

Embracing Indigenous Wisdom to Build More Resilient and Adapted Communities

By Lisa A Baker and Jim McGrath

“We have lived our lives by the assumption that what was good for us would be good for the world. We have been wrong. We must change our lives so that it will be possible to live by the contrary assumptions, that what is good for the world will be good for us. And that requires that we make the effort to know the world and learn what is good for it.” Wendell Berry (American novelist and poet)

Introduction, Purpose

As housing and community development practitioners in America, we are on the front line when it comes to providing affordable housing and shaping communities for long term sustainability and resilience. We are also tasked with helping our residents recover from extreme conditions - whether it is a deadly pandemic, the outcome of rising income inequality, or the aftermath of hurricanes, brutal wildfires, drought, and other forms of severe weather. These events also lay bare and visible to us our shared history of economic, class, and racial barriers to full participation in society and highlights the patterns of housing, financing, lending, and economic segregation that reinforce them.

In many cases, these extreme conditions and social disparities stem from our historical approach to land use, as well as to the way we relate to the natural world. This way we think about land and how we view our relationship with the world, has often been driven over the past several centuries by outward expansion from Europe.

As in other places, in the United States, this was typified by people moving westward over America, moving onto lands already inhabited by indigenous peoples. It has been further driven by industrialization and by the increasing commodification of goods - including housing - that pushes us into an almost constant cycle of consumption of material goods and using housing as “investment” goods to be used as collateral for more material wealth. This pattern relies on two assumptions - in the case of material

goods, that you can value the resource at its extraction cost without true consideration of its replacement cost, and, for housing, that units will always bring higher values in order to build wealth.

By valuing resources at the extraction cost instead of at its replacement cost, we fail to take into consideration impacts to the environment and to the ecosystem of which we are a part. By focusing on individual wealth building through the commodification of housing, society creates a system of winners and losers - and we become inured to a system that allows many people to experience housing instability as the trade-off.

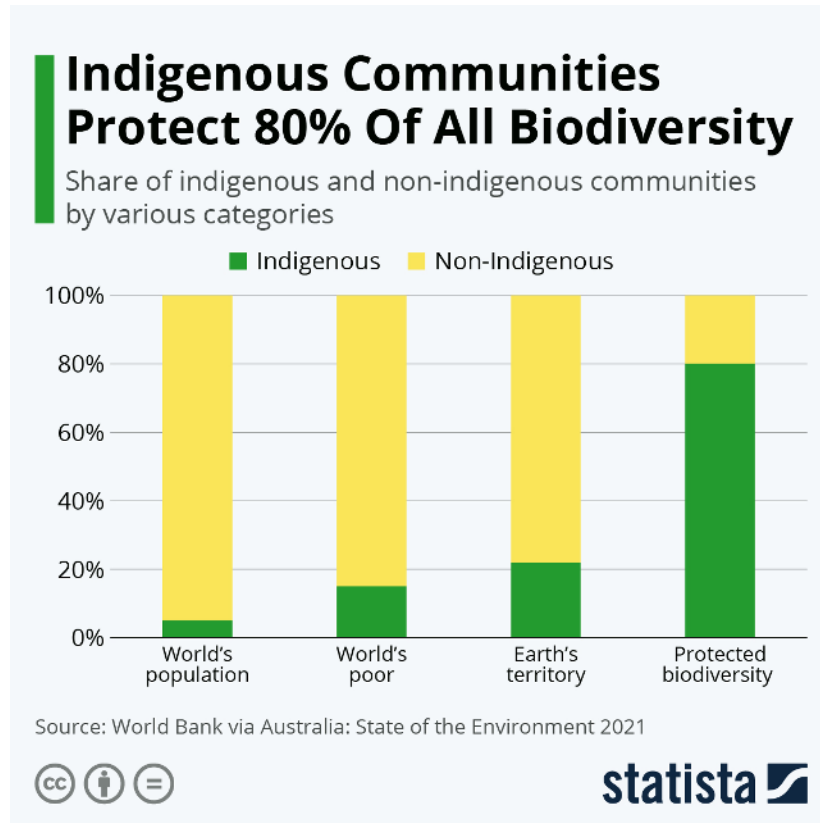
This is not about either political or economic systems, but it is about what we deeply value. In our modern system, there is one constant driver of this valuation system. That driver is its focus on us - on humans. A focus on our desires, our wants, and our interactions with each other, instead of a focus on our place in the world and on the effects of our interactions with the land and other living things.

This desire to keep ourselves at the center of attention is so ingrained in our modern dominant culture that it is automatic to pay attention to human impacts without giving much thought to other impacts, unless they pose an immediate threat of human harm. It is almost impossible for us to center a development conversation without putting humans at the heart of it. In fact, if you look up antonyms to “human-centered,” you will get words like “inhumane,” “uncaring,” “non-civilized,” “merciless,” “alien.” This automatic cultural norm lies at the core of current environmental and climate issues. This, ironically, is having a negative impact on our communities and on our people in terms of unstable housing conditions, a large wealth gap, and increasingly severe and dangerous weather.

And, yet, what if there were different ways of thinking about healthy communities? And what if these ways were still here? Still in use? And what if they could provide us with valuable lessons from a repository of deep human knowledge about different ways to see and shape our world? Through this whitepaper, NAHRO’s International Research and Global Exchange Committee has undertaken an initial exploration of the issues, opportunities and possible new avenues of collaboration toward improving our collective resilience and deepening our ability to adapt to change. This whitepaper offers some thoughts on our opportunity to research, rethink, and relearn so that we may marry the best of what we have created over the last centuries with sound and enduring traditional practices.

Background

According to several sources, including the International Institute for Sustainable Development (IISD), the United Nations (UN), and Australia’s 2021 State of the Environment Report, indigenous peoples occupy 20% of the Earth’s territory and protect 80% of the Earth’s entire remaining biodiversity. They have accomplished this amazing feat despite being only 5% of the world’s population and making up 15% of the world’s extreme poor.



The UN working paper, “Indigenous Peoples and Their Relationship to Land,” puts forward the tenet that “the Aboriginal vision of property was ecological space that creates our consciousness, not an ideological construct or fungible resource...Their vision is of different realms enfolded into a sacred space...[the] notion of self does not end with their flesh, but continues with the reach of their senses into the land.”

For others, attention to the full relationship between land, humans, and living creatures is an embodiment of the concept of “reciprocity” between humans and other members of the environment. For the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) of southeastern Oregon, this concept comes from their creation belief and creates a “moral and practical obligation for humans and biota to care for and sustain one another...[a]rising from human gratitude and reverence for the contributions and sacrifices made by other[s]...to sustain humankind.”

There are several other indigenous American proverbs that talk about this relationship between the people, the land, the plants and animals. In traditional Hawaiian culture, there is “He ali’i ka ‘āina, he kauwā ke kanaka”: “The land is a chief, and man is its servant.”

In practical terms, a disconnect has been created between our systems of management - with the current dominant system being focused on an extractive model of resource use and, for want of a better term, a traditional system focused on managing resources through encouraging/maximizing ecosystem resilience.

To be clear, this is not a simple case of the dominant system using resources and of the traditional system leaving the environment untouched. Instead, the traditional system focuses on managing the ecosystem in a way that maximizes human available resources while shaping it to be more sustainable and resilient over time.

Modern studies of the Amazonian rainforest, such as that published by the Field Museum in 2017, demonstrate that humans shaped today’s rainforests by trees planted and cultivated by indigenous peoples thousands of years prior to the arrival of western colonists; in other words, an ecosystem completely shaped by man over time to provide increased abundance that, today, provides one of the largest areas of land-based biodiversity still in existence. And you can see similar results in looking at the ways in which early Polynesians inhabited islands, shaping them to better support human life, while also providing support for others in the ecosystem.

When we think about our work as housing and community development professionals, what would a system shift from human-centered to eco-centered, from resource extraction to resource management, look like? How would a change in focus on human placement within the ecosystem align with our programs, housing development, and planning processes? How can we best engage in meaningful partnerships to begin this work? In the next pages, we’ll look at how different indigenous peoples have approached these issues and what lessons there are for us.

Effecting Change

All good things begin with a story. For the Palau people of Micronesia, the legend of Uab is a cautionary tale, now adapted to the current age, that tells us about the dangers of unsustainable use of land, freshwater, and oceanic resources. This oral history has been kept alive and told across generations to teach children about the need to manage scarce resources. Over time, the legend has been adapted again and again to remain relevant to its people.

Uab was a boy who grew into a giant, consuming his community's limited resources without considering the impacts on others. Over time, as he got older and larger, his appetite increased until the island he lived on began to sink beneath the waves. The ocean waters infiltrated the wells and lakes, making the water unfit to drink. Uab began to eat even the trees, leaving the ground bare, changing the rain patterns. When rain did come, it now hit the bare ground, washing the land off the island onto the reefs and killing the coral. Becoming more and more fearful for their lives, the villagers ultimately killed Uab in order to save themselves.

Today, the Republic of Palau finds itself hostage to a modern day Uab, one whose appetite for consumption is having impacts all over the world, especially in areas such as the Pacific Island regions, which are facing rising sea levels and loss of habitat, just as in the legend. Heeding the story of Uab has opened up new avenues of adaptation based on traditional knowledge. This allows them to both educate the public and to plan for better resilience.

Using the legend of Uab, Palau has embarked on management plans for protected areas (including its four large reef systems) in order to address illegal fishing, unsustainable harvesting of resources, and impacts from climate change. These plans are all based on traditional values of mutual respect between the land, the sea, and the people. For its built environment, Palau has begun integrating climate change into planning, land use, zoning, and building codes, and also into infrastructure protection, especially for fresh water access in times of prolonged drought. This time, the people of Palau hope that their efforts to protect their freshwater, trees, land, and reefs will have a happier ending than the original legend.

Elsewhere, there have recently been several efforts undertaken by indigenous groups to use the western idea of "personhood" in law to uphold the rights of sacred and ancestral forests, rivers, and mountains. According to Duke Press, as of 2023, these efforts have resulted in the granting of legal personhood to New Zealand's Whanganui, the US's Klamath, Colombia's Amazon, and Canada's Magpie rivers. While enshrining the indigenous concept of the land as a living being, this granting of legal personhood to rivers can also help protect them from mining, damming and other deleterious uses, while ensuring that public conversation and public stewardship is applied to them.

In doing this, indigenous peoples have fashioned a language that bridges both types of systems by creating a way to think of these resources as a relationship between the river and its users, rather than as infrastructure or commodities to be used. It also forms an imaginative framework for a different way to see the world, and rethink our relationships to the things around us within the web of life in which we live.

In researching this paper, the authors found that there are many indigenous peoples holding onto life ways and working to incorporate traditional lessons into today's world. Unfortunately, space constraints will not allow us to mention every community! In the next section, we'll take a high-level overview of history, planning, and opportunity with a few indigenous peoples located on three continents: Australia, Africa, and the Americas.

The Study Areas: Australia, Africa, the Americas

Australia

In the Dreamtime, there was only darkness and bare land. There was no life - no plants, animals, trees, and no humans. Wandjina, the creators, were cloud and rain spirits from the Milky Way who created the ancestors and brought them over the seas and life began. Some of the ancestors were like humans and some were like animals.

This is just one iteration of an Australian origin story. There are approximately 500 different Aboriginal peoples in Australia, each with their own language, stories, and territory. These peoples have inhabited Australia for tens of thousands of years; archaeologists believe that the land was first inhabited at least 50,000 and maybe even 60,000 years ago by the same peoples who make up the Aboriginal population today.

As some of the oldest peoples to still live on or near their traditional lands, they have deep knowledge of the habitat and of adapting and surviving change, including habitat loss and climate change. They have evolved adapted housing and created land and water resource management techniques unique to their environment. Much of this knowledge has been at danger of loss due to displacement and, due to loss of ownership of traditional lands, they cannot always exercise their traditional practices, but much of their knowledge has endured despite circumstances.

As with other indigenous people, the Aboriginal peoples of Australia have an amazing oral history that helps ensure the passing of information on to the next generation. Unique to the peoples of Australia, however, is a complex system of songlines, part of which are star charts that map the land based on a complex system of myth, star/landmark correlation, and physical and cultural waypoints on a journey.

Each songline explains the route followed by a creator-being during the course of the myth. Retelling the route through song, dance, and re-enactment describes the landmarks on the landscape including useful plants, rivers, trees, and watering holes. Within these songlines, geography, mapping, plant and animal life, resources are intermingled with myth, showing not only the path, and where to obtain food, shelter, water, but also showing an interdependence and co-mingling between the people, the land, and nature. Just as in the origin story where the ancestors of us all are both human and animal.

This complex web of information has passed from generation to generation for thousands of years. It forms the basis for deep understanding that remains relevant today. Indeed, the ancient songline navigation systems actually shaped today's Australian highway network system throughout the continent, showing us just how important, relevant, and valuable these indigenous systems continue to be.

According to the NIH's National Library of Medicine, Australia has already seen a 1.4 Celsius (2.52 F) rise in temperature since 1910. This has resulted in reduced rainfall, severe heat waves, and devastating fires in parts of the continent. These changes are having adverse impacts on people, and especially on vulnerable aboriginal peoples. Currently, despite challenges, they are continuing to adapt to circumstances, and to begin to engage with scientists on analysis and adaptation strategies.

Traditional Systems

Prior to colonization, aboriginal peoples in Australia produced their own housing, adapting local materials as building materials. Their architecture was environmentally well-adapted, cooling passively and protecting from rain, and designed for complex social and cultural interactions. In addition, many tribes had specific geographical migration and cultural patterns for environmental/economic reasons, along with sophisticated responsibilities for land and water management.

Aboriginal peoples used a variety of local materials, choosing them based on an array of factors, including local availability, seasonality, performance, durability, expected and prevailing weather conditions. In addition to the use of local materials, people considered siting and orientation to be as important as materials and construction - lessons we are just relearning today.

Australian indigenous peoples used many types of different grasses in construction for shade, cooling, and protection from rain and dust. They used bark extensively as sheeting and roofing with bark varieties varying by region. When bark or other materials were unavailable, they used stone. Depending on the area, they also employed earth as cladding, such as mud, sand, or clay for permanent structures. Throughout the continent, tribes used a sophisticated understanding of available resources to provide housing based on location and availability.

According to one 19th century observer, "These permanent residences being proof against all kinds of weather, from excessive heat in the summer to frost in the winter, suit the constitutions of the aborigines very much better than the wooden cottages used at the Government aboriginal stations." C. 1881.

With colonization, these peoples became dispossessed of their lands and rights. Traditional land use and housing types were replaced by settlements known as "town camps" that formed at the edges of colonial towns that aboriginal people were barred from living in.

Interestingly, early British settlers acknowledged that Aboriginal construction was a valuable skilled technology. The first houses of British settlers were timber frames with bark sheeting, similar to indigenous housing. The settlers recruited Aboriginal peoples as experts to identify, collect, and install.

One researcher says: "Aboriginal groups have lived in the study area for thousands of years and developed effective land and river management strategies. During that time

they experienced climate fluctuations of varying length and intensity but were consistently able to adapt and survive. Their resilience or ability to cope ... was based on the integration of their traditional belief systems and a hunting and gathering culture which incorporated seasonal movement, land ownership, burning of country, trade as well as other cultural practices. Most importantly, people today have inherited kinship relationships based on land which gives them rights and obligations for care and maintenance of all aspects of the natural environment. This knowledge can be revitalized to help people adapt to and cope with the threats of climate change.”

Despite these acknowledgements, most indigenous peoples currently live in government housing which is too rigid for adaptation and whose modern western materials are maladaptive for Australia’s climate. For example, in Alice Springs, Northern Territory, housing is constructed of hollow concrete blocks which are cheap to purchase, but which trap heat. There is no tree shade, and cooling is provided by water intensive swamp coolers. There are no heat pumps or air conditioning and the houses do not cool at night.

Jim Davison of AHURI (Australian Housing and Urban Research Institute) says: “In Australia, issues around adequacy of housing stock for Indigenous households has been an on-going issue especially in remote areas where wear and tear has been significant and the costs of building, repair and maintenance have been high. Substandard housing has been found to be detrimental to health outcomes, so programs have been directed at improving sustainability by improving housing infrastructure but also empowering local Indigenous people.”

Resilience and Adaptation Planning

Aboriginal peoples’ settlements are some of the most vulnerable to climate change impacts and hardships. Even today, most do not have control of their traditional lands and cannot use their deep knowledge to engage in more expansive land use management, “Most significantly for today, access is constrained by rights to land. While the people are restricted in their access to traditional lands and the practice of that knowledge, their capacity to manage against potential climate risks is compromised,” Memmoint et al, *Aboriginal Responses to Climate Change in Arid Zone Australia: Regional understanding and capacity building for adaptation*, University of Queensland, 2013.

When asked about climate-adaptive strategies they invariably include social, cultural, and economic elements such as local ownership, local employment, and local involvement as well as control of design and implementation as traditional and important components of adaptation strategies.

Like other indigenous populations we have looked at, they see human influence on the landscape and weather as inevitable. The difference is that they believe human influence should be seen as active stewardship of the land and water to the benefit of themselves and the plants and animals that coexist with them. Examples of this are evident in their traditional practices of land management and belief systems, such as in their well-

developed burning regime to reduce catastrophic fires and their sophisticated methods of protecting springs so that water production is protected.

Nevertheless, today's indigenous Australians struggle to find access points in the broader, dominant cultural framework. "Finding institutional fit can also be problematic and many Indigenous adaptation initiatives exist separately from other wider policy frames. For example, in South Australia every single local government (74 in total) has a climate adaptation plan, and the State has established an (award winning) adaptation framework. Despite this abundance of adaptation measures, Indigenous groups in South Australia still cannot find entry points to garner financial or other support to implement their own adaptation initiatives. They must "fit" within the existing governance frames, even if their own adaptation planning exists outside it. They are not explicitly catered for or written about in local adaptation plans outside of statements of land acknowledgment and respect," Nursy-Bray and Palmer et al, *Old Ways for New Days: Australian Journal of Justice and Sustainability*, 2019.

Although they struggle to find access within the regular governmental order, these groups have nevertheless articulated adaptation initiatives and climate responses for themselves and for the broader community that demonstrate actions that seek to combine traditional ways with modern needs. Some specific identified strategies from community sessions include:

- Reestablishing fire burning on the traditional system.
- Creating nurseries for native plant restoration.
- Promoting the return of native animals.
- Focusing on native shade trees to provide cooling to structures and streets/sidewalks.
- Providing public water stations to access clean drinking water in the harsh climate.
- Improving water storage for drought conditions. Focus on protecting and managing existing springs.
- Using traditional passive cooling techniques, including using wind as a passive cooling mechanism - especially in terms of door and window placement in homes.
- Focusing on white (cool) roofs, proper orientation to minimize heat gain.
- Emphasizing "other ways of knowing," especially in the context of traditional stories (yarning), art made from traditional materials, and photos.

More importantly than these actions, aboriginal groups have been adamant that, "While identifying impacts is an important dimension ... it is in fact the values underpinning responses ... that drive and will help or hinder adaptation...."

This centering of community values to drive resilience comes from deep and long term knowledge of survival on the land. "Adaptation is framed in cultural/historical terms and [as] part of the history of Indigenous survival over millennia – rather than [as] actions they need to take to address a recent issue (i.e. climate change). In this sense, adaptation is

constructed as the application of 'old ways to new days,' (pers comm, Stuart, A, Leaders workshop 2017)."

Indigenous aboriginal groups in Australia are uniquely situated to help frame and lead the effort for improved climate response and adaptation. As one tribe states in their plan: "Climate change is another grave challenge to our country that is not of our making. However, like all coastal groups around Australia, Gunggandji people have demonstrated the capacity to adapt to climate change over thousands of years. Our ancestors have lived through a 10-metre rise in sea level, great changes in rainfall, the arrival of new plant and animal species and great upheavals caused by volcanic activity as river courses changed and new land forms emerged." (Gunggandji, from "Old Ways for New Days: Australian Indigenous Peoples and Climate Change.)

Africa

Kaang, the Lord of All Life, began to plan the wonders he would put in the world above. First Kaang created a wondrous tree, with branches stretching over the entire country. At the base of the tree he dug a hole that reached all the way down into the world where the people and animals lived. After he had finished, he led the first man up the hole. He sat down on the edge of the hole and soon the first woman came up. Soon all the people were gathered at the foot of the tree. Next, Kaang began helping the animals climb out of the hole.

Kaang gathered all the people and animals. He instructed them to live together peacefully. Then he turned to the people and warned them not to build any fires or a great evil would befall them. As evening approached, the sun sank below the horizon. When the sun disappeared, fear entered the hearts of the people. They could no longer see each other as they lacked the eyes of the animals which were capable of seeing in the dark. They lacked the warm fur of the animals and soon grew cold. In desperation, one man suggested that they build a fire to keep warm. They soon grew warm and were once again able to see each other. However the fire frightened the animals. They fled to the caves and mountains and ever since, people have not been able to communicate with animals. Now fear has replaced the friendship once held between the two groups.

This is one version of the origin story for the San people of Africa, who live primarily in the region where the countries of Botswana, Namibia, and southeastern Angola are situated. There are approximately 3,000 tribes in Africa and Africa is the second-largest continent on the planet. According to Worldometer, Africa's current population is 1.465 billion (rounded), which is almost 18% of total world population and is still fast growing and urbanizing - the population is expected to reach 2.4 billion by 2050 with 80% of growth in its cities. And while the Aboriginal peoples of Australia are the longest settled people, Africa is the birthplace of modern humans, who populated Africa approximately 200,000

years ago, while the earliest fossil of our *genus* recently found in Ethiopia dates to between 2.75 and 2.8 million years ago.

As the cradle of humanity and nicknamed “The Mother Continent,” Africa has seen major climate and geological changes. And some of the oldest continuously inhabited cities in the world are located in Africa, such as Faiyum (c 2181 bce), Tangier (c 800 bce), and Zelia (c 700 bce). Many of its tribal peoples can still be found practicing traditional land use patterns while gleaming modern cities can also be found throughout the countries on the African continent. To quote Stephen Wanjala, Executive Director of Housing and Development Finance Consultants (HDFC Africa) Ltd, “ancient African cities’ longevity reflects adaptive strategies. Historical experiences have ingrained a culture of flexibility and innovation, fostering resilience against various stressors.” Nevertheless, “aging infrastructure and rapid urbanization present challenges. Balancing preservation of heritage with modern needs becomes crucial.” Add to that, more challenging weather that includes drought, cyclones, high heat along with some areas that experience high poverty and/or high instability and the balance becomes even more difficult to achieve.

Traditional Systems

While Africa is rapidly urbanizing, nevertheless there are many indigenous peoples that still hold control of their ancestral lands and traditional practices. These include the San and Hazda people, which are very well studied, but also, according to Stephen Wanjala, Executive Director of HDFC Africa, the Maasai of East Africa, and the Ogiek who live in the Mau and Elgon forests of Kenya. The Maasai are pastoralists, while the Ogiek are farmers and apiculturists who have practiced apiculture (beekeeping) for thousands of years.

In the book, “Harnessing Zimbabwe’s Indigenous Knowledge for a Changing Climate,” 2020, Konrad Adenauer Foundation, author Anna Brazier worked with volunteers known as Community Knowledge Gatherers to compile traditional indigenous knowledge from Zimbabwean communities as a way to think about climate resilience and adaptation. While her work focuses principally on agriculture, there are important community resilience elements germane to this paper - especially about the introduction of foreign land use patterns and their impacts, as well as on using indigenous knowledge systems to understand weather and climate.

As in Australia, colonial era immigration brought European farming practices, including forest clearance, mechanical plowing, and the introduction of monoculture crops (focusing on one crop) instead of interplanted drought tolerant cereal crops. Monoculture crops and mechanical plowing require expensive inputs including hybrid seed, herbicides and pesticides. Some of these practices can cause environmental damage. The author mentions deforestation as one aspect that is particularly harmful as this reduces “soil nutrient and water-holding capacity.”

Fortunately for Zimbabwe, there are rural communities where traditional systems are still in place and land use is still controlled in the traditional manner and some group wild harvesting still takes place. Nevertheless, change can be seen both by scientific measures, as well as by the people, who note that some rivers have dried up and rainfall patterns have changed, with the rains coming later in the year.

Where aboriginal peoples in Australia have deep knowledge about building materials, wind and passive cooling, Zimbabwean weather forecasting has been the subject of academic interest. The system includes observed changes in certain plants and animals, along with observing weather phenomena and movement of the stars, sun, moon. There has been scientific interest and documentation of these practices and some scientific research has confirmed the accuracy of predictions.

Also, as we have seen in Australia, there is a traditional way of working to preserve springs. In Zimbabwe, there are springs, rivers and waterways governed through a complex web of customary protections that also include man made water management systems. All of these are vulnerable, especially when rain is not abundant, to contamination, and to ground compaction by heavy vehicles, plowing, and grazing.

There is opportunity for economic development initiatives that combine modern agriculture with traditional interplanting, drought tolerant crops, and food forests, as well as in thinking in new ways about underground water management and water movement. In an email interview, Executive Director Wanjala stated, “One promising adaptation practice is agroforestry. Combining trees, crops, and sometimes livestock on the same piece of land can enhance biodiversity, increase resilience to climate change, and provide multiple sources of income and food. This method is being successfully implemented in various regions to promote sustainable land use.”

When it comes to housing, Brookings Institute’s report “Foresight Africa 2023,” looks at top African priorities in the coming year. In the chapter, *Africa’s cities*, author Muhammad Mustapha Gambo states that “climate change cannot be solved without delivering climate resilient housing and tackling building emissions, as buildings account for 19 percent of the world’s greenhouse gas (GHG) emissions.”

Africa has a long history of large empires, dense cities, and rural villages throughout the continent in places as diverse as Ethiopia, Egypt, Carthage, Sudan, and others. The indigenous peoples of Africa have seen many climatic changes and adaptations over time. Current threats include changes in rainfall, high heat, and rising seas. Like other places in the world, development has tended to focus on dominant culture trends. However, indigenous systems survive and, unlike in Australia, many indigenous people still have a connection to traditional lands and to traditional systems. This gives Africa the unique opportunity to think about hybridized systems of development.

Resilience and Adaptation Planning

The Brookings report describes resilient housing as 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.” Although the majority of Africa’s growth is projected to take place in cities, African countries are looking at indigenous housing types to help meet demand, while curbing emissions. Africa is fortunate in having ample local materials and a history of climate adapted structures throughout the continent, including beehive houses, cliff villages, stone, and rammed earth structures. According to Jonathan Duwyn of the United Nations Economic Programme (UNEP) Buildings and Construction, Cities unit, “Locally adapted sustainable design, construction, practices and materials coupled with renewables and innovation represent a great opportunity for mitigation and resilience...”

UNEP’s Building Global Status Report, 2022, states that Africa has an abundance of natural sustainable materials, including adobe, laterite (a clay-like material rich in iron and aluminum oxides), termite mound soil, timber, stone, bamboo, sand and dry vegetation. Traditional climate adapted product types include rammed earth, compressed earthen blocks, wattle and daub, cob, timber-framed construction, sandbag construction, and thatch.

Africa is also rich in wind and solar, which is important given that only 43% of the population had access to electricity in 2021, while temperatures have gotten warmer and cooling needs are greater. “And as Africa’s climate warms even more, it is vital that we embrace sustainable building designs that do not need costly and damaging cooling systems,” according to Duwyn.

Hybrid systems that marry traditional materials and structures with modern methods include the development of building bricks from laterite and the development of Durabrick, which is a compressed stabilized block of earth, sand, cement, and water. Hybrid building systems include those like the one at Lycee Schorge Secondary School in the Burkina Faso town of Koudougou, which consists of nine buildings of laterite bricks around a central courtyard. The brick absorbs heat during the day and radiates it at night. Surrounding the buildings is a second facade of local eucalyptus wood that wraps around the classrooms to provide shaded spaces that protect students during the heat of the day. According to the UN, “research shows that these techniques can help prevent the need for air conditioning, the long range transport of materials, and concrete production that all contribute to the emissions driving the climate crisis.”



Photo credit: Livinspaces

It isn't only interior country or urban spaces in Africa that are harnessing traditional practices for hybrid innovation. Currently, a lot of work is being done in the countryside by integrating traditional wisdom with modern technologies through smart village concepts. These involve integrated use of energy-efficient housing, sustainable agriculture, and efficient resource use - achieving synergy by respecting heritage and embracing advancements.

In Mozambique, 60 percent of its 28 million people live in low-lying coastal areas, where sea level rise and storms cause deleterious effects including erosion and flooding (<https://www.urbanet.info/climate-resilient-housing-mozambiques-coastal-cities/>).

Making this issue more perilous, there is a tradition of self production of buildings and infrastructure. In many cases, these buildings can be placed on unsuitable or unstable land and/or be built by people lacking construction skills. To combat these issues, USAID's Coastal City Adaptation Project was initiated with technical backing by the UN Human Settlements Program to develop climate resilient techniques to improve resilience of housing and improved water supplies. Launched in the cities of Pemba and Quelimane, community members participated in a series of community meetings and group discussions to look at concepts, share ideas on housing types and materials. From the insights gained in these forums, the program developed housing models and helped normalize resilient techniques in the community that would meet social and cultural needs, be affordable, and improve resilience. Program work showed that people who wanted to build their own homes could easily adopt simple and low-cost techniques that would withstand weather events. These included items such as:

- Raising the foundation with packed soil, stone, cement.
- Low vulnerability site selection.
- Using durable local materials such as coconut wood, bamboo, or local laca-laca, reinforced with galvanized wire and diagonal poles, finished with mortar plaster.

- Symmetrical roofing with proper slope to withstand heavy winds and prepared to accommodate rainwater harvesting.
- An ancillary benefit is improved economic resilience and new jobs



Photo credit: Climate Resilient Housing in Mozambique's Coastal Cities, Casimiro Antonio, Brian App and Marian Olanda Bata for Urbanet

The Americas

Wakea, the Sky Father, and Papa, the Earth Mother, had a beautiful daughter named Ho'ohökūkalani. Ho'ohökūkalani gave birth to a baby boy. Can you imagine her sadness when the child was stillborn? The kūpuna (elders) whispered, "the child looks like a root." The family wrapped him in kapa cloth, placed him in a basket, and buried him in the 'āina (land).

Ho'ohökūkalani grieved the loss of her son, crying and mourning and watering the grave with her tears. Before long, a plant started growing from the same spot where the baby was buried. This plant with its long stalk and heart-shaped leaf was named Hāloanakalaukapalili for its leaves that fluttered in the wind. It was the first kalo (taro) plant.

Ho'ohökūkalani became pregnant again. This time, a healthy, thriving baby boy was born. He was given the name "Hāloa" in honor of his older brother, the kalo. Hāloa was the first Hawaiian person.

The Americas form two large continents, that, like Africa are very diverse and like both Africa and Australia, are home to a large number of separate indigenous peoples - some

of whom are still living on traditional lands and some of whom do not have access to their traditional lands. In addition, in many places such as Canada, the continental United States, or Hawai'i, many indigenous peoples were subjected to systems of forced acculturation, such as the boarding school system which operated into the 1970's in the United States. The last federally-funded residential school in Canada closed in 1997. The US Indian Welfare Act of 1978 gave Native American parents the legal right to deny their children's placement in off-reservation schools.

Forced relocation, dominant culture acculturation, and the residential boarding school system all had impacts on the traditional transfer of knowledge and understanding to succeeding generations as well as causing traumas that have impacted health and mental health over generations.

Despite these challenges, indigenous people have continued their practices, or are working to reclaim them where possible. There has been a resurgence in culture that began to take off in the late 1970's. As of January 2022, there are 574 federally recognized tribes in the United States. In 2021, National Public Radio (NPR) estimated that there are more than 200 additional tribes that do not have federal recognition and who did not receive pandemic funding. Newly released Census data from June 2023 show that there are 2.7 million US residents who identify as American Indian or Alaska Native alone or in combination with one or more other identities.

Housing and building patterns, especially on reservation and traditional lands can vary widely in type, suitability, and resilience and some have many of the same challenges as aboriginal peoples of Australia with governmental housing in older product types.

Traditional Systems

As in other places, native American dwellings traditionally have been built from locally available material and designed to be climate adapted to the places where people live. This is very different from the dominant system in which we have very similar product types, with variability in technique and materials only as related to specific weather issues.

Depending on where traditional lands are located, traditional housing and building materials varied widely - from the Gowah (Hogan) of the Dine (Navajo) which are created by layering logs horizontally, plastering gaps and using a living earth and grass domed roof, to the Ulax of the Subpiaq in the Alaska area, built partially underground for geothermal heat and protection, and built with a wood and whale bone frame, layered with sod and grass. Or the Chickee of the Seminole, a stilt house built of thatch roofs over a Cypress frame and still built today in Florida by architects. Adobe apartment style homes are a hallmark of Southwestern Pueblo peoples. There are many other types, including plank houses, longhouses, and pit houses. Traditional materials are wood, grasses, bark, rock, rammed earth, adobe brick, brush, hide.

Some housing types were/are built for mobility, all for maximum efficiency. For some people, like the Dine, a family might have a summer home and another home for the balance of the year to accommodate livestock, such as sheep, and agriculture.



Photo credit: Pixabay of Taos Pueblo

Currently, US tribes are grappling with the same types of issues as the dominant culture since tribal housing development now uses the same types of housing forms, and tribes have been chronically underfunded for development. Add to the mix that tribal lands have been held “in trust” by the Bureau of Indian Affairs, thereby making them unable to use standard lending products while, at the same time, being generally in areas that are more challenging to develop. According to the US Interagency Council on Homelessness, overcrowding, substandard housing, and homelessness are common in Native American communities.

Resilience and Adaptation Planning

“Tribal People have learned to take care of the land because our land took care of us,” said Kat Brigham, Chair of the Board of Trustees for the Confederated Tribes of the Umatilla Indian Reservation at a Wilson Center event. “It’s important for tribal people to be at the table. We have a lot of knowledge, we have a lot of experience on how to protect and restore natural resources...”

As stated earlier in this paper, 80% of Earth’s remaining biodiversity is on indigenous lands where they live. A running theme throughout this paper which holds true for the Americas as well is that a large part of indigenous identity is bound up with, and linked to, the natural world. Chief Seattle said, “Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect.”

Despite the diversity of geography, political systems, housing, and economic enterprises, a common thread is that understanding and change start not with things, but with intention, echoing a similar ethos as that expressed by Aboriginal people in Australia. Similarly, the idea of our interconnectedness to , and not just living “on top” of, the land.

A good example of this in action is the Saint Regis Mohawk tribe’s solution for climate adaptation in the face of pollution and degradation of the Saint Lawrence River. As reported by Grist, the tribe wanted to base their plan on a thanksgiving prayer, the *Ohen:ton Karihwaterkwew*, or “what we say before we do anything important.” “We say it every day,” said Amberdawn Lafrance, the tribe’s environmental coordinator. According to the article, the saying is so integral to the Mohawk way of life that it forms the basis for community planning in other areas as well. They prioritized change based on natural resources for which they were grateful. Echoing the Palau story of *Uab*, they worked “backward” and “took work that we’re already doing and we assigned it under each of the categories,” said Ms. Lafrance, including water, fish, and trees in order to create their adaptation plan.

Another example is the Swinomish Indian Tribal Community of the Pacific Northwest, which is reviving traditional shellfish farming in “clam gardens” as a climate adaptation strategy to manage both habitat and resource conservation through an aquaculture practice that uses a diverse set of practices to preserve shoreline and improve habitat. These include clearing rocks from sand flats, aerating sediment, installing low-lying rock walls parallel to the shoreline. Over time, sediment and shell pieces accumulate on the landward side of the wall, forming a sort of terrace that reduces beach slope, protects the beach, while also increasing beneficial clam habitat, according to Courtney Breiner, et al “Clam Gardens: An Indigenous Community-Driven Climate Adaptation Strategy to

Manage Aquatic Species and Habitats in the Pacific Northwest,” Northwest Climate Adaptation Science Center, 2021.

Despite obstacles, the federal government in the United States has continued to move forward with several initiatives and joint ventures in the areas of waterway restoration, wildfire management, and using traditional knowledge in advancing understanding of climate change and in the development of comprehensive adaptation strategies. There are currently partnerships with the US Department of Agriculture, 11 agreements with the US Forest Service for co-management and stewardship of national forests and grasslands, as well as the development of Dibajinjigaadeg Anishinaabe Ezhitwaad, or The Climate Response Framework and the US Resilience Toolkit for tribal nations.

One of the most fundamental ways in which some tribes are working towards increased resilience and adaptation is through the Land Back movement. This is being undertaken in different ways in different places. The Yocha DeHe Wintun nation was interned away from its traditional lands in 1907. In 1980, they were granted back a portion of their ancestral lands in Yolo County at the same time as new federal legislation allowed gambling on Native American tribal lands. Building on their agricultural knowledge, developing their governance, and gaining independence due to gaming revenue, they began to purchase back additional traditional lands for farming and stewardship.

The Wiyot tribe in Eureka have taken a different path to land restoration through the creation of a community land trust controlled by the tribe. The land trust worked with the City of Eureka from 2000 to 2019 for the return of Tuluwat Island. The last 270 acres were returned to the tribe in 2019. The land trust has since formalized and its first new project, announced in March 2023, is the rehabilitation of two Victorian homes into youth housing along with a facility providing wraparound services in the City of Eureka, which is also the center of the tribe’s ancestral homeland.

Major Lessons Learned, Avenues for Future Research

Lessons Learned

Throughout this whitepaper, we have focused on different aspects of resilience and adaptation as they are unfolding on three different continents. In some places, as in Australia, the focus is on planning and on finding ways to incorporate deep indigenous knowledge into existing dominant culture thinking and planning while finding ways to

enfranchise populations that might no longer have traditional stewardship rights and responsibilities.

In Africa, there is a tension between city and rural adaptation, but there is still a strong presence of indigenous people on their ancestral lands and keeping their body of knowledge intact. Many of the most innovative programs come from thinking about adaptation of materials - using local materials to shorten supply chains, create economic opportunity, and using indigenous building forms in new ways that help to minimize climate impacts or that help homeowners develop more resilient housing.

In the Americas, there is a combination of those who are dispossessed and those still holding onto tribal lands. However, the legacies of forced acculturation have made impacts on tribes and affected their knowledge base in different ways. Tribal governments have many of the same issues of overcrowding, homelessness, availability and affordability as dominant culture communities, but with added layers of complexity. Through it all, tribes have worked to regain stewardship of ancestral lands through the Land Back movement, or through strategic partnerships with others, including the federal government, that has resulted in improved public lands stewardship.

In all cases, indigenous people are more likely to be some of the first who have to become more resilient and adapt and are likely to already be thinking about, and starting, that adaptation. Common takeaways from this survey that can drive improved resilience and adaptation for us all include:

General Thoughts on Process:

- It's about more than land acknowledgements - Give value and an equal seat at the table to indigenous peoples, realizing the value - social, adaptive, economic - of their unique body of knowledge.
- Change our thinking to change our outcome - this includes the aboriginal idea that the values underpinning responses are what drive and will help or hinder adaptation.
- Focus on stewardship, not on management or control, putting the land and its biodiversity at the center.
- Create plans that prioritize local natural resources that are prized.
- Involve community members in providing input, local knowledge, and finding ways to be proactive in their community.
- It's about systems: remember that whatever we do to the web of life, we ultimately do to ourselves.

Building Sustainable Economic Prosperity:

- Find prosperity through multidimensional land use - agriculture, land use, water management.
- Rethink the relationship of agriculture to the land. Plant food crops that are naturally sustainable. Use interplantings to increase biodiversity, which improves long term viability without expensive and deleterious inputs.
- Shorten supply chains, focus on locally available materials for both sustainability and as an economic driver.
- Build synergy between old and new systems to create something better.
- Respect both the land and its biodiversity to increase abundance for us all.
- Adapt housing types and models to local conditions and changing climate.
- Provide adequate adapted and affordable housing to decrease homelessness, reduce the incidence of climate refugees, and to create economic stability.

Materials and Housing:

- Find ways to incorporate traditional climate adapted housing forms to local communities using modern methods.
- Use passive systems to cool and heat homes and reduce the need for air conditioning, heating, and power. This includes using wind as well as orientation, but also shading and rainwater systems.
- Adapt locally available traditional, high quality building materials to reduce travel miles, increase availability, and provide economic opportunity wherever possible.
- Materials should be renewable or reusable, whether it is stone, wood, or a new type of natural or engineered material.
- Prioritize the natural environment in streetscapes and employ trees for shading streetscapes and sidewalks to reduce heat island effect.
- Work to strike balance between the built environment and the land in which it is located. Promote the return and/or protection of native plants and native animals to improve biodiversity. This can include native plant nurseries and replacing non-native landscaping with locally adapted plantings.
- Pay attention to water - both above ground and below ground. Protect local springs and sources. Focus on a variety of storage options, both natural and manmade, for drought times. Be mindful of over compaction and its impact on underground water movement.

A Few Ideas for Future Research:

- More work can be done in the area of moving our thinking from resource extraction to resource management - or, as stated by indigenous populations, changing our thinking to change our outcomes. Capitalism already has a system that values inputs and costs, what would be needed to restructure our systems to gauge the true cost of our inputs in terms of life cycle from extraction through decommissioning and ease of reuse or replacement in order to drive better decision making?
- There is a lot to learn and study in order to better inform our practices around the concept of holistic community systems and how we consider the health of the entire community (whether city, county, town, village) instead of focusing on homeownership or housing, or economic development as independent drivers. Instead, we should think about impacts on all populations as a whole.
- Especially in the Americas, there are good examples of inexpensive, locally adapted and built housing meant to serve for a short period of time. Can these ideas be adapted to other uses? How could they potentially serve as immediate housing for displaced persons or climate refugees?
- There is a lot to consider with expanding the types of dwelling units and systems we use in order to meet emerging needs. A design competition could help highlight these traditional housing types and rethink them for today. This includes a focus on smaller size units, village configurations with common space, and adaptations that prize comfort, quality of life, and passive systems to provide increased resilience and increased affordability of operations.

And, finally, the research demonstrates that there are other entities with which NAHRO can link and form partnerships. NAHRO, its regions and member agencies, can advance work in true joint partnership with local indigenous groups in coming together and thinking about our shared lands and heritage. We can also work with our international organizations and partners to advance local partnerships with other indigenous peoples.

Other possibilities include working within the framework of the federal government's tribal and climate adaptation initiatives and tools, as well as the United Nations, UNESCO, and other nongovernmental entities (NGO's). Given NAHRO's long history in the housing and community development sphere, its emphasis on partnerships, and its robust international focus on joint issues, NAHRO is uniquely positioned to work on innovative housing and community development types, tools, and new capital products for the benefit of our shared communities and constituents.

On behalf of the International Research and Global Exchange Committee, many thanks to all who contributed to this work, including Elizabeth Scott-Glenn, Stephen Wanjala,

Betsy Morris, Joseph Kamuzhanje, Jim Davison. Additional research information can be found below in the Additional Resources section. **The Authors:** Lisa A Baker is a housing/community development consultant, serves as NAHRO Professional Development Faculty, and is the former CEO for Yolo County Housing in California. Jim McGrath is the Director of HUD Programs at Missoula Housing Authority, and is a past President and Vice President of the Montana Chapter of NAHRO. Both are members of the Research Subcommittee of the International Research and Global Exchange (IRGE) Committee.

Additional Resources:

Statista: [Chart: Indigenous Communities Protect 80% Of All Biodiversity | Statista](#)

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“Weaving Wisdom of Loving Elders to Bring Us Back into Our Hearts,”

<https://www.wisdomweavers.world/>

“Tribes have Climate Wisdom,” https://grist.org/article/indigenous-knowledge-climate-change-solution/?utm_campaign=site-share-button-email

“Indigenous people on the front lines of climate solutions,”

https://ictnews.org/news/indigenous-people-on-the-front-lines-of-climate-solutions?utm_source=Indian+Country+Today&utm_campaign=0778934a7e-THE_WEEKLY_2020_12_03_COPY_01&utm_medium=email&utm_term=0_5e3432615c-0778934a7e-361234512

For more on clam gardens: “Clam Garden Network,” <https://www.clamgarden.com>

“Indigenous Peoples,” <https://www.unesco.org/en/indigenous-peoples>

“The Use of Indigenous Traditional Knowledge in Climate Change Strategies,” The Wilson Center, <https://www.wilsoncenter.org/event/use-indigenous-traditional-knowledge-climate-change-strategies>

“Expert Panel on Homelessness among American Indians,”

https://www.usich.gov/resources/uploads/asset_library/Expert_Panel_on_Homelessness_among_American_Indians%2C_Alaska_Natives%2C_and_Native_Hawaiians.pdf

“Dibajinjigaadeg Anishinaabe

Ezhitwaadhttps,” <https://www.fs.usda.gov/research/treesearch/58352>

“US Climate Resilience Toolkit,” <https://toolkit.climate.gov/topics/tribal-nations>