Reimagining Twenty-First Century Cities: Heritage as a Solution for Food

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Heritage is often romanticized as beautiful relics of the past, to be admired and preserved. This view is reinforced by various national and international laws and initiatives, such as the UNESCO World Heritage List, which play key roles in protecting sites of cultural and historical significance. These efforts are invaluable in safeguarding the legacies of past cultures, yet they also contribute to a static view of heritage—one that prioritizes conservation over innovation and adaptation.

However, heritage is far more complex than mere remnants of the past that require preservation. It is not simply about safeguarding monuments, artifacts, and traditions; it is also about recognizing heritage as a powerful tool for addressing contemporary challenges, particularly those related to sustainable development in rapidly growing and challenging urban environments.

This perspective raises critical questions: How can heritage help to address the challenges facing cities of the future? Can heritage offer innovative solutions and alternative sustainable development models for urban living? What obstacles must be overcome to realize these approaches? What are solutions to propose for these issues and shortcomings for cities of the future?

Projects dealing with heritage for sustainable development in cities focus predominantly on the economic pillar, often overshadowing other aspects of

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sustainable development.[1] Moving beyond these conventional approaches, this paper focuses on two fundamental dimensions of heritage for sustainable development in an urban context. Firstly, this paper will explore the intersection of food security, the climate crisis, and heritage, using examples from Senegal. Senegal provides a valuable case study due to its rapid urbanization and growing population, which are creating significant challenges for food security and sustainable development, particularly in the context of the climate crisis. Second, the paper will examine how built heritage, along with traditional architectural practices and materials, can contribute to addressing the climate crisis while fostering more sustainable urban futures. This section will discuss rich examples from across Africa, a region with long-standing traditions of using heritage for sustainable urban development. The conclusion will propose solutions to some of the identified issues and shortcomings, aiming to integrate heritage into broader urban sustainable development strategies.

Defining Heritage

Before considering how it can help to address the challenges facing cities, heritage first needs to be defined. Cultural heritage sites (such as monuments, historic buildings or archaeological sites) are often distinguished from natural heritage (such as national parks, protected areas or national landmarks). Additionally, their tangible aspects are separated from their intangible ones, particularly in urban contexts. These distinctions, originating from colonial times, have been reinforced, legitimized, and formalized by post–World War II international frameworks, particularly the UNESCO World Heritage Convention of 1972 and, more recently, the UNESCO Intangible Heritage Convention of 2003.

However, heritage is complex, and can only be understood holistically through integrating nature, culture, and both its intangible and tangible dimensions. It is only through such comprehensive understanding that heritage can effectively address sustainable development challenges. One compelling example is the Saloum Delta in Senegal, a UNESCO World Heritage property since 2011. This delta is a marshy labyrinth of mangroves, small islands, and urban settlements. It has shellfish

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mounds, some of them several hundred meters long, produced by its human inhabitants over the ages. In this way, it offers a harmonious blend of nature and culture. Despite these connections, the Saloum Delta was inscribed on the UNESCO World Heritage List as a cultural heritage site only. Its key intangible heritage manifestations—particularly traditional fisheries with their various fishing techniques, artisanal boats, and spatial and social rules and norms, essential for feeding urban populations—were also excluded from such inscription. This example demonstrates that the artificial divisions imposed by UNESCO, among other organizations, impoverish heritage, creating arbitrary silos.[2]

Heritage properties are often understood as static, unchanging, and quite literally frozen in time. This perception stems from the idea that heritage must be considered "authentic" to have value; it must retain its "original" design, materials, workmanship, and setting. Consequently, heritage is frequently seen as belonging solely to the past, which leads to the oversight of its potential contributions to sustainable development, including solutions to climate change. The Saloum Delta is again a telling example. Historically, seashells were used as barriers against rising sea levels, showcasing an effective traditional response to environmental challenges. These solutions have been implemented elsewhere, particularly in the West, such as in New Orleans in the United States. The Gulf Coast, including areas around New Orleans, has experienced significant land loss due to rising sea levels, hurricanes, and human activities such as oil drilling and levee construction. Using oyster shells to create artificial reefs and shoreline barriers has helped to reduce wave energy, prevent further erosion, and rebuild degraded coastlines. However, these solutions are now being neglected in the Saloum Delta. Instead, seashells in the Saloum Delta are now primarily used as construction materials, disregarding their original purpose and the ingenuity of past practices. Mangroves have been used instead to protect the delta's shorelines, but this approach faces challenges, such as slow growth rate, low survival rates, and lacking funding and resources.

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The static view of heritage properties extends beyond their physical aspects to encompass their respective communities, who are often valued only when perceived as authentic or frozen in time. Essentializing communities as static

and unchanging silences their complex histories, ongoing adaptations, and contributions to heritage. These stereotypes can perpetuate outdated colonial notions of "primitive" or "exotic" cultures, denying these communities agency and diversity. One example is Senegal's nomination dossier advocating for the inclusion of the Bassari Country on the World Heritage List and its evaluation by the International Council on Monuments and Sites, prior to its 2012 inscription on this UNESCO list.[3] This evaluation details the unique heritages of the ethnic minorities of this territory situated in the southeast region of Senegal—including the Bedik, Bassari, and Dialonké—that have been well-preserved and make respectful and sustainable use of local resources for construction and subsistence. These documents further present these communities as having lived away from the "modern world." However, these local populations do not live under autarchy, and often need to travel and work in different parts of Senegal, including cities like Dakar or Touba, a practice that dates to the time of French colonialism. These experiences of migration have significantly influenced and altered their cultural practices. The discussed examples of the Saloum Delta and Bassari Country illustrate the need for heritage to be understood as complex, dynamic, evolving, and holistic in order to solve contemporary challenges.

Heritage Crops for Future Cities: Addressing Climate Change and Food Security

Ensuring food security and fighting climate change are two of the most pressing challenges for cities of the future. With 70 percent of the global population expected to reside in urban areas and the total population projected to reach 9.8 billion by 2050, the need for sustainable food systems is urgent.[4] Heritage and local crop, cultivated through generations within specific cultural and geographic contexts, often promote sustainability and resilience in farming systems. Can local crops serving as heritage be the solution to these pressing challenged for cities of the future?

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conditions. Such accumulated wisdom is a key part of agricultural heritage, preserving sustainable farming methods attuned to specific ecosystems. Local crops often hold symbolic value within communities, being integral features of festivals and rituals, many of which occur in cities.[5] One example of such a local crop is fonio, a small-grained cereal that is amongst the oldest cultivated crops in the southeast of Senegal but is also found in several other West African countries including Mali and Guinea. Gluten-free, nutritionally rich, and even considered a "superfood," fonio is gaining popularity in the West. This crop was inscribed on Senegal's intangible heritage register in 2019. It is deeply linked with the social practices that shape the lives of communities in these regions, often featured in initiation ceremonies as a traditional dish or offering.[6] Its preparation and presentation in these ceremonies symbolize purity, fertility, and the continuity of cultural traditions. The grain's inclusion in rituals underscores its role in connecting individuals to their heritage and ancestors. In recognition of its significance, 27 July has been designated as International Fonio Day.

Cities are fundamental for the sustainability of local crops. Urban markets make these crops accessible to urban customers; cities also preserve and celebrate the heritage dimension of local crops. Fonio, for instance, is deeply connected to Kédougou, the largest city in the Bassari Country, close to the World Heritage site. Women, who are largely responsible for cultivating fonio, sell the crop in cooperatives within Kédougou, a crucial market center. The city also serves as a vital connection between vendors and consumers, both locally and across Senegal. Since 2009, Kédougou has also hosted the Festival of Fonio. Held annually, this event features traditional dances and music, celebrating key female figures in the production and commercialization of fonio and providing opportunities for selling the crop. It is also a political event, attracting government representatives who often make financial commitments to cooperatives that produce and commercialize fonio during their participation in the festival.[7] In cities, fonio is also embraced by chefs and food enthusiasts who value its traditional significance. Urban restaurants have incorporated fonio into contemporary dishes, celebrating its cultural heritage while introducing it to a broader audience.

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Furthermore, local crops contribute significantly to food security by diversifying agricultural production. Dependence on a narrow range of globally

traded crops makes food systems vulnerable to supply chain disruptions and price fluctuations. This is illustrated by the impact of the recent war in Ukraine on Senegal. Senegal, like many African countries, relies heavily on imports of wheat and other grains, of which Ukraine and Russia are major global suppliers. The war in Ukraine caused significant disruptions to supply chains, reducing the availability of wheat and leading to rising global food prices. By promoting local crop varieties, a more stable and resilient food supply can be ensured, reducing the risk of food shortages and price spikes, particularly in cities.

We have seen that cities are fundamental for local crops, but as heritage, these crops are also crucial for cities of the twenty-first century in the face of climate change and growing populations. These crops are often well-adapted to local soil conditions, even poor ones, and require fewer external inputs like pesticides and fertilizers. Some crops are also more resilient to climate variabilities, and able to withstand both drought and heavy rain, which are becoming more frequent due to climate change.[8] This is the case for instance for fonio: it grows on poor soils and endures both drought and heavy rain.

Moreover, cultivating diverse local crops can improve soil health, sequester carbon, and preserve biodiversity, all of which are paramount for mitigating climate change impacts in both rural and urban areas.

In regards to climate change mitigation, local crops like fonio have a smaller carbon footprint than their imported counterparts. By shortening the transport route from producer to consumer, they support a zero-kilometer philosophy and require less energy for transportation and refrigeration, thus reducing greenhouse gas emissions associated with long-distance food transportation. This is particularly relevant for cities, where the demand for locally sourced food can significantly reduce food-related emissions. Moreover, cultivating diverse local crops can improve soil health, sequester carbon, and preserve biodiversity, all of which are paramount for mitigating climate change impacts in both rural and urban areas.

Local crops face numerous challenges despite their many benefits, this is especially true in urban settings. Issues such as popularity, dietary habits, cost, production, and supply constraints impact their success. Fonio, for example, is not widely popular, nor is its market infrastructure well-developed in cities. Dietary habits and preferences play a significant role in this. In Senegal, fonio ranks as the fourth most popular cereal, significantly behind rice, which is widely

consumed, particularly in urban settings, at approximately 100 kilograms per person per year. Rice is largely imported, with 80 percent coming from abroad.[9] This dependence can lead to significant disruptions in supply chains, reducing availability, especially in urban centers with large markets to supply.

In many regions, fonio is still perceived as a lesser alternative, a transitional food rather than a staple. Fonio's higher cost compared to other cereals is a result of its limited production and complex processing. Shelling fonio is labor-intensive and often done manually, with shelling machines being too expensive for small cooperatives. This constraint limits large-scale production and affects fonio's availability in city markets. Distribution networks for fonio are less developed compared to those for more common grains, making it less accessible to urban consumers. Additionally, the quality of fonio sold is often inconsistent, with impurities and variations that make it less attractive compared to more polished and uniform imported cereals. As a result, despite its nutritional benefits, fonio and other local crops struggle to compete with more established and widely available cereals in urban environments.

Hence, while local crops encounter significant obstacles, they could be a solution to pressing challenges faced by cities of the future. Another critical challenge of the urban future is to ensure that urban settlements, as the built environment, can be harnessed not only as solutions to the climate crisis, but also as contributors to social cohesion and inclusion.

Built Urban Environment, Climate Change, and Social Sustainability

Heritage is defined as "the built environment," which includes historic centers, urban structures, and ensembles with multiple values, such as historical, social, architectural, aesthetic, and economic significance. However, the built environment cannot be siloed exclusively as tangible heritage; its rich intangible aspects also need to be considered, such as construction techniques, spiritual or sacred meanings, festivals and celebrations, cuisine, crafts, and performing arts associated with the built environment, including in urban settings. Such

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heritage needs to be understood in relation to surrounding natural features, such as rivers or mountains. For instance, the urban layout and architecture of Paris, France, cannot be separated from the river Seine, as the river has not only influenced the city's physical development but also its cultural and economic significance throughout history. It is no wonder that the only World Heritage site in Paris is the central sections of the Banks of the Seine.

Local materials, such as earth, stone, and wood are often used as construction resources. Using these materials in construction can help to address the climate crisis by reducing transportation costs and the carbon footprint associated with importing materials over long distances. Examples include Petra in Jordan, carved directly into the rose-red sandstone cliffs; Machu Pichu in Peru built with local granite stone; and the Taj Mahal in India, whose marble was sourced from the nearby Makrana quarries. Moreover, local materials are often better suited to the local climate, providing natural insulation and durability. In specific cases, the restoration of heritage buildings constructed with nearby materials also reinforces social cohesion and group identity. One example is the Great Mosque of Djenné in Mali, a World Heritage site since 1988. The bricks of this mosque are made from adobe or banco, a blend of clay, water, shea butter, baobab tree powder, and rice husks.[10] Susceptible to erosion, the Great Mosque of Djenné is renovated and repaired once a year during an event called *Crépissage* (Plastering). This activity involves re-plastering walls, repairing cracks, and reinforcing structural integrity, and represents the collaborative effort of local craftsmen, artisans, and residents from the town of Djenné. By participating in the renovation process, community members actively engage in preserving and celebrating their collective history, fostering a sense of urban unity and belonging.

The use of local materials is not without its challenges. Some materials, particularly organic ones, degrade quickly, especially in harsh weather conditions, requiring frequent replacement. Climate change can further exacerbate this deterioration, especially in cities, by increasing the frequency and intensity of heavy rains, high humidity, heat retention, and temperature fluctuations. Obtaining local material can also be time consuming, and the labor and time involved in regular building maintenance might not be possible for all. In addition, restoring buildings associated with heritage values requires specific skills and knowledge that might not be readily accessible. Residents may hence prefer modern construction materials and methods. The residents of Macuti town, for instance, have faced some of these problems. Macuti town, part of the Island of Mozambique World Heritage site, is a dense urban area of traditional construc-

tions of natural materials, notably thatched palm leaf roofs and walls, built with stone, earth, and sand, reflecting a blend of indigenous African architectural techniques.[11] These houses need regular maintenance and have recently been more prone to degradation and destruction due to extreme weather, including partial or complete destruction from tropical cyclones. In Macuti town and other areas where local materials are used, some houses have been rebuilt with modern materials like cement instead of more traditional materials, and thatched roofs have been replaced with more durable materials such as corrugated metal sheets.[12] Addressing these changes in construction materials in many urban settlements requires a holistic approach that combines adequate funding, incentives and legislation, skilled labor, and community involvement.

Adaptive reuse and renovation of buildings is another important consideration in the physical urban environment. This can play a pivotal role in tackling the challenges of climate crises, economic changes, and shifts in societal demography. Repurposing and renovating urban buildings instead of demolishing them preserves their values while giving them new life and purpose. This approach underscores the dynamic nature of heritage, demonstrating its ability to adapt and evolve over time. Moreover, adaptive reuse and renovation counters the relentless drive toward modernization and progress as newness, which often leads to homogenization of many urban centers, by creating a more diversified urban landscape.

Studies have shown that reusing and renovating buildings, rather than demolishing them, significantly reduces energy consumption and the emission of carbon dioxide and other greenhouse gases.[13] This approach also minimizes the use of fossil fuels, fresh water, and materials. A key contributor to these environmental benefits is "embodied energy," which refers to the total energy required for the initial construction of buildings and during their operational life.[14] By reusing and adapting buildings, carbon dioxide emissions associated with constructing new buildings are avoided. Reusing and renovating buildings are often part of a broader urban regeneration process, through providing heritage structures with new, recreational uses that stimulate economic

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growth and improve quality of life. One example is the V&A Waterfront in Cape Town, South Africa, which presents innovative urban adaptive reuses of its historic buildings. Former industrial structures, such as old warehouses and a power station, have been repurposed into trendy shops, restaurants, art galleries, and offices, preserving their architectural and historic values while serving contemporary needs. Museums have also opened, such as the Zeitz Museum of Contemporary Art Africa, housed in a converted grain silo, creating a cultural and creative hub within a building of historic and industrial value.[15] As exemplified by the V&A Waterfront, the benefits of reusing and adapting heritage buildings have gone beyond environmental gains. Economic revitalization and regeneration boost tourism through the transformation of the area into an attraction, accompanied by job creation during both the construction phase and the ongoing operation of businesses within the waterfront. Various public spaces, such as parks, promenades, and waterfronts opened, providing recreational areas for residents and visitors.

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However, adaptive use poses notable challenges.[16] Repurposed cultural heritage buildings may not meet some standards, such as those for zero-emission buildings. Retrofitting historic buildings with energy-efficient technologies can enhance their sustainability by installing insulation, high-performance windows, efficient heating, ventilation, air conditioning systems, and energy-efficient appliances and lighting. Another obstacle is that adaptive reuse strategies are, in some cases, more expensive than demolition and new construction. This can be due to the need for structural assessments and the integration of energy-efficient technologies. Additionally, there can be regulatory and logistical hurdles. Historic buildings are often subject to strict preservation laws and guidelines that restrict modifications. These regulations aim to protect the architectural and historical integrity of structures, complicating the implementation of necessary updates or changes. Furthermore, compliance with modern building codes, such as those for fire safety, accessibility, and seismic stability, can be particularly challenging in older buildings. These requirements may necessitate extensive and costly alterations, which can be a deterrent to developers. To address these issues, the V&A

Waterfront project involved close collaboration with preservation authorities and local government agencies to ensure compliance with heritage conservation guidelines. This collaborative approach helped navigate the complex regulatory landscape and integrate modern updates without compromising historical integrity.[17] In addition, the project utilized economic incentives and funding opportunities for heritage conservation and sustainability improvements, which offset some of the higher upfront costs associated with adaptive reuse.

Finally, it has been widely documented that the reuse and renovation of buildings as urban regeneration leads to gentrification, which is the attraction of wealthier residents and businesses to previously undervalued areas.[18] This influx can drive up property values and rents, making regenerated urban areas less affordable for lower-income residents and small businesses, undermining the social fabric and diversity of the community. This is what occurred with the V&A Waterfront in Cape Town. The upscale nature of the waterfront, with its luxury shops, restaurants, and hotels, attracts affluent residents and businesses. As a result, nearby neighborhoods have experienced a rise in real estate prices, making housing less affordable for lower-income residents. The gentrification spurred by the V&A Waterfront development contributed to the displacement of lower-income residents from nearby areas.[19] It is clear that there are difficulties, illustrated by this example, in arriving at equitable social, environmental, and economic benefits for all through the reuse and adaptation of urban cultural heritage.

Conclusions

This article has outlined the fundamental roles that heritage can play in addressing food insecurity, climate change, and shifts in societal demographics for cities in the future. It has also identified and discussed the various challenges facing heritage in fulfilling these roles. I now offer recommendations to effectively address these issues.

To consider heritage a solution to pressing issues facing cities of the twenty-first century, it must be comprehensively understood, integrating nature, culture, and both intangible and tangible dimensions. UNESCO, which plays a leading and structural role in defining heritage, should revise its frameworks to achieve such a complex consideration. This could involve revising the Operational Guidelines for the implementation of the World Heritage Convention to eliminate the distinction between natural and cultural heritage in evaluation criteria. Additionally, greater synergies could be fostered between the implementation

of the 1972 World Heritage Convention and the 2003 Intangible Heritage Convention, through more alignment between their lists. This would help to remove the distinct silos of intangible and tangible heritage.

Future research could focus on dietary habits and preferences to understand how local crops, considered as heritage, could gain popularity locally and regionally, using more successful examples like the baobab. Promotion efforts could highlight their nutritional benefits, cultural significance, and their role in resilient agricultural practices. Research could also center on improving the quality of production and developing effective distribution strategies. Establishing novel partnerships between local farmers and distributors could further ensure that these crops can reach urban markets effectively.

Finally, adaptive reuse is a popular approach to safeguarding the built environment. However, it often leads to gentrification, contributing to the creation of segregated urban spaces. To mitigate these issues, urban planning policies could prioritize affordable housing initiatives alongside adaptive reuse projects. Additionally, community engagement and inclusive development strategies could help to ensure that the benefits of adaptive reuse projects are shared equitably among all residents of the affected areas. Implementing mixed-use zoning policies, which encourage a blend of residential, commercial, and recreational spaces that cater to a range of income levels and needs, could also promote diverse socioeconomic integration within neighborhoods.

These recommendations—which establish a more integrated international framework for heritage identification and protection, promote local crops and enhance their quality and distribution, and ensure that adaptive reuse of heritage buildings benefits all—can significantly contribute to addressing the issues outlined in this paper and ensure the continued relevance of heritage in twenty-first century cities. WA

Notes

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2. Ibid.
3. The nomination of the *Bassari Country: Bassari, Fula and Bedik Cultural Landscapes* submitted by the Government of Senegal and its evaluation by ICOMOS are available at: "Bassari County: Bassari, Peul, and Bedik Cultural Landscapes," *UNESCO World Heritage Convention*, 2012, https://whc.unesco.org/fr/list/1407/documents/.
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5. The Globally Important Agricultural Heritage Systems programme coordinated by the Food and Agriculture Organization of the United Nations (FAO) clarifies the connections between agricultural biodiversity, local crops, sustainable development, and heritage. More information is available from: "Globally Important Agricultural Heritage Systems," Food and Agricultural Organization of the United Nations, https://www.fao.org/giahs/en/.
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13. Gillian Foster, "Circular Economy Strategies for Adaptive Reuse of Cultural Heritage Buildings to Reduce Environmental Impacts," *Resources, Conservation & Recycling* 152 (2020).
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