

POSITION PAPER

CAN THE URBAN POOR AFFORD SUSTAINABLE CONSTRUCTION?

A JUST TRANSITION IN THE BUILT ENVIRONMENT OF INFORMAL SETTLEMENTS



Cities Alliance
Cities Without Slums

Hosted by
 **UNOPS**

Acknowledgements:

This position paper is the result of a working group on the topic of sustainable construction and the urban poor, facilitated by the Cities Alliance Secretariat.

Cities Alliance team:

Technical Supervision: Arne Georg Janssen and Laura Lima

Review: Julian Baskin, Laura Puttkamer, and Marie Munzert

Communication: Yamila Castro

Front page image: Slums in Manila, by Tatiana Nurieva, AdobeStock.com

Please cite this publication as: Cities Alliance (2023): Can the urban poor afford sustainable construction?

The publication includes inputs from various practitioners working in the field, as well as Cities Alliance members.

A special thanks to the working group members:

Mona Aneela Delluc (Holcim), Esther Moltie (Deutsche Gesellschaft fuer Internationale Zusammenarbeit GIZ GmbH), Stephen Seidel and Nurlan Moldosherip (Habitat for Humanity International), Alexandre Apsan Frediani (IIED), Jonathan Duwyn and Pauline Guerecheau (UNEP), Magashen Naidoo and Ying-Chih Deng-Sommer (ICLEI), Smruti Jukur (SPARC), Melanie Chirwa (SDI Zambia), Anna Muller (SDI Namibia), Patience Mudimu and Evans Banana (SDI Zimbabwe), Monika Glinzler (Government of South Africa), Geoffrey Morgan and Alicia Regodon Puyalto (UNOPS), Ariana Karamallis and Monica Schroeder (Build Change), Mae Emerick, Kobi Ruthenberg and Alexander D'Hooghe (ORG Permanent Modernity), and colleagues from the Cities Alliance secretariat.

Disclaimer:

The views expressed in this publication are those of the author(s) and do not necessarily reflect the corporate policies or viewpoints of the Cities Alliance Secretariat, its members, or UNOPS.

First published in 2023.

Cities Alliance - UN House
Boulevard du Régent 37 -40
1000 Brussels, Belgium.



This material/production has been financed by the Swedish International Development Cooperation Agency, Sida. Responsibility for the content rests entirely with the creator. Sida does not necessarily share the expressed views and interpretations.



Federal Ministry
for Economic Cooperation
and Development

Contents

Executive summary	5
01. Introduction	6
0.2 Setting the scene: Environmental, economic and social sustainability in the context of informal settlements.....	8
2.1 Environmental sustainability in the face of rapid urbanisation	8
2.2 Economic sustainability: Guaranteeing affordability and accessibility in informal contexts.....	10
2.3 Social sustainability: Towards a just transition.....	11
0.3 Promising approaches and potential entry points	12
3.1 Affordability	13
3.2 Sustainability	16
3.3 Desirability	21
3.4 Scalability	24
3.5 Inclusivity.....	26
0.4 In action: Case studies	30
4.1 Sustainable housing innovations: ROOH's Resilience Labs transforming informal settlements in India.....	30
4.2 The Cato Manor Green Street Retrofit in Durban, South Africa (ICLEI).....	31
4.3 Retrofitting for climate resilience in Honduras (Build Change)	32
Conclusion: Key messages and outlook	33
References	36





Executive summary

Most urban construction over the next decades is going to take place in the Global South, often in the form of incremental upgrading or makeshift homes. Considering that the built environment today already accounts for nearly 40 per cent of all CO₂ emissions and that the **CO₂-budget left** for that sector is already almost depleted, it is key to focus efforts on sustainable ways of construction in order to reach the 1.5 degree Celsius goal. By making alternative, circular, and low-carbon construction methods both attractive and affordable and by supporting sustainable construction through political frameworks and regulations, it is possible to create more resilient and environmentally friendly buildings and infrastructures at the demand side, like the fast-growing informal settlements of the Global South.

Through this paper, Cities Alliance aims to shed light on this debate, its main positions, potential entry points, and research gaps. It explores the concept of a just transition towards sustainable construction in urban settings by applying the narratives of the climate community, including adaptation, mitigation, and resilience efforts for a more sustainable, low carbon construction sector. It keeps the needs of the urban poor firmly in mind, such as improved and resilient living conditions and local value chain

development, as well as the needs of the informal economy. Cities Alliance also emphasises the responsibility of governments to create equitable and inclusive regulations for sustainable construction.

Overarching, long known themes such as secure land tenure, policy regulations, community leadership, and incremental housing and upgrading through local and vernacular design approaches are also explored to illustrate that sustainable construction should not be viewed as outside of or separate from a more holistic just transition in the construction of value chains. This paper argues that excluding the urban poor from any link of the value chain—from sourcing and subsidizing materials to developing the capacity to use them, to their affordability, and to the national frameworks regulating the value chain—will result in a very hefty bill on the overall state of the world.

Principles of the circular economy and its role in the construction sector can help in detailing five potential entry points identified for a sustainable future of construction in informal settlements. In this paper, Cities Alliance aims to cross-fertilise ideas and strengthen the narrative of a just transition in sustainable construction in a rapidly growing urbanised world.

CAN THE URBAN POOR AFFORD SUSTAINABLE CONSTRUCTION?

A JUST TRANSITION IN THE BUILT ENVIRONMENT OF INFORMAL SETTLEMENTS





INTRODUCTION

At least half of the buildings that will exist in the world by mid-century have yet to be built. At the same time, we build the equivalent of Paris each week. Consequently, the global building stock will double in the next 30 years and triple in Africa, meaning that as much housing and infrastructure will have to be created in just a few decades as was created in the last 300 years combined. The built environment with its known backlogs and future demand is already today responsible for 37 per cent of energy and process-related CO₂ emissions and over 30 per cent of energy demand globally. It is crucial to ensure that current and future buildings follow ever lower carbon construction guidelines while increasing requirements for climate adaptation and resilience.

Most new buildings and infrastructures will appear in the Global South, and mostly as self-constructed buildings in informal settlements. For example, 70 per cent of the African building stock expected for 2040 has yet to be built (IEA 2019) and more

than 80 per cent of that growth will occur in cities, especially in informal settings (Myers 2016).

Therefore, it is key to empower the urban poor to act as agents of change, supporting inclusive and sustainable growth for everyone. Circular economy principles as well as low-carbon pathways will help to support a just transition and achieve the Sustainable Development Goals (in particular number 11) while meeting the goals of the Paris Agreement.

To make existing and future housing more resilient and sustainable, urgent action and massive investment is required. By 2030, three billion people or about 40 per cent of the world's population will be living without adequate housing. At the same time, near-zero emissions and resilient buildings must be the norm by 2030 to achieve global climate goals. Today, inadequate housing is disproportionately inhabited by urban poor people, exposing them to hostile policy environments, social exclusion, and

inadequate public health systems, while leaving them especially vulnerable to the impacts of climate change.

The increase in the number and strength of extreme weather events is one of climate change's most visible effects. Inadequate housing puts those who are already vulnerable at even more risk when natural disasters or pandemics strike. To protect people, their assets and livelihoods against increasingly frequent future crises, we must invest in better, safer, and more sustainable and resilient housing. In most cases, with relatively simple and inexpensive solutions, it is possible to upgrade informal housing in terms of sanitation, lighting, and ventilation, while keeping the construction climate-friendly.

In 2023, a [Cities Alliance working group](#) began discussing sustainable construction in informal settlements, which led to a workshop in September entitled "Sustainable construction and alternative building materials in the context of informality". This paper stems from that process as well as the

contributions of Cities Alliance members and partners such as Build Change, GIZ, Habitat for Humanity, ICLEI, IIED, GIZ, Holcim, SDI, ORG, UNEP, and UNOPS, among others. It will dive deeper into the topic, looking at opportunities in the informal economy and local value chains, while considering overarching themes of secure land tenure, community leadership, and incremental housing and upgrading through local design approaches.

The paper will also introduce potential entry points for the cross-fertilisation of ideas and narratives for a future approach to construction in informal settlements and beyond. Case studies from informal settlements around the world will also provide an understanding of what a just transition in sustainable construction could look like. Ultimately, this paper aims to combine the narratives of climate change challenges in terms of adaptation, mitigation, and climate resilience with those of rapid urbanisation, especially in informal settlements, where urban poor people's plights and their potential for improved living conditions are often overlooked.





SETTING THE SCENE:

ENVIRONMENTAL, ECONOMIC AND SOCIAL SUSTAINABILITY IN THE CONTEXT OF INFORMAL SETTLEMENTS

Looking at sustainable construction in informal settlements, it is important to analyse all three aspects of sustainability: environment, economy, and society. In this section, we will therefore present the challenges and opportunities that each aspect of sustainability presents.

2.1

Environmental sustainability in the face of rapid urbanisation

In a recent publication “rapid urbanisation and the circular economy”, Cities Alliance demonstrates how circular economy and climate mitigation actions can

improve socio-economic conditions in developing cities and explores the role of an integrated, inclusive city planning approach. Through experience, Cities Alliance is convinced that the only way to respond to the scale of the challenge of sustainable construction is to put people living in the poorest areas of cities at the centre of any solution or strategy, to ensure joint decision-making and co-production, and to capacitate them with skills to advocate for themselves, negotiate with the government, organise their communities, manage financial mechanisms, and catalyse sustainable construction. This will support both climate mitigation and climate adaptation efforts, while also strengthening the resilience of the urban poor and the resilience of the entire city.

The housing and construction sector is an important cornerstone for improved circularity and sustainability at the city level. Considering that just three materials, concrete, steel, and aluminium, are responsible for more than 20 per cent of overall global emissions today and that the CO2 budget for the housing and construction sector is quickly dwindling, it is crucial to find more circular, low-carbon construction methods and materials that can at the same time benefit both the local economies and value chains at scale. This applies not just to the construction of housing, but also to infrastructure, such as plumbing and

electricity. Leapfrogging conventional construction techniques is an important opportunity for further embedding circular and low carbon principles and techniques from the outset. Policies and regulatory frameworks should include a focus on vernacular architectural and design technique and traditional knowledge, which have been proven effective in adapting to local climate circumstances for centuries. Targeted investments and governmental support have the potential to make such approaches attractive again. At the same time, sustainable construction can help to create more jobs with new skill sets.

The Global ABC's new report on embodied carbon savings through retrofitting existing buildings offers solutions for more sustainable construction, even in contexts where concrete and steel remain in use.



2.2

Economic sustainability: Guaranteeing affordability and accessibility in informal contexts

Currently, the Global South produces a lot of raw building materials for the Global North, while also having to import processed materials at high prices, both financially and environmentally.

Often, products of lower quality and waste materials are shipped to the Global South and are used in informal settlements due to their affordability and availability. For example, imported materials for plumbing or electrical installations often are of low quality or arrive damaged after a long transport from Asia or Europe. The impact of excess resource consumption in the North is offshored to the South, where it often leads to insecure, low - quality housing and environmental degradation.

Policy-makers should therefore focus on regulating the trade of unsustainable material for the Global South to avoid it becoming a dumpsite, and instead should focus on sustainable, circular trade.

At the same time, livelihoods in informal settlements are often negatively impacted by the high cost of upgrading housing. The cost of building materials for informal residents can reach up to 30 per cent of their monthly budget. This strain is particularly high in female-headed households, which often live below the poverty line and therefore are less able to afford construction materials. There is a direct correlation with the gender pay gap that exacerbates economic challenges and makes it even harder to afford the necessary materials for upgrading and/or protecting housing from climate-change related incidents such as flooding.

Local value chains are an important entry point. They can support incremental upgrading by using local building materials with lower carbon footprints that provide higher insulation and resilience capacities and are more affordable.

Localizing construction also can come with opportunities for jobs and skills development, less strain on the environment, and opportunities for learning from local communities about vernacular building materials and techniques. So far, local

materials are often produced in low volumes and are not always of sufficient quality. Training construction workers, improving architectural knowledge, and ensuring safety, both for workers and for the environment, in the extraction of local materials, are key for improving local value chains.



Photo: Albert Gonzalez Farrad / UNAMID



Photo: NJ / AdobeStock.com

2.3

Social sustainability: Towards a just transition

Over **one billion people** live in informal settlements today. They face multiple challenges and aspects of poverty, including a lack of job opportunities, dependence on subsistence livelihoods, costly and unreliable basic services, and inadequate or non-existent political representation and rights, including secure tenure or the right to housing. High prices for sustainable construction exacerbate the situation, while self-constructed housing often relies on ad hoc measures and unsafe building materials that are not sustainable at scale. Considering that urban informality and climate change impacts intersect to affect informal settlements in a way that is disproportionate to how much CO₂ they emit, climate justice is key to a just transition that aims at greening the economy in a way that is beneficial to everyone. The **concept of climate justice** calls for “putting equity and human rights at the core of decision-making and action on climate change”.

Self-help housing initiatives and self-constructed informal housing already play a vital role in the construction and regeneration of local neighbourhoods. However, **these structures can lack quality** due to poor or limited choices of

building materials, inefficiency in energy use, threats to biodiversity, poor planning, and a lack of construction control measures. Assisted self-help housing can be affordable, smart, useful, practical and flexible, and most importantly, it can ensure that sustainable construction is not done to the detriment of affordability, safety, or the environment. Capacity-building and the circular use of building materials can help to ensure a just transition where urban poor people can afford to build safe, sustainable houses and infrastructures. Creating resilience to climate hazards and disasters while providing more secure, accessible, affordable and attractive housing and reliable infrastructures are opportunities for the sustainable construction sector.

This makes a more sustainable, circular approach to construction even more important. The recycling of building materials is already a daily practice in informal settlements, if often born from necessity rather than choice. Even so, it is possible to build on existing structures and knowledge. We need to better understand people’s diverse experience of building materials and construction in informal settlements in different cities, as well as the relationships shaping the value-chain of building materials and the role of different actors in making this value-chain more equitable, sustainable, and resilient. In the following chapter, five potential entry points for improved sustainability in construction in the informal sector are presented.



PROMISING APPROACHES AND POTENTIAL ENTRY POINTS

Sustainability in construction means the use of recyclable and renewable materials in building projects, while also minimizing energy consumption and waste production. In addition, there are social,

environmental, and economic aspects at play, such as the resilience of building materials, the potential of local supply chains, and building regulations that can be enablers or barriers to sustainable construction.

The circular economy in sustainable construction

The circular economy in sustainable construction Circular principles for construction, as outlined in the [Cities Alliance report on Rapid Urbanisation and Circular Construction](#), address sustainability in all its aspects:

- **Reduction and elimination of waste and pollution:** Designing for deconstruction enables the continual reuse and adaptability of building materials. In informal settlements, a modular approach is particularly relevant in terms of adaptability, upgrading, and affordability of housing. The durability of buildings and infrastructure is also key. It should ideally come from materials with low embodied carbon.
- **Protection and regeneration of nature:** Creating green spaces around housing and built-up areas supports nature, biodiversity, and the bio-based economy while increasing resilience and decreasing CO2 emissions and 3. Promising approaches and potential entry points
- **Circulation of products and materials:** A city that supports the circulation of products and materials helps create the demand for reuse in new construction, which helps to reduce material extraction and CO2 emissions from manufacturing. This process also creates employment opportunities, in particular when combined with [capacity-building](#).

“Building materials and climate: Building a new future”, a new report of the UNEP -hosted Global Alliance for Buildings and Construction (GlobalABC), identifies three important approaches to a more sustainable construction: avoiding the extraction and production of raw materials, shifting to regenerative material practices, and improving conventional building materials and processes through decarbonisation efforts.

Building on this report, Cities Alliance has worked on identifying the following five entry points for sustainable construction in informal settings: affordability, sustainability, desirability, scalability, and inclusivity.

ICLEI’s [“City Toolkit for a Just Transition in the Built Environment”](#) for local governments is a valuable resource for legislation, spatial planning, and procurement strategies, leveraging the unique ability of local governments to address the specific needs of their communities.

Another important aspect is tenure security: People are very unlikely to spend any more than the bare minimum on their housing when there is a significant threat of eviction.

Lack of tenure and constant threat of eviction as well as vulnerability to price fluctuation further aggravate the cycle of poverty trapping slum dwellers. For example, many informal settlements have been hit by increasing fuel prices due to the **impact of a multitude of global crises**, which have disrupted trade and supply chains. As a result, goods and building materials are more expensive, with a ripple effect impacting transportation costs, reducing employment opportunities in construction, and deepening poverty and inequality among low -income urban residents. Households are having to make difficult choices and compromises, such as postponing or reducing house improvements or foregoing maintenance altogether. As a consequence, in many informal residences the housing conditions are worsening, while there is no end to the speed of urbanisation.

3.1 Affordability

The intersection of climate change and socio -economic vulnerability, which can be exacerbated by rising energy costs and inflation, profoundly impacts urban economies. The most vulnerable residents of cities often already face multiple challenges. They also bear the brunt of these impacts and struggle with the affordability of building materials. In informal settlements, the choice of building materials is influenced by affordability, meaning that poverty can be a structural barrier to improved and sustainable building materials. The cost of improving housing conditions can be **as high as 15 per cent to 30 per cent** of a household’s monthly budget, which is on top of other housing costs. And climate crises such as floods or hurricanes can lead to the destruction of vulnerable housing and even higher financial and environmental costs for rebuilding and improving resilience.



However, the circular economy principle can provide a valuable entry point in terms of making sustainable construction and slum upgrading more affordable. It can alleviate the financial impacts of global economic crises and inflation in informal settlements by promoting resource efficiency, locally sourcing materials, and creating jobs through circular practices. Together, these approaches can lower construction costs. A Build Change report has found that one of the most common barriers among homeowners, governments and funders who could invest in the improvement of vulnerable housing is a lack of information or misunderstanding about the associated costs. Improvements are often cost-effective at an average of 23 per cent of the cost of building new housing. This means that investments in improving existing housing should be prioritised as a cost-effective means to address the gap in the global supply of adequate housing in informal settlements, as well as to combat increasing threats due to climate change. Preventive investments in disaster resilience are also known to keep costs much lower when compared to building after disaster has struck.

In order to make sustainable construction and upgrading affordable to more people at different income levels, it is important to develop a diverse set of finance options. These could include:

- Micro-financing offers
- Savings and loan groups for incremental upgrades
- Retrofitting subsidies
- Investment opportunities

Energy-efficient designs will further reduce ongoing expenses, while lower waste management costs, resilient housing structures, and community empowerment can strengthen overall economic resilience in informal settlements.

Case Study: The Philippines

In the Philippines, the average total cost of home improvement is unaffordable for most low- and lower-middle income families, at 183 USD per square metre. Build Change has been working with microfinance institutions in the country to support the more affordable incremental improvements approach that targets risk reduction and tailors home improvement loans into incremental packages with lower costs. These packages can be repaid over shorter time frames. While this work is helping to bridge the gap between the estimated 15.6 million vulnerable housing units in the Philippines, microfinance institutions still need more access to financing in the form of subsidies or grants to make home improvement affordable to the most vulnerable families.



The affordability of resilient housing in the informal sector is closely related to potential benefits of the circular economy, such as the environmentally friendly sourcing of local materials (e.g., clay and straw), resource efficiency (fostered through capacity -building and architectural training, as well as adequate regulations), and the creation of decent new jobs with good labour conditions in the construction sector.

Building more resilient and more efficient houses means that less money will need to be invested in

damage repairs after climate disasters, in costs for cooking and heating, and in infrastructure maintenance for entire settlements. Saving CO2 emissions through more energy efficiency is another benefit. Female -headed households and other members of marginalised communities stand to gain the most from this kind of economic empowerment, since they are usually the ones suffering the most from unsustainable housing in informal settlements.

Potential actions

- Address the affordability of construction in informal settlements at both the local and global levels.
- Employ different financing models to support sustainable, incremental upgrading approaches. Support these models with equitable regulatory frameworks.
- Ensure capacity-building to help reap the benefits of a more circular and localised approach to sustainable construction, using alternative materials and methods such as incremental upgrading or retrofitting while also creating new jobs.
- Communicate the high cost, both financially and environmentally, of *not* improving the housing situation in informal settlements to underscore the importance of investing in more resilient housing. Emphasise that, on the other hand, equitable access to adequate housing in informal settlements can generate a direct impact of as much as 10.5 per cent economic growth.
- Support the procurement of alternative and sustainable building materials at reasonable prices at the national level. Explore collaborations with contractors from the private industry to offer financially attractive alternatives.



3.2 Sustainability

A foundational question for sustainable construction is tenure security and strengthened tenure. Without a sense of belonging, there can be no sustainable urban development. The fear of forced evictions can prevent any kind of incremental upgrading or sustainable construction efforts. Therefore, equitable regulations and political frameworks are important to ensure this foundational aspect as well as other facets of sustainability.

Cities Alliance has identified the following interventions that were used in the past to improve (construction) practices in informal settlements:



Empowering local communities

By involving local communities in the decision-making process and establishing community-led processes, a more effective, responsive, and democratic outcome can be achieved. At the same time, working with communities and community-based organisations on strengthening and retrofitting homes greatly enhances community resilience and supports ownership, as well as a sense of belonging.



Capacity-building

Sustainable upgrading provides an opportunity to build local capacity through training and supporting local planners, designers, architects, contractors, builders,

and entrepreneurs. This enhances their skills and knowledge of incremental upgrading, construction, sustainable local material production and resilient building techniques. Workshops, technical assistance, and mentoring programmes are part of this approach, as is capacity-building of government officials and collaboration with architects for mutual learning.



Local procurement

Encouraging the use of local materials and services in slum upgrading projects through local procurement can boost the local economy and create employment opportunities for community members. Equitable regulatory frameworks can provide political support.



Access to financing

Affordable financing options for slum dwellers and local businesses have long been a key concern. Access to microfinance programmes and institutions as well as community-based savings groups and government-backed loan programmes are some valuable approaches.



Value addition

By promoting the development of small-scale industries or community-based enterprises within informal settlements, incremental upgrading becomes easier and more attractive. Importantly, the entire value chain and lifecycle of building materials needs to be considered.





However, these approaches often lack a key aspect of sustainability. While they are strong on social and economic aspects, they tend to neglect the **environmental side of sustainability**. This aspect holds unique challenges, especially considering that climate change impacts are not distributed equally around the world and hit hardest on people in informal settlements. Both climate adaptation and climate mitigation offer entry points that will be explored in the next sections of this paper.

Climate adaptation and resilience

Informal settlements are often more exposed to climatic hazards because of their location on unsafe land within cities. They typically occupy land that is unsuitable, such as riparian areas, steep slopes, or low-lying coastal areas—locations no one else wants or is able to develop. These areas are already at risk of damages from urban flooding and landslides, which result in disaster-driven displacement. With both the number and magnitude of climate-change related disasters increasing, billions of people in informal settlements face even greater exposure to destructive events. Climate change-induced impacts such as increasing temperatures, urban heat islands, health hazards in terms of tropical diseases, and disasters like hurricanes, further magnify the risk of damages to health and livelihoods in living conditions that are increasingly unsuitable. In addition, infrastructure in informal settlements lacks the capacity to withstand natural hazards and sustained stresses. Its failure leads to the loss of lives and assets and to public health hazards.

It is important to also consider the many parts of secondary cities in the Global South that are yet to be built. The question of how to deal with key ecosystem services, especially when informal settlements are built and disrupt ecosystems, is a crucial unresolved issue in urbanisation. Sustainable urban construction must consider the overall impact on the ecosystem. Nature-based solutions **hold promise** for historically disadvantaged contexts such as informal settlements. They include actions to protect, conserve, restore, sustainably use, and manage ecosystems that can address social, economic, and environmental challenges.

These actions, which might include community gardens, green open spaces, infiltration devices, or constructed wetlands, can reconcile urban growth with the maintenance of ecosystems and their services. They can address concerns related to extreme weather events and offer adaptation solutions. So far, however, the majority of nature-based solutions knowledge still comes from the Global North.

At the same time, growing communities in informal settlements are already resourceful when it comes to climate adaptation. They have been forced to develop strategies, such as cutting fuelwood, encroaching on wetlands, or drilling boreholes. These strategies can negatively affect the very ecosystems that, if left intact, could help reduce vulnerability and build resilience to climate change. However, other bottom-up strategies including alternative technologies, recycling and circular economy approaches are contributing to increased resilience in informal settlements. If supported and acknowledged, these strategies can complement

wider urban climate action. The informal economy therefore presents a great opportunity for cities to build climate resilience and support a just transition in all aspects of sustainability and across the entire lifecycle of buildings. But thus far, barriers like insecure tenure and limited political representation continue to restrain the transformative capacity and potentially positive impact of the informal sector on urban resilience.

Climate mitigation

Another environmental aspect of sustainable construction is climate mitigation, since a combination of rapid, unplanned urban growth, increased consumption, and a lack of supporting infrastructure and policy will only exacerbate the emission of greenhouse gas and production of waste in the sector. While the building stock will double in the next 30 years, resources are finite. The production of cement and iron/steel accounts for around **6 per cent and 8 per cent of global greenhouse gas emissions**, respectively. The use of concrete has grown 10-fold in the past 65 years, compared with a 3-fold increase in steel and a near-stagnant growth in timber. Currently, less than **1 per cent of concrete** is made from recycled materials. To mitigate this kind of carbon lock-in, we need more circular, low-carbon construction methods and materials today while also planning for the supply of energy from renewable sources. On top

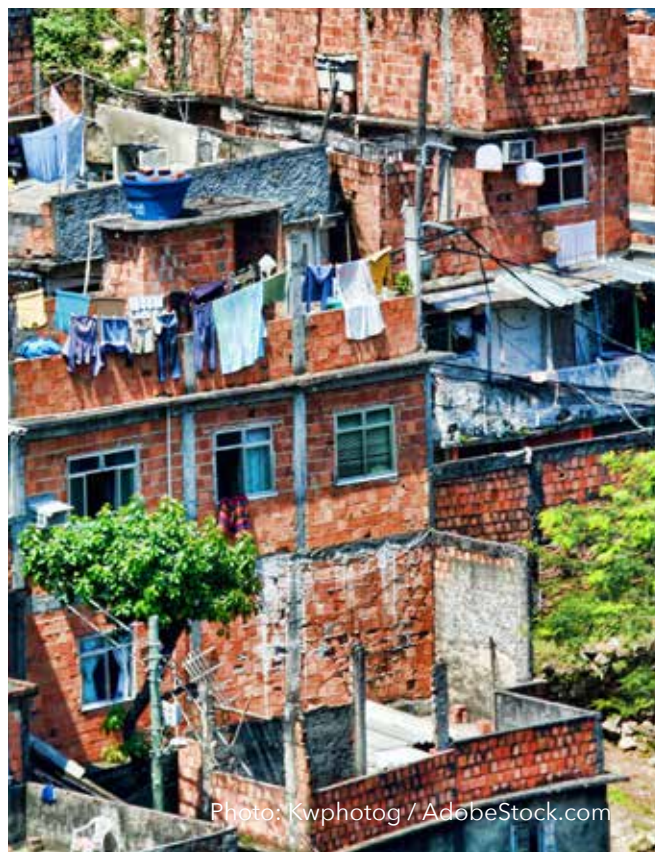
of prescribing technical solutions for environmental challenges, socio-economic factors must also be considered. Mitigation actions will require solving the structural barriers to social inclusion in order to unlock local contributions and capacity.

Industrialised countries must take global responsibility for current and historic emission levels through climate mitigation efforts. This includes stopping incentives to pollutant materials and exports. At the same time, developing nations and their cities must be empowered to develop in a way that meets their socio-economic needs without exacerbating climate change. Factors like rising energy costs impact daily household choices, in particular in informal settlements, where many families are forced to use cheaper and more polluting cooking and heating fuels like charcoal or firewood. This can further deplete local forests, exacerbating climate change and undermining long-term sustainability goals. In a circular economy-based approach, planning, design, building materials, energy, operational energy efficiency, and resilient building are addressed. In addition, resilient infrastructure is provided to protect and connect communities and enable socio-economic development. Most importantly, any implementation of low-carbon buildings and construction must always be locally adapted to the circumstances in each country and city.



Case Study: Rio de Janeiro, Brazil

Self-help housing has significant potential to integrate circular and sustainable principles into slum upgrading. For example, in Rio de Janeiro, local authorities provided self-help schemes with the materials to build settlements that result in better living conditions than the typical local barrio construction. Residents undertake the work and then have more cash to spare to contribute to local services. The houses in Rocinha are built using cement and blocks and are therefore more durable, if not as sustainable as they could be environmentally. This example still highlights the opportunity for the integration of climate mitigation and circular techniques and materials into self-help housing programmes through community and government collaboration.



This approach will also help cities to minimise their environmental footprint and reduce resource consumption. Strategies include the use of renewable energy sources, the implementation of energy-efficient designs, retrofitting and home strengthening with the added benefit of carbon savings, and the use of environmentally friendly alternative construction materials. To effect change at scale, these strategies

must be reflected in housing policy, building codes, and municipal budgets and the finance mechanisms available to urban poor communities. As much as 25 per cent of emissions from cement and concrete can be saved by adapting building codes and by training architects, designers, contractors, and builders to use the best available technologies, which would also have to be supported by regulatory frameworks.



Potential actions

- Enhance climate justice through circular economy principles such as reducing emissions, creating local jobs, building resilient structures and empowering marginalised communities. This aligns with equitable and sustainable development in informal urban contexts in seeking fairness for everyone facing climate impacts, especially in the informal building sector.
- Provide assisted self-help to people in informal settlements to acknowledge and support their resourceful bottom-up strategies towards climate adaptation. This will complement wider urban climate action and make the informal economy key to climate resilience.
- Set up training and exchange programmes with local and international architects, designers, planners, and contractors to ensure mutual learning and a sustainable approach to the use of local materials and vernacular construction techniques.
- Consider both adaptation and mitigation approaches when drawing up regulations and policies for sustainable construction. Circular economy principles such as retrofitting and refurbishing can be very helpful. For example, in Colombia, the national government officially endorsed guidelines [AIS 410](#), which focus primarily on upgrading informally built housing.
- Improve governance in planning and construction control measures to connect the built environment to nature and ecosystems. This includes raising awareness about the positive impacts of environmentally friendly materials and methods, including circular economy approaches.
- Ensure that regulatory frameworks are more equitable, addressing not only the support needed for local and more sustainable value chains of building materials, but also the unfair competitions created by the incentives to pollutant materials and dominant actors.



Photo: Rodson Pierre Saint / UNOPS

3.3 Desirability

In order to implement a more sustainable construction practice in informal settlements, aesthetics, and cultural and historical beliefs must be considered. Perceived status symbols and aspirations are particularly important in the context of informality. For example, many African cities focus on building with concrete, steel and glass, emulating a style that has been very popular in the developed world. Currently, the **demand for concrete is growing in the Global South**: No fewer than 15 cement plants opened in West Africa in the last decade. The annual consumption of the material increased by 5 per cent per person in the same area, earning African cities the title of “the last great cement frontier”.

While the source of construction materials can vary significantly by country, local building materials such as bricks or clay and renewable materials such as wood, bamboo, and straw are often the ones with lower carbon footprints and more employment opportunities along their value chains. Most importantly, the transition towards local and renewable building materials in informal settlements (and beyond) must not happen to the detriment of affordability. A more conscious approach is required to define the appropriate materials

in each individual case, ensuring that they will be readily accepted by the local community, which depends on both price and quality. Stakeholder participation in decision-making processes is key to acceptable incremental upgrading.

The desirability of sustainable construction is also closely related to building regulations from national and local levels. As long as these regulations do not support or enforce the use of more durable and sustainable building materials, secure tenure, and affordability, it will remain a challenge to implement a sustainable approach to construction. In addition, governments must create regulations –and the capacity to enforce these regulations– that support the use of high-quality and safe materials rather than hazardous materials, which are often used in informal settlements. For example, while plastic can be flexible, strong, and moisture-resistant and can thus replace composite materials like concrete, it also brings safety issues. By the time that materials such as PET bottles are being reused or recycled in construction, their safety, especially during extreme weather events, is often compromised and inadequate. This can further expose the inhabitants of informal settlements to hazardous living conditions. At the same time, the circular economy approach can help to identify valuable, high-quality plastics that can then be used in construction.

By making sustainable construction more attractive, both culturally and politically, an important entry point can be created. The New European Bauhaus approach can serve as inspiration: It looks as projects, places, practices, and experiences that are:

Beautiful

Aesthetically pleasing, but also inspired by art and culture, responding to needs and improving quality of experience beyond functionality.

Sustainable

In harmony with nature, the environment, and our planet.

Inclusive

Encouraging a dialogue across cultures, disciplines, gender, and age.

Technological advances also play an important role in making sustainable construction more attractive. Innovations such as ecological or biofuel toilets; solar energy for use in lighting, charging devices, heating, and cooking; and even artificial intelligence for analysing the challenges and potential of a more sustainable approach to construction in formal settlements are all opportunities for leapfrogging ahead and reaping

the co-benefits of poverty reduction, education and capacity -building, as well as decent work and economic growth. At the same time, we must be careful not to lose too many jobs that construction currently creates by relying too much on technology. Rather, new and alternative building techniques and materials should support the local value chain and local jobs, which also fortifies the idea of a circular economy.

Case Study: Malawi

In Malawi, the German Development Cooperation supports the production of climate-friendly bricks within the project “More income and employment in rural areas of Malawi (MIERA)” through the so-called “Eco-Kiln Technology”. Locally, there is a need for 120,000 new homes per year and an associated use of 3.5 billion bricks per year. Eco-Kiln has installed a vertical shaft kiln, which mainly uses waste materials from the tobacco and food industries during brick production. This technology emits 85% less CO₂ and consumes around 85% less energy compared to vernacular methods.



Photo: GIZ

The place of informality in architectural discourse and practice

In the context of this paper, it is worth noting that architecture historians have been documenting and theorizing over informality, often presented as a sub-case of vernacular architecture. This lineage of historians tends to focus on the technological and tactile qualities of material and formal practices. Their research substantiates the cultural values of built environments of pre-modern and developing societies. Prime examples of such studies include Bernard Rudofsky’s ‘Architecture without Architects’ (1964), or more recently, Julia Watson’s ‘Lo-TEK: Design by Radical Indigenism’ (2019).

This historical and theoretical discourse enables architecture practitioners to gain a renewed appreciation of building technologies that may have been dismissed as rudimentary from a modern standpoint. Most notably in recent years as our societies come to appreciate the pressures of sustainability and resilience, materials such as mud, cardboard, wood and various textiles, can be found to be incorporated even in more elitist public and cultural architecture projects, such as D. Chipperfield’s Naga Museum in Sudan (2008) built predominantly from mud, or T. Mori’s Thread Artists’ Residence & Cultural Center in Senegal (2015) featuring large, undulating bamboo roofs.

For local governments, housing upgrades in low-income areas should take precedence, which must translate into regulations as well. This could take the form of defining housing upgrades as a prevention measure ahead of disasters. Having to frequently replace low-quality materials, which likely do not protect against climate disasters, can impact household budgets, especially for urban poor people. It is cheaper in the mid- to long-term to build sustainably and with climate resilience in mind—and it has a lower carbon footprint: improving a house instead of building a new one saves **two-thirds of embodied carbon** of an equivalent new house. For the same embodied carbon budget of one new house, more than three houses can be improved and made safer.

To increase the desirability of sustainable construction, a close look at materials and methods is necessary. Importantly, sustainable construction must not happen to the detriment of the safety of either people or the environment. Apart from the affordability and desirability of materials, their durability must also be considered in order to not compromise on performance. Challenges include solving the questions of who can absorb the risks of innovating and demonstrating the benefits and desirability of low-cost and more sustainable building materials. Governments have an important responsibility to use these materials in public buildings and encourage their uptake within large private-sector initiatives, while also working on more favourable regulatory conditions.

Simultaneously, it is important to train artisans and workers in the use of appropriate materials and unsustainable construction techniques. For example, local material extraction is not always efficient or conducive to healthy ecosystems and the environment. Through training, regulation, and innovative use of technologies, it is possible to improve the quality and environmental footprint of materials. Labour conditions must also be attractive to increase desirability of working in sustainable construction. Together, these strategies can help to foster change, even if this process takes time.



Photo: Alejandro Barba / Unsplash

Potential actions

- Consider housing and building aspirations and how they bring certain cultural expectations and perceived status symbols with them. Where possible, materials like concrete and steel can be replaced with other affordable and resilient materials such as recycled concrete, timber, or sustainable alternatives. Where this is not possible, following guidelines for reducing carbon emissions is important. It is key to not compromise safety or longevity and durability of materials when looking for an alternative, more circular economy-based approach to construction, including action by the private sector.
- Make sustainable construction more attractive in terms of aesthetics, environment, and social and climate justice. Construction must be environmentally friendly and conducive to the circular economy, but the more beautiful it is, the more desirable it will become. Communicating the value of buildings and infrastructure as a cultural legacy is important.
- Harness technological advances to increase the desirability of sustainable construction, but without endangering local jobs. Rather, new technologies can help create new jobs with better labour conditions. They can also help trace the origin of local and other materials and make sure that their environmental footprint is as low as possible.
- Adapt local and national regulations to make sustainable construction the standard, including for public buildings and large private-sector projects. Support sustainable construction through favourable policy frameworks and regulations, housing and public works programmes, and financial subsidies.

3.4 Scalability

The scalability of sustainable construction refers to the ability of approaches to perform well under an increased workload and large demands. There are already many projects showcasing the potential and power of sustainable construction. However, many of them operate on a local scale that is relatively small. In order to meet the challenges of rapid urbanisation and climate resilience, it is key to scale the concept of sustainable construction as soon as possible. This applies to housing in informal settlements and urban poor areas that are endangered due to climate change hazards, but also in terms of a just transition.

Incremental upgrading is one of the most common approaches in informal settlements and in housing in general. Rather than the traditional approach of

a few large construction companies undertaking large housing projects, the “massive small” approach argues that greater scale can be reached by enabling the millions of small-scale contractors who are already building houses in the informal settlements to do so more effectively and efficiently. The massive small approach supports existing incremental housing approaches in a way that improves outcomes. It does this by providing a number of key services.

These include:

- Using building materials that are sustainable and more conducive to incremental construction.
- Building or improving houses and infrastructure in stages.
- Avoiding backlogs through incremental steps.

Case Study: Buenos Aires, Argentina

Informal settlements in Latin American countries such as Argentina provide good examples for incremental upgrading. Barrio 31 in Buenos Aires, for example, received 18 kilometres of basic infrastructure and services from the city between 2015 and 2019. These included sewers, drainage, water, public lighting, and roads. The city also renovated 26 public spaces and 1,700 housing units. It constructed 1,200 new residences and 3 new public schools as well as 3 healthcare centres. By giving land titles to residents and preventing more affluent incomers from grabbing land and driving up prices, the city managed to avoid gentrification and exclusion in Barrio 31. Instead, the slow and localised scaling process directly benefited the original informal dwellers of the settlement, who now have land titles and subsidised 30-year mortgages.



Photo: Complemento / AdobeStock

While incremental upgrading takes time, Cities Alliance recommends accelerating the process of more sustainable construction and scaling it up to reach more informal settlements around the world. While the “correct” strategy will look different in every city, principles of circularity, just transition, and sustainability apply everywhere. As the example of Barrio 31 in Buenos Aires shows, it is important to avoid gentrification in informal settlements. While this process cannot be stopped completely, it can be slowed down by giving priority to the original inhabitants of an area, which also greatly contributes to social justice.

Achieving a successful scale necessitates inter-sectoral collaboration, fostering alliances with local enterprises, NGOs, organised communities, and governmental

bodies. Digital platforms can be used to leverage progress and visibility. Automation processes make it possible to reduce the time it takes to design homes or implement retrofitting measures. Artificial intelligence and 3D-printing technologies can help to design resilient and affordable homes. Cities can establish innovation hubs to foster collaboration and investment in the sector of sustainable construction, inviting companies to venture into value-added products and incentivizing citizens to invest in alternative building controls. Stringent quality control and knowledge exchanges will further fortify scaling efforts, while policymakers are required to advocate for favourable policies including tax incentives and streamlined regulations for a sustained expansion of sustainable, resilient and socially just construction practices in informal settlements.

Potential actions

- **Encourage incremental upgrading** to achieve meaningful and widespread change in the long-term while leapfrogging common difficulties such as gentrification or construction based on social aspirations alone.
- **Ensure the private sector provides better material alternatives** to promote local, sustainable supply chains that support the circular economy. This can take the shape of recycling existing materials, reducing the CO2 footprint of concrete and steel, or working with vernacular architectural methods and materials.
- **Promote and subsidise green building materials** to create demand for them and turn them into an important entry point to scale the market for alternative building materials.
- **Prioritise renovations and enable the incremental upgrading of homes**, for example through smart zoning that fosters various building approaches to help scale sustainable construction approaches.

3.5 Inclusivity

The just transition towards sustainable construction in informal settlements has many different layers, from affordability and sustainability to desirability, scalability, and inclusivity. The “**Leave No One Behind**” maxim emphasises the importance of inclusivity in urban planning. The inclusion of local communities into the planning and decision-making process contributes to responsive, effective, and sustainable solutions that deepen democracy and enhance community resilience. At the same time, the principles of circular economy also aim to guarantee fair and inclusive working conditions. Considering that the right to decent work in the construction sector is often not realised, which affects young people and women in particular, the creation of inclusive and decent jobs is all the more important.

Capacity-building across all stakeholders, from informal and construction workers to architects, urban planners, and government officials, is again a particularly important approach to guarantee a sustainable, environmentally friendly, affordable and

economically viable construction industry in informal settlements that supports the local economy and value chain.

The public perception of informal settlements can bring discrimination and stigma. This influences the policy perspective as well, in terms of gaining electoral approval, and it can therefore impact inclusive approaches and interventions. Too often, informal settlements or “slums” are still seen as illegal or even menacing.

Considering that many migrants often **go to informal settlements first** when arriving into an urban context, some cities actively try to create a hostile environment in these areas to stop rapid urbanisation. This can result in a lack of access to urban amenities and social infrastructure as well as community buildings, public spaces, school and sports facilities, and health services. Lack of tenure is another element to these exclusionary practices, as are slum evictions. However, this usually results in displacing people to another part of the city where they will build another informal settlement, while feeling resentment and bitterness. This results in social division, as opposed to inclusivity, which could serve as a crucial entry point.

Nowadays, many slum upgrading programmes tend to take a more inclusive approach, which is partly due to a better understanding of the multiple dimensions of poverty and informality. Slum communities are now more often seen as a vital part of the city and its economy. This has also made slum upgrading efforts more complex, and the challenge of sustainable construction adds yet another facet. Promising approaches include:

- Providing security of tenure.
- Ensuring that inhabitants live away from danger zones like flood lines and slopes.
- Working with materials that fit into self-building, incremental upgrading, and informal contexts.
- Enhancing the right to be recognised and represented so that the rights of those living in informal settlements can be respected, protected, and fulfilled, for example through participatory mapping.
- Supporting participatory processes and joint decision-making, as well as community organisation and co-creation.



Case Study: Nairobi, Kenya

An example of more inclusivity in planning and construction comes from the Mukuru settlement in Nairobi, a 243-hectare area, where Muungano wa Wanavijiji, a federated social movement of urban poor is active. After years of legal battles by Muungano, the Akiba Mashinani Trust and SDI to avoid evictions, Mukuru has been declared a Special Planning Area by Nairobi City. This is noteworthy because it has created a government-mandated collaborative effort to bring together various stakeholders for upgrading Mukuru at scale. Muungano organises residents into groups of around 100 people. Every group is autonomous and works on improving living conditions in their area. Priority and funding go to projects that enable slum upgrading and the integration of the settlement into the city's fabric. In Mukuru, 250 community mobilisers represent thousands of people, leading mapping efforts which have led to the replacement of almost 4,000 pit latrines. Recently, the Nairobi City Council Government has approved the construction of 13,000 new houses in Mukuru as part of a social housing project, showcasing an inclusive approach to sustainable slum upgrading.



These approaches require flexibility and ingenuity. The tenure security aspect is key to a more sustainable understanding of construction, since it will encourage residents to invest for the mid- to long-term. However, the context of rights in informal settlements is overly complex and can depend on local regulations, cultural customs, and the peculiarities of each settlement. Conventional methods of land registration like surveying and titling might not always work well or be too expensive. That is why methods such as participatory slum profiling, community-led household enumerations, and peer-to-peer exchange and learning as pioneered by Slum Dwellers International, and co-creating neighbourhood plans can bring both better, more sustainable and cost-efficient results.

Importantly, they are not a replacement for formal tenure, but a step on the continuum towards secure tenure, making evictions less likely. Importantly, local and national governments need to support these endeavours. On top of land tenure, sustainable construction approaches and technologies must take priority. Often, governments intervene when slum dwellers start practices like the illegal extraction of sand for making concrete. By providing attractive alternatives at affordable prices, both the government and the private sector can intervene, while also supporting the transition towards more resilient and environmentally friendly buildings and infrastructures in informal settlements. Other stakeholders such as universities and development

agencies can be useful in capacity-building, supporting local skills, spreading awareness of alternative building materials and practices, working with local construction knowledge, and making the overall conversation around sustainable construction more relevant to urban poor people, who already experience multiple other challenges.



Potential actions

- Involve local communities in the planning and construction process to achieve secure land tenure and sustainability. Include the urban poor in the conversation and give them decision-making power as well as representation.
- Improve land tenure security and give rights to informal residents as part of local and national policies.
- Provide capacity-building for co-creative, inclusive approaches and representative community organisation. This includes capacity-building within governments and planning and design offices.





Photo: Abdul Awal Uzzal, AdobeStock.com

IN ACTION: CASE STUDIES

4.1

Sustainable housing innovations: ROOH's Resilience Labs transforming informal settlements in India

The Roof Over Our Heads (ROOH) campaign envisions delivering resilient, low-carbon, and affordable homes, encouraging households to take charge of their housing solutions while enhancing public infrastructure for urban residents, especially those in informal settlements. Supported by the UN High -Level Champions' Race to

Resilience (R2R) and Race to Zero Campaign, ROOH strives to catalyse a locally driven, globally assisted resilience breakthrough. The goal is to assist 4 billion

vulnerable individuals in constructing homes that can withstand the disastrous impacts of climate change.

This initiative prioritises the production of affordable, accessible materials and alternative financing and governance mechanisms tailored to informal inhabitants' economic constraints. Community involvement, particularly that of women in informal settlements, is central to ROOH's strategy. The campaign plans to showcase its approach through 100 labs, engaging communities in design development and the demonstration of locally adapted responses.

For a comprehensive understanding, the labs undergo a demonstration process in selected cities across five climatic zones in India, including Surat, Ahmednagar, Pune, Gangtok, Mumbai, Bhubaneshwar, Paradeep, Cuttack, and Bengaluru.

ROOH has conducted labs in 17 informal settlements, meticulously documenting the material characteristics and construction techniques of houses made from various materials, emphasizing their incremental nature. The documentation includes a detailed analysis of how residents, facing natural hazards and climate stressors, construct and layer materials for resilience. The immediate outcome of this effort is to present prototypes of housing upgrades within informal settlements, incorporating resilient designs and materials to mitigate the impact of climate change on their habitats.

4.2 The Cato Manor Green Street Retrofit in Durban, South Africa (ICLEI)

Nestled in Durban's Cato Manor, the Green Street Retrofit project provides an example of sustainable housing transformation within the realm of existing social housing units. The initiative employs a strategic approach to retrofitting, introducing energy- and water-efficient solutions that contribute to the community's overall resilience. Among the key interventions are the installation of solar water heaters, rainwater harvesting systems, and the implementation of energy-efficient lighting. These upgrades not only foster a marked reduction in the energy and water footprint of the homes, but also actively contribute to broader environmental sustainability goals.

An integral part of the project is its commitment to affordability, a critical consideration in the context of informal settlements. Opting for retrofitting instead of new construction allows the initiative to preserve the cultural and communal continuity vital to the fabric of Cato Manor while simultaneously improving living conditions. The success of the project is deeply rooted in its approach to community engagement, involving residents in both the planning and implementation phases. This ensures that the retrofits are tailored to meet the genuine needs and preferences of the community. This retrofitting model, with its focus on sustainability and economic viability, not only serves as a practical blueprint for the enhancement of informal settlements but also underscores the importance of utilizing local

resources and actively involving community members in the pursuit of sustainable urban development. The Green Street Retrofit project showcases the transformative power of community-driven, environmentally conscious initiatives.

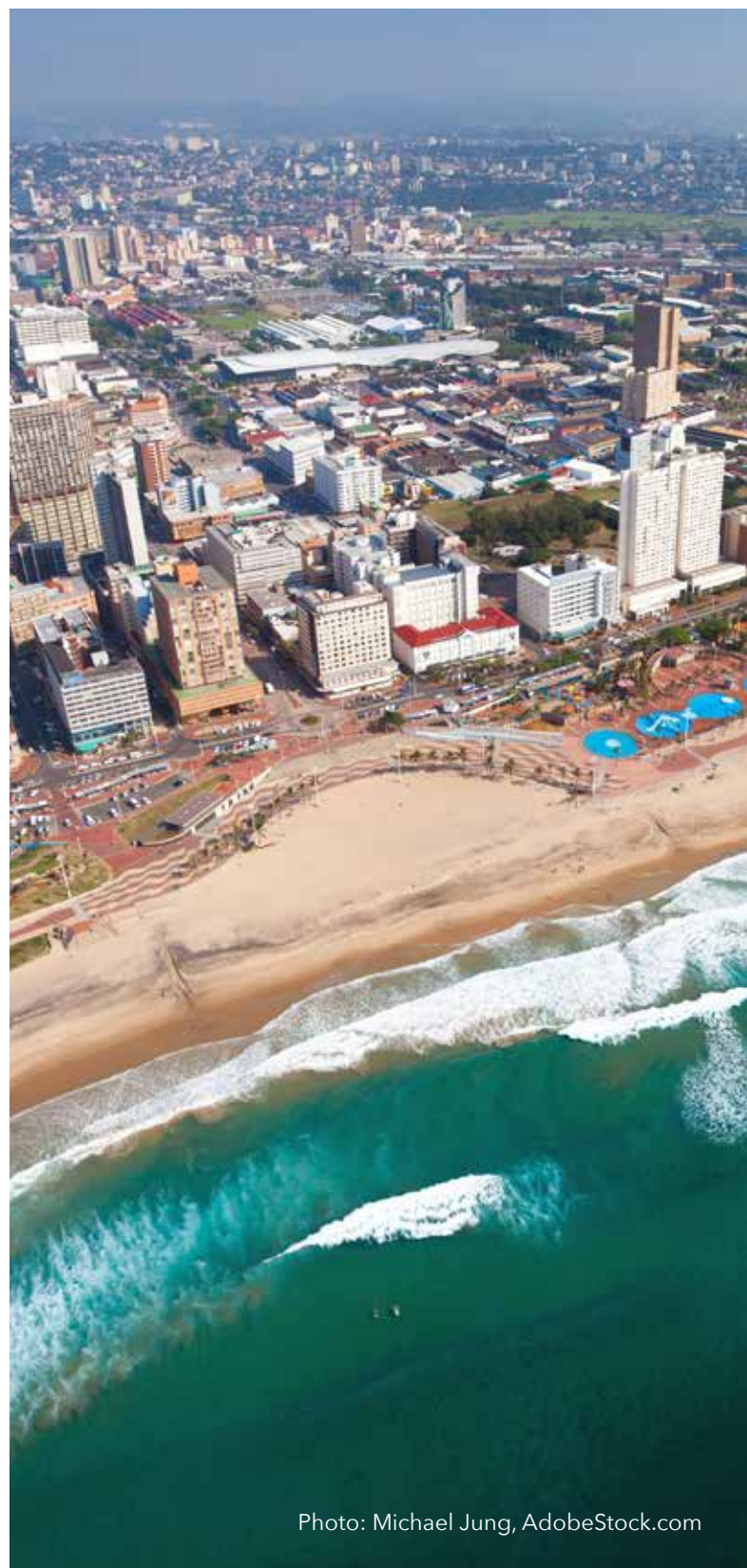


Photo: Michael Jung, AdobeStock.com

4.3

Retrofitting for climate resilience in Honduras (Build Change)

Honduras' Sula Valley, a vital economic hub in Central America, faces heightened vulnerability to severe weather events, impacting its critical port, Porto Cortez. Hurricanes Eta and Iota in 2020 exemplified the region's susceptibility to natural disasters, causing widespread damage. Recognizing the economic repercussions of disrupted life in the Sula Valley, Build Change initiated a climate -resilient housing program in 2022. Collaborating with the Honduran Red Cross, the programme combines technical expertise in retrofitting for disaster resilience with emergency response experience.

The initial phase, focused on Lupo Viejo and Potrerillos, successfully upgraded eight houses. This pilot, identified by the Latin American Development Bank as a top -10 innovation for social impact, aims to prevent involuntary climate-driven migration by

enhancing existing homes. Families in the Sula Valley often face displacement due to floods, impacting their socio -economic and psycho-social well-being.

Retrofitting involves strengthening homes for earthquake, wind, and flood resilience, adding a flood-resistant second story. This space not only serves as a refuge during floods but also accommodates family needs or home-based businesses. The retrofit includes improved access to energy, water, and waste management through photovoltaic panels, rainwater collection tanks, and biodigesters.

These improvements ensure that families have access to essential resources during emergencies, reducing risks of soil and water contamination. The rainwater harvesting system, which includes a 1100 -liter tank, is connected to a functional second-story bathroom and provides a week's worth of water for a typical family. Beyond individual homes, Build Change promotes broader systems change by training and collaborating with local builders, engineers, students, and government officials for scalable, sustainable impact.



Photo: Build Change



Photo: Build Change





CONCLUSION: KEY MESSAGES AND OUTLOOK


The world is on schedule to double its building stock by 2060. Most construction activity will happen in informal settlements. Considering the high emissions of the construction and housing sector in combination with rapid urbanisation and climate change effects, there is an urgent need to prioritise sustainable construction and alternative materials in informal settlements. Sustainable construction must cater to the needs of the urban poor in terms of affordability, desirability, environmental sustainability, scalability, and inclusivity, while respecting local context and conditions. At the same time, it must contribute to the circular economy, which includes local value chains and decent jobs.

By leveraging technological advances, the potential of local materials and supply chains, and the capacity of resilient construction, a just transition and climate justice in informal settlements can be possible.

Key issues to consider

 **Climate change and rapid urbanisation** present many challenges in informal settlements, but also hold many opportunities for a more sustainable and circular approach to construction and incremental upgrading.

 **Affordable, local, and resilient construction materials and techniques** can boost local economies while increasing climate resilience in informal settlements.

 **Secure tenure, equitable frameworks and regulations** for attractive and resilient housing and reliable infrastructure, along with political support and representation of the urban poor are important components of sustainable construction.



A more sustainable and circular construction sector holds many opportunities for local businesses and green jobs along the value

chain for construction and materials, but these opportunities need to be strengthened.

The following **recommendations** can be made based on the five entry points explored in this paper.

- **Affordability:** Improve vulnerable housing in informal settlements as a cost-effective strategy to increase resilience and reduce the qualitative housing deficit.
- **Environmental sustainability:** Tackle climate mitigation through construction and retrofitting, keeping in mind the environmental footprint and effect of materials and methods.
- **Desirability:** Make sustainable construction attractive by ensuring it is affordable, inclusive, aesthetically and practically appealing, and backed by regulations and frameworks.
- **Scalability:** Ensure targeted capacity-building of all stakeholders as well as financial and political support for incremental upgrading and strategic scaling.
- **Inclusivity:** Strive for climate justice in the informal urban context by building resilient structures, creating local jobs, and empowering marginalised communities and groups to co-create and have a seat at the decision-making table. This includes secure tenure.

Research gaps

While certain aspects of sustainable construction in informal settlements have been well-researched, such as the importance of resilience and costs, there needs to be more focus on how to achieve a just and inclusive transition towards the incremental and sustainable upgrading of informal settlements of the Global South. Based on this report, Cities Alliance has identified the following gaps in research.

- **Circular construction practices in informal settlements:** So far, research seems to focus on the circular economy of waste in informal settlements. The lifecycle of buildings and building materials and the reduction of CO2 emissions in construction are avenues to explore, as are the environmental benefits and challenges of sustainable construction.
- **Ecosystems and nature-based solutions:** The impact of construction on key ecosystem services and the interplay of ecosystems and informal settlements are important unresolved issues in urbanisation. While nature-based solutions hold promise, most of the research so far focuses on the potential of these solutions in the Global North.
- **Sustainable construction in informal contexts:** While there is much progress in research about sustainable construction and alternative materials, the aspect of informality is often missing. Informal settlements have their own logic and context as well as unique challenges and opportunities that hold many lessons. The construction engineering company Build Change has made an important addition to research with its report on the cost of improving vulnerable housing.

- **Incremental sustainable upgrading:** Considering that there is not much time to improve construction practices before the CO2 budget as defined in the Paris Agreement runs out, the timescale of a transition in construction needs to be clear. Incremental upgrading is a process that takes time and patience.
- **Desirability of sustainable construction:** The inhabitants of informal settlements face multiple challenges with construction being just one of them. There is no substantial research yet on how to convince residents of the importance of sustainable construction and on how to facilitate sustainable capacity-building.
- **Climate justice in the construction sector:** Literature on a just transition and on climate justice often neglects the construction sector, and literature on the construction sector often neglects aspects of social and environmental justice. Cities Alliance believes that this intersection is key for finding an overarching approach to sustainable improvements in informal settlements.

As the third year of the United Nations' Decade of Action on the Sustainable Development Goals comes to an end, we must draw upon the diversity of innovative solutions for more sustainable

construction across the world's cities. We must rebuild and reconfigure our cities, and in particular our informal settlements, to transition into a socially, environmentally, and economically sustainable future.



Photo: Jorge, AdobeStock.com

References

- Build Change (2021). The Build Change Guide to Resilient Housing. Retrieved from <https://buildchange.org/wp-content/uploads/2021/09/The-Build-Change-Guide-to-Resilient-Housing.pdf>.
- Build Change (2022). The Cost of Improving Housing. Retrieved from <https://buildchange.org/resources/cost-of-improving-housing>.
- Choplin, Armelle (2023). Concrete City: Material Flows and Urbanization in West Africa). Retrieved from <https://www.wiley.com/en-us/Concrete+City%3A+Material+Flows+and+Urbanization+in+West+Africa-p-9781119812005>.
- Cities Alliance (2021). Building climate-resilient and sustainable cities for all. Retrieved from <https://www.citiesalliance.org/resources/publications/publications/building-climate-resilient-and-sustainable-cities-all>.
- Cities Alliance (2022). Rapid urbanisation and the circular economy: At the intersection of climate and poverty 2022. Retrieved from <https://www.citiesalliance.org/sites/default/files/2022-12/Cities%20Alliance%20-%20Rapid%20-%20Urbanisation%20and%20the%20Circular%20Economy%20-%20At%20the%20intersection%20of%20climate%20and%20poverty%202022%20web-c.pdf>.
- Climate Promise - UNDP (2023). Climate change: A matter of justice - Here's why. Retrieved from <https://climatepromise.undp.org/news-and-stories/climate-change-matter-justice-heres-why>.
- Climate Promise - UNDP (2022). What is just transition and why is it important? Retrieved from <https://climatepromise.undp.org/news-and-stories/what-just-transition-and-why-it-important>.
- Dias, Sonia (2023). Building resilient cities: Resilience in informal workers. In: International Institute for Environment and Development (IIED). Retrieved from <https://www.iied.org/building-resilient-cities-resilience-informal-workers>.
- Dovey, Kim (2014). Sustainable Informal Settlements? In: Procedia. Social and Behavioral Sciences. Retrieved from <https://core.ac.uk/download/pdf/82098588.pdf>.
- Global Alliance for Buildings and Construction (2022). Tracking Progress Global Status Report. Retrieved from <https://globalabc.org/our-work/tracking-progress-global-status-report>.
- Habitat for Humanity (2023). Improving housing in informal settlements. Assessing the impacts on human development. Retrieved from https://www.habitat.org/sites/default/files/documents/Home-Equals-Launch-Report_Full.pdf
- Rowe, Mark (2022). The global effort to improve the world's slums. In: Geographical. Retrieved from <https://geographical.co.uk/culture/the-global-effort-to-improve-the-worlds-slums>.
- SDG Action Campaign (2021). Sustainable Cities: Greening the old alongside the new. Retrieved from <https://sdg-action.org/sustainable-cities-greening-the-old-alongside-the-new>.
- The National News (2022, March 7). India's invisible female construction workers: Underpaid and overworked. Retrieved from <https://www.thenationalnews.com/world/2022/03/07/hold-indias-invisible-female-constructionworkers-underpaid-and-overworked/>.
- Thomas, F. (2018). Female-headed Households. In Encyclopedia of the Anthropocene. Retrieved from <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/female-headed-household>.
- UN Environment Programme (2023). Building Materials and the Climate: Constructing a New Future. Retrieved from <https://wedocs.unep.org/handle/20.500.11822/43293;jsessionid=2D0F3720EB76419D6A1830D4D63DF276>







Photo: Ahturner / AdobeStock.com

Cities Alliance

Cities Without Slums

Hosted by
 UNOPS

For more information

 www.citiesalliance.org

 info@citiesalliance.org

 @Cities Alliance

 @CitiesAlliance