility and communities are underprepared by compound events, such as fire and high winds and other cascading disaster scenarios.

Adding to this disconnect, program development and planning is not traditionally "survivor centric." Programs are not designed around the client/community/end user. Instead, they are designed around program requirements and bureaucratic processes. Vulnerable populations, especially the low-income, elderly and disabled, face even greater barriers to being eligible for, and accessing, aid. While much progress has been made in unified crisis response through the National Response Framework, the Recovery Planning and Recovery framework and implementation needs a more robust process and a move away from bureaucratic process compliance to more integrated on the ground recovery systems.

In November 2022, the Government Accounting Office (GAO), published a report titled "Disaster Recovery: Actions Needed to Improve the Federal Approach" (Disaster Recovery: Actions Needed to Improve the Federal Approach | U.S. GAO) outlining potential policy reforms to improve the system. Each policy direction has pros and cons and all are designed as types of policy choices. Overall, they offer a framework within which to consider systemic change. It remains to be seen if or how program changes will occur.

In the meantime, disaster planners, PHAs, and their community development counterparts can also work with local partners on a strategic pivot from a bureaucratic process to a client-centered practice. Using community focus and stewardship as the basis for considering planning, response, and recovery allows us to rethink our framework and community response by mitigating the need for disaster response through advance adaptation. We can also center immediate recovery efforts around the community and its residents as opposed to around an operational framework and process.

Case Study - Hurricane Helene and the Western North Carolina Floods

Around September 23rd to 24th 2024, meteorologists began to see a tropical disturbance forming in the Caribbean. This subsequently became Hurricane Helene. As the storm progressed, forecasters started showing heightened risk levels for the southeastern US, including the Carolinas. Surprisingly, on September 25th, heavy rainfall began to hit Western North Carolina before Helene's center arrived. Streams and creeks began rising. Jurisdictions began to issue emergency declarations and warnings.

By September 26, Helene rapidly intensified over the Gulf and made landfall near Florida's Big Bend region as a Category 4 hurricane. Western North Carolina was already under storm warning.

On September 27, Helene's path pushed it inland to Georgia and towards the Appalachians. Western North Carolina rainfall ramped up, becoming even heavier. Rivers and creeks reached bank height in the wake of record rainfall. By late that day, peak flooding began. In some mountainous and upslope areas, the 3-day rainfall totals exceeded 30 inches.

As the rain eased, the catastrophic damage became apparent. Roads, bridges, water systems, power, and communications were badly damaged. Emergency response was challenged by blocked/washed out roads and overwhelmed local services. Death tolls rose. A state of emergency was in effect. Evacuations began in flood-prone areas and those downstream of at-risk dams. For days, especially in Ashville, there was little to no access to water and boil water notices were issued.

By late October, some roads reopened, utilities began to be restored and the longer term damage assessment was underway - according to the State Office of Budget, tens of thousands of homes were damaged, thousands of "infrastructure points" - think roads, bridges, sewage, water treatment - were damaged or destroyed. There have also been long term ecological impacts that include widespread tree loss, landslide damage, increased mountain slope instability. Some communities remain isolated due to infrastructure loss.

Today, recovery continues. Some state parks, roads, and tourist attractions have been reopened. But there have been ongoing calls from the state for more federal funding to cover the full scope of damage. In September 2025, the Governor called for an additional $13.5 billion to help complete recovery, while noting that the estimated total damage is approximately $60 billion. In September 2025, FEMA funds that were approved were subject to a Department of Government Efficiency (DOGE) program known as "Defend the Spend" and, though authorized, had not been received by the State.

In emergency management, there is a concept known as "hot wash" - an immediate assessment of what went well, what didn't and what could be done better. Within that framework, here is one take:

What worked:

- Proactive deployment of state and federal resources.
- North Carolina's Department of Transportation's (NCDOT) accurate flood prediction system helped keep motorists safe.
- FEMA and inter-agency coordination proved robust.
- Critical infrastructure—like power and water—was restored quicker than predicted in some areas given the scale of destruction.

What fell short:

- Flash flood sirens failed in certain areas due to power outages, creating dangerous blind spots.
- Remote communities temporarily lacked warning and support.
- Communication blackouts and road isolation delayed response in the initial hours after the storm.

Key Obstacles to Recovery

1. Infrastructure Devastation & Access Issues

- **Widespread destruction of roads, bridges, and utilities**—including major arteries like interstates I-40 and I-26—has left many communities isolated, complicating access to aid and essential services. This has also hindered efforts to restore electricity, cell service, and water systems.

ews.wfsu.org/all-npr-news/2024-10-09/devastated-roads-and-bridges-hinder-recovery-efforts-in-western-north-carolina?utm_source

    - In extremely rugged terrain, even secondary roads are proving difficult to repair, slowing down efforts to reach remote areas.
    - As a result, unconventional methods, such as mule trains, were initially deployed to deliver supplies—a sign of how isolated some communities were in the storm's aftermath.

2. Delays in Financial Assistance & Funding Gaps
    - **Slow arrival of Federal aid**, leaving state and local governments with steep upfront costs. Governor Stein warned that debris removal alone might cost an additional $1–2 billion—and without extended funding support, that burden falls on state coffers. https://governor.nc.gov/april-25-2025-letter-governor-stein-appealing-fema-decision?utm_source

        - Although $555 million in federal disaster assistance was approved, reimbursement processes were sluggish: FEMA's Public Assistance program covers only 75% of eligible costs, and the remainder strains local budgets.

        - State legislative packages and private loans offered some relief, but only about **37% of currently estimated needs** (around $53 billion in total damage) were being met; approximately $32 billion remained unfunded. AP NewsReddit

3. Insurance Shortfall & Economic Vulnerability
    - **Flood insurance coverage in the affected areas was extremely low—less than 1%**. This left many residents uninsured and financially strained. https://www.politico.com/news/2024/10/02/helene-flood-damage-insurance-00181952?utm_source

    - Economic loss in tourism-dependent regions. Businesses continued to struggle with lost workers, revenue, and limited financial aid, prompting some to consider relocating or closing permanently. https://www.theguardian.com/environment/2024/nov/12/asheville-north-carolina-restaurants-losing-workers-after-hurricane?utm_source

4. Disrupted Social Services

    - The damage to roads, power, and communication networks **hampered child welfare and social service operations**. Home visits, foster care oversight, and inspections in remote counties remained constrained. WUNCNorth Carolina Health NewsCarolina Public Press
    - Although some regulatory requirements were waived and temporary aid provided, service delivery remained patchy without reliable infrastructure. WUNC

5. Environmental & Coordination Challenges
    - Aggressive debris removal from waterways sparked environmental concerns: over-clearing may destabilize streambanks, increase temperature and sedimentation, and harm habitats, as well as increase future flooding and slide risk. Asheville.com
    - Political and regulatory shifts—such as diminishing protections for wetlands following changes in federal policy—further undermine effective flood mitigation and resilience

planning. Asheville.com

6. Mental Health Crisis

- It's estimated that **20–40% of survivors** may experience post-traumatic stress disorder (PTSD), with trauma more likely if stable housing isn't restored promptly. The state allotted $25 million in mental health resources, but experts warned far more would be needed. Crisis to Connection: 6 Months After Hurricane Helene in WNC | Foundation for Health Leadership & Innovation

Longterm Recovery

After a disaster the focus is on immediate health and safety, restoration of services and access. For long term recovery, lack of resilience planning means there is a strong push for a "return to normalcy," which manifests as rebuilding in the same places, often in the same way, as before the disaster. Because recovery is often about "building the plane as we fly it," as opposed to a community led and thought out process, immediate needs, both physical and social, can lead us to rebuild as quickly as possible, and in a way that the availability of funding dictates. When there is a high concentration of lower income residents, renters, or underinsured homeowners, there is a larger chance that those with the fiscal means will rebuild, while those without will either take longer to recover, be forced to move from their community, or experience a greater propensity to become homeless. As disasters become more common, larger scale, and more destructive, communities and residents need to adapt, plan ahead for disaster recovery, and tackle the hard questions about how society will build better resilience for all its members in order to continue to thrive.

Lessons from An International Perspective

The United States is not alone in both needing to plan for, and recover from, small scale to large scale emergencies and disasters. And it is not alone in developing response frameworks for responding to planning and implementation needs.

Types of Planning and Response Systems

In the **US**, there is an "all hazards" approach - regardless of source of origin and as outlined in a jurisdiction's hazard mitigation plan. To work in the disaster response framework, the system uses the Incident Command System (ICS) and Emergency Support Functions (ESF) to coordinate. The majority of the response and recovery work is placed on local and state governments with federal support when local capacity is overwhelmed.

In the **European Union**, the framework is the EU Civil Protection Mechanism and the lead is the European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG-ECHO). In the EU approach, EU member states work together through a voluntary Civil Protection Pool of assets and experts. The Emergency Response Coordination Centre (ERCC) provides real time coordination and monitoring. It focuses on adaptation, resilience, and cross-border cooperation.

For **Japan**, their organizing framework is the Basic Act on Disaster Management (1961, revised). Their lead agency is a Cabinet office with coordination from the Prime Minister. In the Japanese

model, they focus on a two-prong approach of highly centralized planning married to strong community level preparedness. They use Disaster Management Councils across national, prefectural, and municipal jurisdictions. Due to their unique vulnerability to seismic and tsunami conditions, they focus on investments in early warning systems, seismic monitoring, and infrastructure resilience. Japan has an annual day of Disaster Prevention for public education throughout the country.

In **Australia**, they rely on the Australian Disaster Preparedness Framework (2018) and Emergency Management Arrangements. This is under the auspices of Emergency Management Australia (EMA) under the Department of Home Affairs. In Australia, the focus is on "shared responsibility" between the Commonwealth, states/territories, local governments, businesses, and communities. The system puts strong emphasis on resilience and risk mitigation. Australia uses a system similar to the US ICS system known as the Australasian Inter-Service Incident Management System (AIIMS) for cross system communication.

In **India**, disaster planning is done through its Disaster Management Act (2005). The lead entity is the National Disaster Management Authority (NDMA), chaired by the Prime Minister. Similar to the US, it is a multi-tiered system: national, state, district. They have a National Disaster Response Force (NRDF) for any specialized response. In India, disaster planning is integrated with development planning and climate adaptation.

China stands out for the distinctiveness of their system. The legal framework is set in the Emergency Response Law of the People's Republic of China. Their lead entity is the Ministry of Emergency Management (MEM, established only in 2018). Different from other systems, the People's Liberation Army and People's Armed Police often take the lead in disaster response. Cross agency coordination is done at the State Council level, while (as in the US system) local governments are the primary implementers on the ground. China also has a separate National Disaster Reduction Committee that focuses on strategic planning.

Separate from these national systems, there is also a global/multilateral set of frameworks.

- For the United Nations (UN) they include:
    - Sendai Framework for Disaster Risk Reduction (2015-2030), global blueprint for resilience.
    - UN Office for Disaster Risk Reduction (UNDRR), coordination and advocacy.
    - International Search and Rescue Advisory Group (INSARAG), setting standards for urban search and rescue.

- World Health Organization (WHO),
    - International Health Regulations for Pandemics

Each of these systems has developed based on the unique needs, geography, history, and other factors of their respective country/organization. However, in general, many systems share common characteristics across their individual policies and frameworks. These common traits showcase both the strengths of these systems and their shortcomings. In terms of common themes or traits, these all embody some form of the following:

- Taking a risk-based and all hazards approach - focusing on all risks and hazards that are likely to occur in a given geographical approach.
- Multi-tiered or multi-level approach. Even in strong centralized models, there is a large local planning, resilience, mitigation component.

- In many systems, such as Australia, the US and the EU, there is a strong emphasis on the private sector; while all frameworks have strong roles for the local community.
- For many frameworks, especially Japan, EU, India, there is increasing integration of disaster planning with climate change adaptation and sustainable development.
- Very few, if any, systems take a client- or survivor-centered perspective on assistance and recovery.
- Very few focus on embracing an adaptive lens or stewardship model towards enhancing future resilience.

Issues and Mismatches

In the US, the majority of funding for disaster planning, response and recovery goes to the initial disaster response phase. The US is not alone in this. Many national disaster frameworks appear to be stronger on immediate responses such as search and rescue, wildfire response, immediate food relief, and logistics but weaker on recovery, reconstruction and building back more adaptive and resilient communities. There are a variety of reasons that can account for this:

1. **Short term expectations**, political and media pressure - Governments are expected to respond quickly to visible crises and receive positive interactions with residents and media while long term recovery, especially recovery that means changes in land use, zoning, or building standards are slower and more politically fraught. Meanwhile, real human needs for housing, mental health, and economic rebuilding are less visible, affect private infrastructure more than public infrastructure and are harder to sustain politically.

2. **Fragmented Responsibility** - Whether in research studies, GAO reports, or in interviews such as the one IRGE conducted with Mr. Harry Smith, CEO of the Australasian Housing Institute, an often cited issue is the mismatch between central and local response, fragmented responsibility, and the overall patchwork of agencies with some jurisdiction over planning, implementation and recovery.

3. **Funding gaps** - Response funding is often guaranteed through emergency declarations or contingency funds while reconstruction requires long term sustained investment over time and begins competing with other budget priorities or even other subsequent disaster events.

4. **Limited Pre-Disaster Recovery Planning** - Countries like Bangladesh, Fiji, Grenada, India, Indonesia, Nepal, Malawi, Mozambique, and Zimbabwe have all adopted Build Back Better (BBB) policies in the aftermath of climate and/or seismic induced catastrophes. However, few countries integrate recovery planning before disasters - especially in land use, equitable treatment of lower income persons, affordable housing access, insurance, recovery of the land and biosphere. Recovery from catastrophic events is frequently created and implemented during recovery itself. As in the case of the Western North Carolina floods, sometimes that has unintended downstream consequences where short- and long-term recovery actions negatively impact the environment - potentially making the next event even more catastrophic.

    - In the **United States**, one can see this in responses to the California wild fires, Hurricane Maria in Puerto Rico, Hurricane Katrina, major catastrophes where recovery is still in progress years and even decades after the event itself.

- **India**, while the NDMA mandates recovery planning, states who do the planning often focus on relief. There is limited economic, housing, or mental health access unless international aid is available.

- **Australia** has been putting increased attention to recovery through its National Disaster Recovery Principles. However, due to the governmental structure of Australia, responses are state based and the emphasis is on community-led recovery. While empowering at local levels, it still faces challenges in implementation, which was particularly apparent after the Black Summer Bushfires (2019-2020).

- **EU Solidarity Fund** there are funds to provide financial assistance for recovery, but implementation can falter in recovery as it did for Germany's Rhineland and Westphalia floods where the fund provided insufficient coverage for losses, coupled with delayed and fragmented delivery on the ground.

In looking at the disasters mentioned, there are also other points to consider. As disasters continue to get bigger and more complex, the scale of the disaster becomes overwhelming, especially at the local level, where local governments, churches, businesses, volunteers - the ones expected to lead recovery - are also impacted, maybe losing staff, infrastructure, and resources. One element that often gets overlooked is that, especially in a small community, there isn't sufficient capacity to manage recovery while coping with one's own immediate needs and trauma.

In most of the disasters cited above, community voices were not equally heard. Renters, seasonal workers, disabled/elderly residents, rural and indigenous communities often report being excluded from recovery planning. Indeed, in the paper "Embracing Indigenous Wisdom for More Resilient and Adapted Communities," indigenous populations in Australia at one point did not have any formal access to climate change and resilience planning even when it was not connected to disaster recovery. Participation is often dominated by established, well resourced community members, thereby impacting the direction and type of recovery.

Recovery funding is often delayed, insufficient, complex and difficult to manage. Many communities also lack the expertise to submit applications, manage reporting requirements and eligibility rules - this effectively locks smaller, poorer, and often rural and indigenous groups out of funding available for recovery. While there are recovery frameworks, they tend to be weaker and more neglected than pre-planning and disaster response - underfunded, less visible, dependent on a fragmented system that could be better coordinated and having unequal impacts on local populations and their environment. These issues impact psychosocial and economic recovery, availability/affordability and quality of housing. As climate change intensifies, there will be long term impacts for all, but they will be disproportionately worse for the most vulnerable and create increasing community inequalities as these groups are left further behind unless we start to change now.

Blueprint for a Better Way Forward

"Sometimes it takes a natural disaster to reveal a social disaster" - Jim Wallis, from the Washington Post article, Katrina Pushes the Issues of Race and Poverty at Bush, 2005

What Drives Disaster Recovery Inequality

What we've seen through the research is that a natural disaster can both reveal existing social inequality and deepen it in its effects and aftermath. There are many avenues by which this happens:

- Pre-existing inequality
    - Lower income communities with older or poor existing infrastructure, less access to public services, and weaker governance are more susceptible to damage and slower to recover. UNUWider published a working paper on natural disasters and economic inequality based on wildfires from across the globe using satellite data from real-time activities as an evaluation tool. UNU-WIDER : Working Paper : Natural disasters and economic inequality while a study in Mongolia showed that economic inequality expanded after a winter disaster that caused livestock loss - with that inequality persisting even after general recovery Economic inequality expanded after an extreme climate event: a long-term analysis of herders' household data in Mongolia | Sustainability Science

- Disparities in recovery: wealth, race, socio-economic status
    - Research in the US showed that after natural disaster hazard damage, white and more educated households tend to gain or retain wealth in many (but not all) cases, while non-white households and renters have more propensity to lose wealth https://bit.ly/2LCvt7k
    - Studies of Hurricane Harvey showed that lower income neighborhoods had longer delays in recovering normal levels of mobility, commerce, and access to essential services. https://arxiv.org/abs/2211.11100?utm_source

- Spatial/Geographic Inequalities
    - Recovery is uneven across communities and even within a community. There is evidence of this in the case study cited in this paper regarding restoration of services in Ashville, and the access issues in more isolated communities. Another example is Puerto Rico after Hurricane Maria. Those communities with better infrastructure and/or wealthier members recovered more quickly in terms of mobility and utility restoration, while remote and marginalized areas lagged. Regional differences in resilience of social and physical systems: Case study of Puerto Rico after Hurricane Maria - Takahiro Yabe, P Suresh C Rao, Satish V Ukkusuri, 2021

A disaster can change a household's economic or social direction - where some recover or even benefit, others remain partially or wholly unrecovered afterwards. Poorer households have fewer buffers such as property, savings, connections. Since assistance usually doesn't fully compensate for losses or aren't available to persons, such as non-homeowners, losses for more vulnerable groups increase.

- Disasters don't just expose and exacerbate economic inequality, but there are often intersecting issues of disability, age, homeownership status, race, gender. Marginalized groups or those not typically prevalent in governance are often excluded from decision-making. In coverage by the AP in June 2025, Afro-Mexican coastal peoples who were severely impacted by Hurricane Erick received less aid, had poorer infrastructure, and suffered from persistent poverty. Afro-Mexican communities devastated by Hurricane Erick call for emergency aid and The Impacts of Climate Change on the Poor in Disadvantaged Regions | Review of Environmental Economics and Policy: Vol 12, No 1

A Special Note about Insurance

The issue of economic resources and insurance has come up throughout this paper. The ability to access financial resources - including insurance proceeds -is a major driver of ability and opportunity for recovery. This access is often mostly available to households who are better resourced overall. Because poorer and underserved populations either may not own property, or it may not be valuable due to type and location, or it may not be affordable, insurance and/or adequate coverage is very often not available. There have been several attempts to address this inequality in different countries. For example, after the 2010 Haiti Earthquake, insurance providers, including international reinsurers, worked with other organizations to develop microinsurance schemes for low-income homeowners. These policies offered payouts for rebuilding with earthquake-resistant features, such as reinforced concrete walls and flexible steel framing, providing financial relief and helping structures better withstand future seismic events. EXECUTIVE SUMMARY- Post-Disaster Needs Assessment In Haiti | United Nations Development Programme)

After Cyclone Idai, 2019 in Mozambique, insurers partnered with government and other organizations to introduce affordable cyclone specific insurance products to incentivize rebuilding with wind resistant designs helping in recovery while also linking it to long term resilience, Mozambique: Thousands remain vulnerable to recurrent disasters one year on from Cyclone Idai | IFRC

There are other examples, including in the US, where insurers, in partnership with State authorities, linked future fire resilience to enhanced property insurance plans to promote rebuilding with fire resistant materials. Wildfire Response and Readiness

These are great first steps towards building adaptation that prioritizes future resilience. In some cases, such as Mozambique and Haiti, these policies also partnered with non governmental organizations (NGOS) and nonprofits to address affordability and access for poorer resourced households and these can serve as models for future, more equitable recovery strategy components.

However, insurance companies are also under stress from the current accelerated number and size of disasters - whether cyclones, hurricanes, wildfires, or seismic activity. Consider the most recent 2025 Los Angeles fires which caused billions of dollars of damage not just in property

damages, but also to income and economic interruption. This disaster coupled with other recent and destructive events, are placing incredible strain on insurance markets and causing market withdrawal altogether from some markets, most notably in the US in Florida, Colorado, Louisiana, Arkansas, Minnesota, Oklahoma, South Carolina, South Dakota, Washington and California Map Shows 9 States Where Homeowners Are Losing Their Insurance, https://home.treasury.gov/system/files/311/Analyses_of_US_Homeowners_Insurance_Markets_2018-2022_Climate-Related_Risks_and_Other_Factors_0.pdf, Climate Change, Disaster Risk, and Homeowner's Insurance

This is not just a US problem. On September 10, 2025, the newsletter, The Polycrisis, published a piece titled, "Insurance in the Polycrisis: the future is triage on an uninsurable earth." The article leads with this quote, "Flooded homes lose value. Overheated cities become uninhabitable. Entire asset classes are degrading in real time, which translates to loss of value, business interruptions, and market devaluation on a systemic level," Gunther Thallinger of Allianz on LinkedIn. A year before this, they write, the Economist published a cover, "Climate Change is Coming for Your Home." The issue isn't confined to far away places, or remote islands, but it is here now, even in Middle America.

Opportunities to Reset the Table

Recovery policies can also unintentionally reinforce inequality. If we fail to use a survivor-centric perspective and are not mindful of using the stewardship and community economic lenses, then the issues of inadequate building codes, land tenure insecurity, lack of equal access to financing and aid will all deepen the social and recovery divide. Add to that policies that allow rebuilding in the same way or in the same high risk area, or shifting financial assistance to those who are better resourced all drive future inequality higher.

What's Next for Preparedness and Recovery

Resilient Housing is that which can "resist, recover, and adapt to adverse effects of climate change or natural disasters…resilient houses are required to be planned, designed, built, operated, and maintained to reduce vulnerability to indicated threats." Brookings Institution, Foresight Africa, 2023

Adapting and Increasing Resilience

In the paper from One Earth, "From ruins to resilience: How 10 cities rebuilt greener after climate disaster," author Lindsey Jean Schueman writes, "When disaster strikes, it tests the resilience and ingenuity of communities. Around the world, cities battered by climate catastrophes have turned adversity into opportunity, rebuilding smarter, greener, and stronger." The article highlights a variety of resilient strategies - from engineering done by beavers in England to rediscovering traditional indigenous housing types to rebuild faster, while incorporating modifications to enhance earthquake resilience in Indonesia. From ruins to resilience: How 10 cities rebuilt greener after climate disaster | One Earth

In 2023, The World Economic Forum advanced three (3) ways to move forward with climate-resilient solutions for vulnerable communities, focused on using housing as an opportunity to address climate adaptation, resilience, and mitigation to the benefit of vulnerable populations. These ideas built on lessons from UN-Habitat and reach conclusions very similar to those outlined in NAHRO IRGE's paper on Indigenous Wisdom with respect to materials, housing, community and economic prosperity framework principles. 3 ways to advance climate-resilient housing solutions in vulnerable communities | World Economic Forum. They include:

1. **Linking climate change and the global affordable housing shortage** and designing solutions to solve both. This includes a focus, as in the Philippines and Nepal, on using local materials such as bamboo and plaster to create structurally sound and sustainable cement bamboo as a building product. This product is earthquake resistant, creates fewer carbon emissions and provides local jobs.
2. **Prioritizing community preparedness through resilient housing**. The United Nations (UN) projects that growing numbers of climate displaced populations will add to the complexity of the global need for housing. The report cites that the World Bank reports it is four times more cost effective to invest upfront in resilience than in rebuilding after disaster - which has the added cost of disruption to services, livelihoods and community economic prosperity. To make the goal achievable, they highlight work being done in Trinidad and Tobago to build local capacity and raise awareness in order to address risks.
3. **Redirecting the focus and financing to least-developed and emerging economies**. While this section focuses on the impacts to least developed countries who emit the fewest emissions but suffer the greatest impacts, the lesson that our regional, state, and national frameworks consistently focus funding and recovery on areas with the greatest resourcing and infrastructure without an equal look at disadvantaged, poorer, and less built out infrastructure and services is one we should not overlook. We cannot be adapted and resilient in silos - but need to focus on improving ways in which capital, expertise, and access to planning and recovery can be shared by every type of jurisdiction in order to have a strong society, minimize internal displacement, and provide for better economic and social returns.

As these issues intensify and increase, our ability to adapt and recover will be tested in new ways, including supply line disruptions, materials shortages, insurance stressors, internal refugees and housing needs. In 2023, the Journal of Climate Change and Health presented a research paper, Research article Escalating costs of billion-dollar disasters in the US: Climate change necessitates disaster risk reduction, showing that escalating costs of billion-dollar disasters in the US highlights the need for disaster risk reduction and framing the issue in economic impact terms can help heighten awareness and build political will for change. Their work shows that global temperature rise is in correlation to increases in billion dollar disasters "from just three in 1980 to 22 in 2020." If temperatures continue to rise, so too will large scale and costly disasters, especially in areas unequipped to withstand them.

One type of model for Climate Adapted housing - Passive House

Ultimately,housing is about shelter rather than an economic commodity and thriving communities are built on stably housed people regardless of economic price point. Becoming more climate adapted means leaving behind post WWII traditional housing development and focusing on different adaptation and housing models designed to be more resilient and adapted to local climate needs and concerns. There is quite a bit of work being done in this area and some of that has already been covered above. Below is a look at one innovative type and thinking about what kinds of housing models can help communities become more resilient.

This type is not a plan per se, but a set of design and construction principles that, collectively, are called Passive House. Originally developed in Germany and developed and standardized by the German Passive House Institute, it is now in use in several countries. In an interview with Shannon Pendleton of Sanderson Architectural, and Passive House Accelerator LIVE!, we explored the concept of passive house design and the impact it can have on improved adaptation and resilience for residents and for communities. Passive house design can be applied to single family, multi-family, affordable and market rate housing. Other types of passive design can be applied to commercial and industrial spaces. According to Ms. Pendleton, these design principles are being adopted in many other places, such as Germany, Scotland, Ireland, Brussels.

So, what are the principles of passive house design? They are adaptable to different climates and to different environments. Common features include:

- **Superinsulation** to reduce heat in both directions to create stable indoor temperatures with minimal energy inputs.
- Construction designed to **eliminate drafts and uncontrolled air leakage** to prevent heat loss, control moisture, and improve comfort.
- **High Performance windows and doors** -triple glazing with insulated frames are standard. Placement and orientation are done to maximize solar gain in winter and minimize heating in summer. The insulation is designed to reduce “thermal bridging” or heat leakage around edges.
- **Heat Recovery Ventilation (HRV) or Energy Recovery Ventilation (ERV)** so that fresh air is continuously supplied through ventilation. Heat and humidity is transferred out and fresh air in without mixing the two in order to ensure indoor air quality without excess energy use.
- Using design and shading through building orientation, window placement, and shading devices that are **optimized for local conditions** to maximize free heat in winter and prevent overheating in summer.
- **Right sizing** mechanical systems to minimize energy use and needs.

These elements matter in preventing or in weathering a disaster. Good passive house design increases resilience by providing some energy independence during a power grid failure by providing daylit spaces and promoting thermal stability in the indoor spaces. The need for smaller and more efficient systems also means less draw on power grids. Passive house ventilation standards improve indoor air quality in the event of wildfires or outdoor pollutants during an emergency situation. Design standards focus on moisture control and building envelope durability

which helps avoid leaks, and building envelope degradation that can force a family out of their home. When designed for it, passive house design can include vapor control to reduce mold formation or leaks for faster reoccupation. Coupled with proper siting, smart drainage, and landscape planning using native plants and indigenous siting principles can support increased resilience from some flooding. Passive house design anticipates harsher climates with rising extremes and plans in advance for safe and livable homes.

What's Missing and Building a Resilient Framework

"You can't build a house for last year's summer," African Proverb

This saying, "you can't build a house for last year's summer" is an old proverb based on learned agricultural wisdom. What our ancestors and indigenous peoples have long known is that we are part of this planet and its systems. We often forget that our survival depends on the health of the earth and on observing natural rhythms and adapting to their changes. The saying embodies a practical truth - every year brings different weather patterns, different growing conditions, and different risks. Building or planning based on what worked in the past can leave us exposed to what comes next.

While originally meant as an agricultural metaphor, we are reminded that this applies on a global scale as weather becomes increasingly extreme and disasters become larger and more unpredictable - whether in the form of heatwaves, turbocharged fire events, floods, or droughts. We can no longer rely on policies, technologies and infrastructure designed for a more stable climate and on economic policies that exacerbate inequality and create deeper pockets of poverty. Our survival depends on preparing for our future and not relying on our recent past.

Reducing Social Inequalities Exacerbated by Existing Recovery Models

When a disaster happens, everyone feels it, but not everyone is impacted equally or recovers in the same way. Our existing inequalities help shape who is harmed, who waits longer for assistance, and who ends up permanently displaced. Our existing recovery models can often create or reinforce these tendencies, rather than help level the playing field.

Just as traditional planning and zoning practices tend to address issues raised by those who are well resourced, better educated, and have time available to participate in community planning, we often see this same pattern play out in disaster planning and recovery, with the added twist that first responders, such as fire, police, emergency medical services, search and rescue, tend to dominate the design, decision-making, and execution of disaster response and recovery. FEMA tends to support these patterns through its funding and structures. As a result, the focus is often on high visibility threats, immediate protection and response. Most training, resources, and incentive structures are aligned to the disaster event itself rather than before or after. This shows up in how well the response framework is built out, and how relatively weaker and poorly resourced are mitigation and recovery models. The current system lacks strong community engagement, an understanding and implementation of mitigation to prevent disaster in the first

place, and a lack of focus on more vulnerable population needs excepting possibly for immediate evacuation needs.

To reduce these vulnerabilities, communities should be more proactive and engage residents and stakeholders in identifying vulnerabilities. Communities need to be more inclusive and active in hazard identification and mitigation beyond high visibility threats and scenarios by centering community members and social vulnerabilities as opposed to placing the highest focus on logistical infrastructure and first response technical needs.

Underlying Systems

While we have talked about community resilience and planning, the need to be survivor- or resident-centric, to provide equal access to funding, and a look at different types of housing that can help create faster recovery or mitigate displacement and materials usage, we haven't focused on two of the more intractable issues - infrastructure and insurance. Very often, especially in rural or marginalized places, there is a lack of infrastructure, insurance, and services. When disaster strikes, the disparities are magnified, and recovery is hindered. Very often, it seems like these are insurmountable issues.

Infrastructure

There are models for improvement outside of the disaster and recovery model that can be used as a way to think about early mitigation steps prior to disaster. One good international case study is that of **Barrio Mugica in Buenos Aires**, also known as Barrio 31. This is one of the largest and oldest informal settlements in Buenos Aires. And while the term informal settlement might not sound like something we would recognize in the US, we have analogs, such as county islands, colonias, homeless encampments, and backyard housing.

This large informal settlement went through a community improvement process that involved setting standards and rules for its integration into the larger community, followed by processes designed to regularize land tenure which also provided the foundation to extend financial and infrastructure support to connect homes to water, sewer, utility grids. They provided house numbers, residential rehabilitation, relocation where warranted to safer housing, and upgraded public spaces, and connected the community to emergency medical services and schools. To increase sustainability, the Barrio added efficient lighting, rainwater harvesting, bike paths and provided education, training, and small business development. https://www.urbanagendaplatform.org/best-practice/transforming-barrio-mugica-reintegrating-socially-excluded-community

While there have been improvements, it isn't a panacea as issues around density, irregularity of layout, narrow alleys, and informal construction remain. But what it can provide are some lessons for disaster mitigation and enhanced resilience in communities with low infrastructure. Here are a few takeaway lessons:

- **Formal addresses** - in an emergency, uniform addressing matters, making the site readily identifiable to first responders and providing a way to aggregate and plan for mitigation and improvement.
- **Infrastructure and basic services** - proper drainage and landscaping means water can be directed away from structures and into areas where there will be less impact and fewer recovery issues. Functional sanitation reduces risk of water and land contamination. Lighting means easier identification, safer evacuation. Upgrades also focused on recycling, reducing overheating and flooding in order to reduce environmental stress. All of this means less risk of mold, housing damage, fewer lives at risk, and reduced chance of disease. These are cost effective, community-led solutions that make a huge impact in community resilience.
- **Incremental Upgrades** - Barrio Mugica shows that resilience planning and mitigation isn't a binary "do it all now or do nothing" set of choices. What it does show is that a strategy that improves what can be improved, relocates where necessary for safety and doing it continuously over time makes a difference.
- **Community participation** -These improvements happened with direct community participation - residents helped set the priorities and conducted monitoring through community councils. This helped ensure community buy-in that was culturally appropriate and incorporated local knowledge of risk and hazard making it more successful.

Insurance

Stressors are escalating as climate risk, inflation, and market retreats rise. The housing industry suffers from a lack of diverse product type due to being predominantly focused on single family and multi-family housing while often excluding condominiums, co-ops, and other nontraditional models, especially in the affordable housing realm. Look at these together and it is clear the industry is in need of new cross-cutting interventions that include finance, building standards, land-use regulation, and policy. These possible interventions fall into the following general groups: Insurance-specific Opportunities, Housing Market, Policy Reforms. There is no single magic-bullet that will solve these issues; instead, it will take finding combinations that best fit with different types of risk and opportunity.

1. **Insurance-specific Opportunities**
    a. **Risk Pooling.** Already in use is Risk Pooling and Reinsurance. This includes creating/using state or regional insurance pools like California's FAIR Plan or Florida's Citizens to help stabilize availability. The caution here is they aren't used to subsidize inherently risky building locations, but support good planning. These can be backed by national reinsurance programs designed to cover extreme events to lower carrier risk exposure and keep them in the market.
    b. **Resilience Retrofits.** Provide incentives to insurers to offer discounts for resilient construction or rehabilitation that meets local threats such as flood or fire. To enhance availability to lower income households, expand federal support programs for resilience retrofits to keep homes insurable.

c. **Use Mapping**. Make standardized climate risk maps publicly accessible to help educate consumers and stakeholders. Where it isn't already law, mandate disclosure of flood/fire risks at time of sale/transfer.

2. **Housing Market Interventions**
    a. **Zoning.** Update zoning to allow condominium and cooperative models in more places. Minimizing sprawl can improve disaster response times and prevents first responders from defending ever larger areas with the same number of bodies. Defensible space means less damage and faster recovery.
    b. **Streamline.** Streamline approval and financing for lower- to middle-income buyers for nontraditional ownership types.
    c. **Size.** Encourage smaller unit sizes, such as stacked flats, to minimize subsidy while improving access to housing - sufficient affordable housing to help mitigate/prevent homelessness means less environmental degradation, chance of fire or other hazard from unhoused populations.
    d. **Require resilience.** Tie affordable housing finance programs, such as tax credits, HOME and CDBG to resilience upgrades that reduce long term insurance and operating costs.
    e. **Alternate types.** Consider community land trusts and limited-equity models that have affordability components that can be used in risk pooling with other housing types to improve the cost and lower risk.
3. **Policy Reform**
    a. **Avoid high risk.** Discourage development in high risk zones and connect it with upzoning in preferred development areas to expand supply.
    b. **Green infrastructure.** Build out fire breaks, stormwater systems, microgrids, and other green infrastructure to reduce risk and operating costs in order to reduce insurance risk and cost.

Where PHAs fit in

Public housing authorities (PHAs) are often underutilized in disaster and recovery planning. Their participation is often left to recovery in a way that seems uncoordinated and disconnected from overall actions by other government agencies and players. But PHAs are woven into the fabric of their communities and bring talents and opportunities to the table. PHAs manage housing and programs for people who are often the most vulnerable to disaster impacts, including the elderly, disabled, low wage earners. Early planning and intervention can reduce issues around evacuation, displacement, temporary housing needs, and safe shelter.

PHAs themselves have risks to mitigate, including older properties, infrastructure and propensity to be located in geographies exposed to natural and manmade hazards. Including PHAs in hazard and risk assessment means safeguarding housing stock. Through retrofit and mitigation, it means the difference between being able to shelter in place or having displaced populations.

PHAs not only work with vulnerable populations, but are also governmental or quasi-governmental entities. They can plan for housing services provisions, and implement their own

disaster continuity plans, bringing more hands to the table early and ensuring better recovery. PHAs can help identify housing gaps, funding opportunities, contribute to hazard mapping, and ensure housing recovery is part of general community resilience while also helping ensure underrepresented households are part of planning for both the disaster itself and a more rapid and equal community recovery.

Building a Resilient Framework

How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it, except the pleasure of seeing it. Adam Smith, The Theory of Moral Sentiments, 1759

The US is not alone in its need to find new ways to adapt to change. In both the US and internationally, we fall short of addressing needs for better pre-planning and recovery models. We need more government engagement to create change, and we have not re-centered our systems around the very people we wish to serve. The best disaster recovery is prevention and mitigation of its most deleterious effects. A resilient recovery framework centers on preparing in advance, building multi-stakeholder platforms and focusing strategies on different sectors in a multi-dimensional way. Recovery can be changed from a reactionary response to a crisis to a more strategic process that plans in advance to tackle difficult issues of mitigation, land use, housing type, affordability changes needed for equitable community adaptation and resilience.

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APPENDIX

Table Showing lessons learned in adaptation by type and strategy adapted from “Embracing Indigenous Wisdom”, JOHCD 2023

Type	Strategy
Materials	➢ Use **locally available high quality reusable materials** to reduce cost, increase local economy
Materials and Economic Prosperity	➢ **Shorten supply chains** to reduce time costs and to improve resilience and sustainability
Housing	➢ **Adapt housing** types/products to locale & to changing climate ➢ **Focus on passive systems** to reduce costs, enhance resilience and reduce impacts of intensive energy use in cooling and heating
Housing and Economic Prosperity	➢ Create sufficient adapted/affordable housing to **decrease homelessness** for improved economic stability and to maintain habitat
Community	➢ **Pay attention to water**. Protect local sources. Focus on natural storage ➢ Prioritize the natural environment in walking and streetscapes
Community and Economic Prosperity	➢ **Respect the land** and biodiversity to improve resilience and for economic opportunity
Economic Prosperity	➢ Ground community in the land through **multidimensional land use** - including water, built environment, agriculture ➢ Build **synergy between old systems and new** for something better

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